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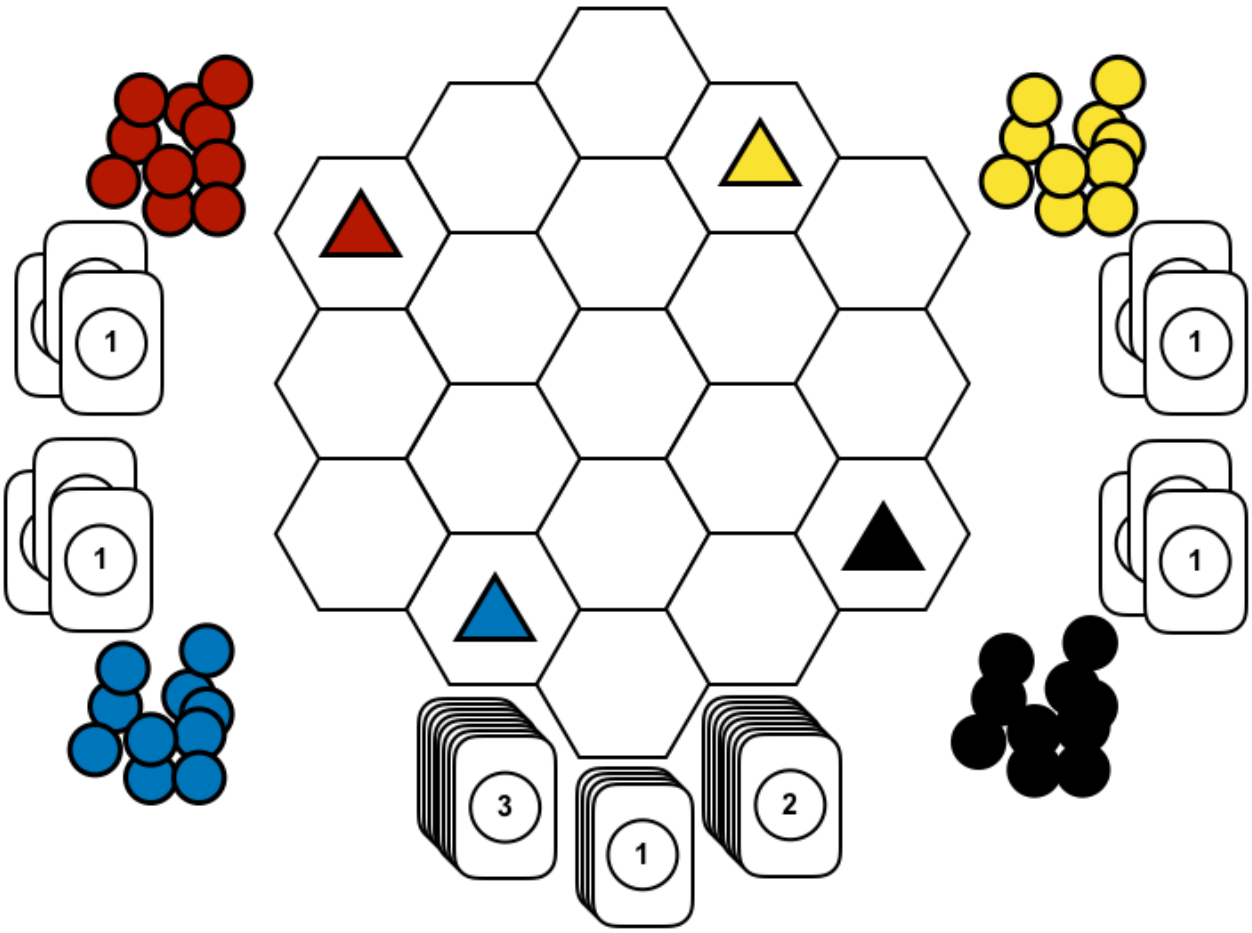

Gameplay-Supported Reflections on the Dialectics of Design Practice

Exploring Relations between Designers, Design Contexts, Design Processes and Designs by Means of Gameplay

Master of Science Thesis in Interaction Design and Technologies

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Gothenburg, Sweden 2019

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Cover: A digital illustration of the result of the design project of the master thesis, the design game *Weapon of Criticism*. See section 6. Result for more information. Illustration by the author. All images and figures in the report produced by the author unless otherwise specified.

Göteborg, Sweden 2019

Abstract

Design practice is anything but neutral. Designers, the various artifacts of design processes as well as overall design contexts carry values, assumptions and prioritizations about design-technical as well as socio-cultural issues of all kinds. The results of design practice, designs, are not neutral either, influencing the contexts they are created for and deployed in, beyond what they might have been explicitly designed for and beyond their intended effects on their circumstances. In addition, the biases of design practice have the potential to affect the actual designer, whether through elements of the design process or through the design context. These issues are of theoretical and practical importance to any designer, as they relate to questions of what can and cannot be designed (for) and what the consequences of design practice are. With this in mind, this thesis aims to explore how gameplay can be used to support reflection on these issues.

To answer that question, this thesis in interaction design locates itself within the methodological frameworks of research through design and gameplay research and design. Beginning with a comprehensive material review including theoretical research and previous practical work, theoretical frameworks encompassing reflection, gameplay and the relations of design practice (i.e. those between designer, design context, design process and design) are identified. An iterative design process follows, where users are brought in early in ideation and where playtesting with users is a central component. The design process iterates over not only one but two parallel tracks of design game concepts exploring different approaches to the exploration.

Ultimately, the result of the thesis is a board game titled *Weapon of Criticism*. Involving three to four players, the focus of the game is to win the game by occupying a certain proportion of the game board. The attempts at occupation are performed through deciding on a tile to occupy and then answering questions about design projects, questions which start with ones written on description, explanation and reflection cards and are developed into follow-up questions by other players. Through this design, *Weapon of Criticism* provides an answer to the research question of the thesis.

Keywords: interaction design, research through design, gameplay design, design game, reflection, reflective design, activity theory, human-artifact model

Sammanfattning

Designpraktik är allt annat än neutralt. Designers, designprocessers olika artefakter såväl som övergripande designsammanhang bär på värderingar, antaganden och prioriteringar om alla slags designtekniska såväl som sociokulturella frågor. Designpraktikens resultat är inte neutrala de heller, då de påverkar sammanhangen de är skapade för och som de sätts in i på sätt som går bortom vad de uttryckligen kan ha designats för och bortom de avsedda inverkningarna på deras omständigheter. Utöver det så finns det möjligheter för designpraktikens fördomar att påverka designern själv, var sig det är genom beståndsdelarna i en designprocess eller genom designsammanhanget. Dessa frågor är av teoretisk och praktisk vikt för vilken designer som helst, då de berör frågor om vad som kan och inte kan designas (för) och vilka konsekvenser designpraktik har. Med detta i åtanke är avsikten med detta arbete att utforska hur spel (*gameplay*) kan tillämpas för att stödja reflektioner kring dessa frågor.

Detta utforskningsarbete inom interaktionsdesign utgår ifrån metodologiska ramverk för forskning genom design (*research through design*) och spelforskning och -design (*gameplay research and design*). En omfattande materialgenomgång över teoretisk forskning och tidigare praktiskt arbete följs av identifiering av teoretiska ramverk kring reflektion, spel och designpraktikens relationer (det vill säga de mellan designer, designsammanhang, designprocess och design). Därpå följer en iterativ designprocess som involverar användare tidigt idégenereringen och i vilken speltest spelar en central roll. För att utforska olika angreppsvinklar på arbetets forskning itereras över två olika designspelkoncept parallellt.

Arbetets slutliga resultat är ett brädspel vid namn *Kritikens vapen* (*Weapon of Criticism*). Spelet, som är till för tre till fyra spelare, går ut på att ockupera en viss andel av ett spelbräde. Försöken att ockupera delar av brädet går till genom att spelare väljer en ruta att försöka ockupera och sedan besvarar frågor om tidigare designprojekt. Spelare besvarar först frågor skrivna på beskrivnings-, förklarings- och reflektionskort och fortsätter med följdfrågor från andra spelare. Genom sin utformning erbjuder *Kritikens vapen* ett svar på arbetets forskningsfråga.

Acknowledgements

There are a number of people who deserve a great amount of gratitude from the author of this master thesis for a various number of reasons who will be acknowledged here, and there are very likely people who deserve acknowledgements who are left out from this section.

Sus Lyckvi, for unhesitantly accepting the role of supervisor for this master thesis project, for supervising with irreplaceable support and insight for the extended duration of the project and for providing intellectual inspiration even prior to the project itself.

Sara Johansson and David Hallberg Jönsson, for largely having shared the journey through the master thesis, the master programme and even the university itself and for a collegial solidarity without which that journey would not only have been less successful but more importantly far less worthwhile.

Gabriela Velasquez Ulloa, for encouraging and supporting the progression and completion of the master thesis, for inspiring through designerly deeds and through a shared interest in design and for enthusiasm in triumphs and compassion in hardships.

Students and teachers at the Interaction Design and Technologies master programme, for participating in workshops, for answering questions and discussing ideas and for generally commiserating in the process of writing a master thesis.

Friends and acquaintances, for showing support and interest, for providing rare insights others could not and for the occasional respite from the thesis work.

The toiling masses of the world, the authors of history, to whom the future belongs, whose practice is that which may change the circumstances by which they may change themselves.

1. Introduction

This thesis is intended to explore real and practical aspects of the imaginative phrase *Who will design the designers themselves?*[1]. As a thesis in the broad field of interaction design, it is necessary to provide a definition of interaction design to situate its background, aims, process and results. However, in this master thesis, interaction design does not only serve as the academic background and framework which is applied on the questions and problems of the thesis. In fact, it serves as one of its central subjects. In a sense, the intention of this master thesis is to turn interaction design on itself, *interaction design for interaction design*, i.e. viewing interaction design as a context to do interaction design for.

On its own, the above "design for design" is nothing new, but the intention here is to explore *the relationship between designer, design process and design*. Many theorists and practitioners over the world and the ages have reflected on what Karl Marx (1845) once hastily scribbled down as follows:

> *The materialist doctrine that [people] are products of circumstances and upbringing, and that, therefore, changed [people] are products of changed circumstances and changed upbringing, forgets that it is [people] who change circumstances and that the educator must [themself] be educated. [...] The coincidence of the changing of circumstances and of human activity or self-change [...] can be conceived and rationally understood only as* ***revolutionary practice****.*
> [Author's note: Emphasis in original.]

Returning to interaction design: To produce new designs, *designers engage in design processes as products of their circumstances*. At the same time, *designers can themselves shape some of those circumstances* through their shaping of their design processes. As such, aside from being processes aimed at producing new designs, *design processes become circumstances shaped by and shaping designers*. Combining this perspective with that of "design for design", interaction design becomes a design context containing designers, design processes and designs with potential for *transformative experiences*.

While the exploratory design project intended in this master thesis is already research through design on its own, the final intention is to design a design tool for evaluation with gameplay elements, an *evaluative design game*. The game format could offer a powerful combination of conceptual structure and freedom, supporting the interaction designer in *reflecting* on their design process. In this thesis, those reflections are intended to evaluate how *the design process is also a process of the designers designing themselves*.

[1] This (or rather "Quis destinabit ipsos destinatores") is a paraphrase of the Latin quote "Quis custodiet ipsos custodes?", or "Who will watch the watchers themselves?", by the Roman satirist Juvenal. Juvenal is also the namesake of "Juvenalian satire", a concept in critical design (Malpass 2013), which is an area of design most directly related to this thesis through the genre of critical games.

1.1 Research question

This is the research question for the master thesis:

> *How can a game be designed to support designers in evaluating and reflecting on the influence they and their circumstances have on their design processes?*

1.2 Aim

The aim of this master thesis is to design, through iterative ideation, prototyping and evaluation, a design game. As a design game, the game is specifically for playing by designers, and this design game will be designed for a user experience which elicits reflections in the designers. The reflections elicited by playing the design game are intended to specifically provide insights on aspects of the dialectical[2] relationship between designers, design processes (including design tools and methods) and designs. One example of such an aspect would be the ways in which designers influence their design artifacts and vice versa. More concretely, this could be how social and cultural attributes of designers, e.g. different biases, influence choices in design processes, and conversely in what way these choices, through the progression of the design processes, have an influence on designers. Insights on the dialectical designers-design process-designs relationship elicited by playing the design game can ultimately support the designerly development of designers.

1.3 Scope and delimitations

While the design process of this master thesis will be approached critically regarding e.g. the choice of methods in relation to the intended gameplay and user experience, the understanding of the design process as a self-transformational experience will not be applied on the design process to any major extent. Furthermore, the design space, e.g. issues such as number of players, occasion for playing and gameplay media, will be clearly limited through a rapid iterative process.

[2] By dialectical is here meant that the relationship is understood as being simultaneously constituted as a single whole and as its separate parts. It is furthermore meant that the whole is in constant development as a consequence of its internal contradictions, i.e. the respective developments of the parts and the interplay between them.

2. Background

This section introduces the research area of this master thesis: interaction design as a practice of designing for socio-culturally situated and constantly changing contexts of use and user experiences; the dialectical relationship between humans and artifacts; and the application of those two points on interaction design itself. It further introduces problems informing the research question and aims of this thesis.

2.1 Research area

Interaction design has been defined in many ways, emphasizing different aspects of it. A number of different definitions can for example be found in Hallnäs & Redström (2006). One definition is as follows:

> *By interaction design we mean designing interactive products to support people in their everyday and working lives. In particular, it is about creating user experiences that enhance and extend the way people work, communicate and interact.* (Preece, Rogers & Sharp 2015)

By this definition, the user experience is somehow a central aspect of interaction design, further supported by for example Benyon (2013). An important aspect of the relationship between interaction design and user experiences as stated in Preece, Rogers & Sharp (2015), “one cannot design a user experience, only design for a user experience.” But what is user experience, or UX, as a phenomenon? In Roto et al (2011), the following description is offered:

> The notion of experience is inherent to our existence as people. Experience in general covers everything personally encountered, undergone, or lived through. User experience differs from ‘experiences in a general sense’, in that it explicitly refers to the experience(s) derived from encountering systems.

Roto et al (2011) describes three main categories of factors affecting user experience: “Context”, “User” and “System”. An issue to be noted about the above categories is what one might call their isolation, especially regarding the concept of “System”. While it is meaningfully defined as “products, services, and artifacts – separately or combined in one form or another – that a person can interact with through a user interface” (Roto et al 2011), such a concept still carries certain problematic limitations. This limitation can be overcome through the application of a concept such as “artifact ecologies” from the human-artifact model referred to in Bødker & Klokmose (2015), where ecology is to be understood as “the part of the physical world that [a subject] interacts with to realize its life.” Also, while Roto et al (2011) does hint at the complexity and dynamicity of the concepts of “Context” and “User”, they are combined and enriched in with a more explicit socio-cultural perspective in Bødker & Klokmose (2015) in the following two quotes:

> [Users'] shared capacities and experiences are not only based on individual acting and learning in the world: People act in cultural situations where they get to share practices [...].
>
> There is no user without other users who share their experiences with artifacts and materials, understanding, etc.

Another aspect Roto et al (2011) raises is that of time spans of user experience, or temporality, also reviewed and discussed by for example Hassenzahl (2004), Lundgren (2013) and Huang & Stolterman (2011). One way of approaching temporality in interaction design is through processes of change. This could be done for example by investigating the processes of change designed artifacts and their use may go through and designing for those (or at least with them in mind). Change as a factor in and of design is discussed by for example Benford et al (2009) and Bødker & Klokmose (2015). According to the latter, "[every] artifact contains the germ of a new practice and remnants of old practice."

Another insight on change is that not only do the uses and user experiences of artifacts and artifact ecologies change with users' use; the users themselves are changed: "A study of twelve knowledge workers showed that their defining characteristic is that they are changed by the information they process." (Kidd 1994) This is consistent with the learning theory of constructionism (Papert & Harel 1991), postulating that creative practice, practice wherein practitioners externalize received and interpreted information, is a transformative process and experience for its practitioners[3]. Furthermore, this phenomenon has been related to the design process in architecture by Habraken & Gross (1988): "[The artifact designed] is of our own making, the changes we observe are the result of design decisions. We find a dialectic situation: we shape the artifact, but in turn the artifact shapes the way we organize our design processes."

2.2 Design challenge

Borrowing concepts from Bødker & Klokmose (2015), it follows from the above that interaction design can be understood as a socio-culturally situated context of practitioners (designers) within shared but specific artifact ecologies (tools and methods). In these ecologies, the practitioners actively engage in creative practice (design processes), wherein internalized information is externalized (designs). Between the parts of this context, the designers, the design artifacts and the designs, there are dialectical relationships. In other words, as designers are engaged in design processes through design artifacts to create new designs by transforming design materials, the designers also affect themselves by internalization.

This conceptualization of interaction design as a design context with dialectical characteristics presents new challenges for interaction design. Much has been written on how to relate to contexts with dialectical characteristics theoretically and as a designer (e.g. Bødker & Klokmose

[3] It is worth noting that Papert & Harel (1991) stated that constructionism should be understood as "much richer and more multifaceted, and very much deeper in its implications, than could be conveyed by" the formula of "learning-by-making".

2015; Ladel & Kortenkamp 2016; Cole & Engeström 1993; Verenikina 2010; Lee & Roth 2007, Döweling, Schmidt & Göb 2012), and there have also been examples of teaching design students to reflectively design for dialectical contexts (Bødker & Klokmose 2012). These works and others concern themselves with how users integrate new designs into their pre-existing circumstances, how these circumstances condition the uses of these designs and how the designs affect the circumstances and ultimately the user through use. They do not, however, relate this concretely to designerly practice.

The issue of how the use of different artifacts is conditioned by external and internal circumstances, and how this affects the results of the use and also the users themselves, is of course interesting to consider. One example, specifically related to the issue of gender and how artifacts are actively gendered by their designers as well as their users, was provided by Oudshoorn, Saetnan & Lie (2002). This of course relates to the designer twice: first as designer of artifacts, which will affect and be affected by users using them in ways related to such a fundamental societal issue as gender, and second as users of artifacts themselves.

Generalizing further, Galle (2008) raised the issue of “metaphysical awareness” (or the lack thereof) and its consequences on design theory, which is relatable to design practice; without clear awareness of the fundamental assumptions involved in one’s design practice, those assumptions stand a good chance of being reproduced through that design practice, with fundamental consequences for designer as well as design. As expressed by Gaver (2012): “[Artefacts] do not address [philosophical, functional, social and aesthetic] issues analytically, but represent the designer's best judgement about how to address the particular configuration of issues in question.”

These are the challenges that motivate the research questions and aim of this thesis. How can designers be made aware of the socio-culturally conditioned assumptions they bring into design processes and how those assumptions affect designs? And how the designers and their assumptions are themselves affected by the design process? Furthermore, how can the above be achieved not merely through design but specifically through gameplay design, as gameplay is claimed (by e.g.: Fullerton 2014; Schell 2014; Lundgren, Björk & Bergström 2009; Bergström, Björk & Lundgren 2010) to be especially conducive instruments for intended experiences? And finally, how can a design game be designed for reflection and evaluation rather than idea generation and refinement, and what would the fitting media for such a design game be?

3. Theory

This section describes key theoretical frameworks concerning key concepts of the master thesis as formulated by others. Furthermore, this section concludes with an overview of previous work with design games.

3.1 Theoretical frameworks and concepts

As this master thesis is intended to concern itself with the dialectical relationship between designers, design processes and designs; reflection; and gameplay and design games, these three areas are necessary to underpin theoretically. This underpinning is performed in order below.

3.1.1 Designers, design processes and designs

To properly understand an entity, phenomenon or process, according to the dialectical method[4] as featured in e.g. the human-artifact model (Bødker & Klokmose 2011), that entity must be understood twofold: as a single whole, and as constituted by its separate (but interrelated) parts. To establish an understanding of the relationship between designers, design processes and designs, then, it is important to understand the three components of that relationship separately as well as the relationship as a whole. The relationship is illustrated in Figure 1 and Figure 2.

Designers

In a number of traditional interaction design frameworks, the identities “user” and “designer” are clearly separated. However, frameworks such as the human-artifact model of Bødker & Klokmose, building upon the activity theoretical tradition rooted in works such as Vygotsky (1978), explicitly view all human individuals as practitioners. All individuals are considered to “act in cultural situations where they get to share practices” (Bødker & Klokmose 2015), and “each individual, who is part of such praxis, continues and develops this praxis”. In terms of users and artifacts, this is expressed as there being no user “without other users who share their experiences with artifacts and materials, understanding, etc.”

However, individuals in cultural contexts do not only get to share practices, understandings and experiences with their peers in isolation, they are also influenced and determined by the very cultural contexts within which they act. So too are the physical as well as mental artifacts the individuals surround themselves with, wield in their practices and use to interact with the world surrounding themselves. Grace (2014) stated that from the point of view of critical design and critical theory, “the designed object, whether game or ash tray, serves as a gauge of social

[4] See e.g. “Dialectics is the method of reasoning that aims to understand things concretely in all their movement, change, and interconnection, with their opposite and contradictory sides in unity.” (Bødker & Klokmose 2015) and “Contradiction is a notion that considers the totality of a relation. The notion also emphasizes processual aspects of a phenomenon.” (Bjerknes 1992)

anxiety, bias and value", a concept concretely illustrated by the statements "a sexist society, makes sexist games" and "[a] racist culture, has racist play." In a framework for reflective design, Sengers et al (2005) elaborated further on and brought into question the above as issues specifically for designers: On the one hand, the assumptions and values built into design as a field of thought and practice, built into the field at the cost of the marginalization of other thoughts, values and practices; on the other hand, the role of the actual designers involved in a design process, and their own specific, personal influences and preconceptions informing their choices. In the words of Sengers et al themselves: "our very way of reasoning about the world is based on unconsciously held assumptions and perspectives that strongly condition what we see happening around us before we even begin to reason about it." This shapes the way designers regard technology and technological possibilities as well as, and in combination with, issues such as "race, gender and economics".

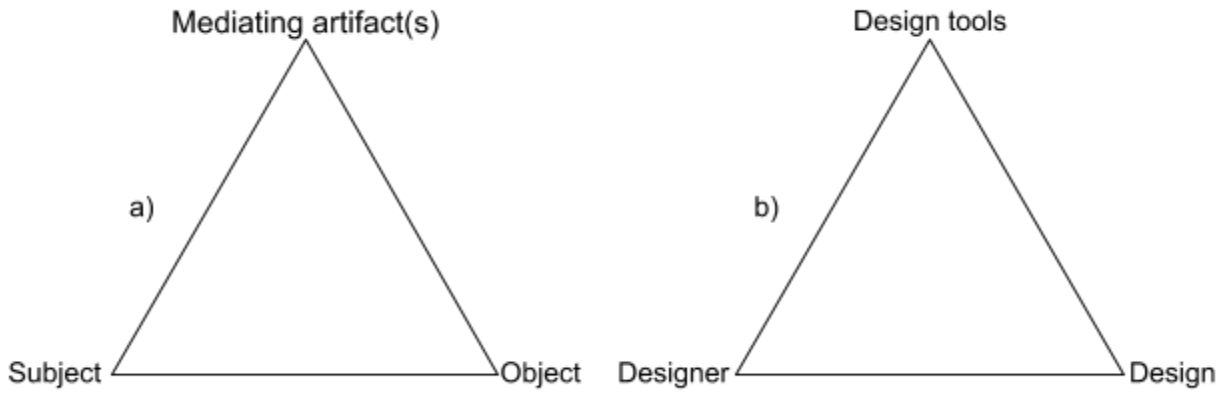

Figure 1: a) The "basic mediation triangle" of activity theory as seen in e.g. Cole & Lundström (1993);
b) A simple illustration of the relationship designer-design tools-design

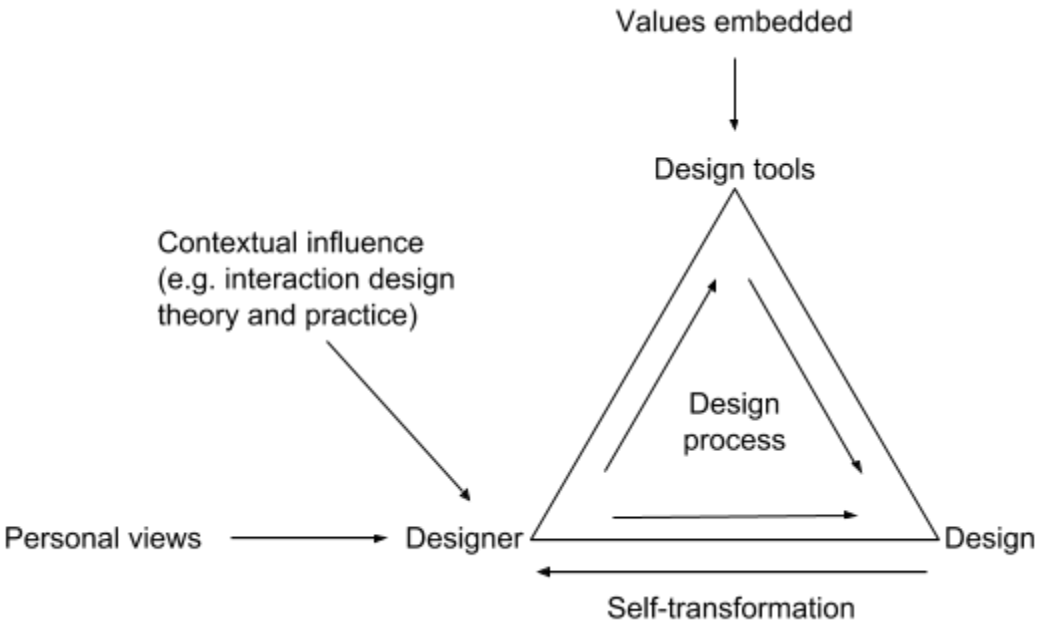

Figure 2: A detailed illustration of the relationship designer-design process-design based

Design processes and designs

As explained in the previous subsection, when engaging in a design process, designers bring with them their own worldviews, built on personal experiences and their cultural contexts. Furthermore, as they engage in this design process, they engage with tools of different types to do design. These might for example be physical tools (including but not limited to pens, sticky notes and computers), or mental tools (e.g. languages and frameworks) (Verenikina 2010). These tools and other artifacts all have their uses and user experiences, however they also have values built into them, in a sense: “Technologies are not inherently values-blind: they optimize for different points of view, for different assumptions about optimal, assumed and allowed uses and users, and for differing values.” (Sengers et al 2005) As such, both the designer and the design tools bring values with them into the design process. Or rather, the designer chooses, based on conscious and unconscious factors, design tools imbued with and/or facilitating certain e.g. views and values.

When designing, however, the designer does not only act upon their design through their design tools in their design process. They also, according to Papert & Harel (1991), enact change on themselves by doing creative work and by acting on and interacting with their environment. It follows, then, that as the design of a designer is shaped by their own views and the assumptions built into and optimized for by their design tools, so too is the designer (re-)shaped by the same influences as the designer engages in the design process.

3.1.2 Reflection

While an advanced understanding of reflection, its various definitions, its history, its components and its processes is beyond the scope of this thesis, having a sufficient understanding of

reflection is necessary to be able to design for reflection and (self-)evaluation. Reflection has been a topic of interest for HCI, and consequently interaction design, since at least the early 2000's, both outside and inside of design practice itself (e.g. Brereton & McGarry 2000). More generally, reflection among professionals has been discussed since at least the beginning of the 1980's (e.g. Schön 1983). As a synthesis of literature on the topic of reflection from within and outside HCI, Fleck & Fitzpatrick (2010) offered a design framework for reflection (i.e. a framework for designing for reflection), which rather than offering the most precise definition highlight a number of important aspects. This framework outlines three aspects: purpose of reflection; (necessary) conditions for reflection; and behaviours and activities associated with reflections.

Furthermore, Fleck & Fitzpatrick organized the third aspect listed above, behaviours and activities, in five levels of reflection to which the behaviours and activities are associated. The different levels are designated R0 to R4, and are as follows: description (no reflection when presenting information on a subject); reflective description (some reflection on a subject through explanation but without exploration of alternatives or extensive analyses); dialogic reflection (interpreting and questioning explanations from different perspectives to identify relationships between elements within the subject); transformative reflection (questioning and fundamentally changing one's own practice and understanding, recognizing the role of one's environment on practice and understanding); and critical reflection (considering much wider implications beyond the current context, including but not limited to ethical, social, cultural or historical issues). In turn, the five levels are associated with technologies and techniques which may be used by designers to support those levels. These are technologies and techniques for presenting, prompting, encouraging, revealing, enriching and dissecting information.

According to Fleck & Fitzpatrick, it is helpful for designers to explicitly pose and answer questions about these aspects when designing for reflection. For the different aspects, these questions may include: how to convey the purpose of the reflection to users of a design so as to not only provoke but to also structure and encourage reflection to that end; how to provide users with the conditions they require for reflection, such as time, structure and encouragement for reflection; and what behaviours for reflection to support through what technologies and techniques. The ending sentence of Fleck & Fitzpatrick summarizes the central concerns of designers designing for reflection: "It is worth reminding ourselves that in all situations, the technologies and techniques can provide only the resources and support the conditions for reflection, but it is ultimately people who do the reflection." The importance of centering thinking and acting people, both users and designers, who are influenced by their direct and indirect environments is supported by others, such as Sengers et al (2005). In Sengers et al, a framework for designing for reflection similar to that of Fleck & Fitzpatrick was presented. The key difference is an explicit emphasis on the reflections of the designers, notably but not exclusively the ways in which they, through their designs, may reproduce aspects of the contexts they inhabit.

3.1.3 Gameplay and design games

Gameplay can be understood as the interaction between user and artifact, or player and game (Lundgren, Bergström & Björk 2009; Bergström, Björk & Lundgren 2010). According to Lundgren, Bergström & Björk (2009), it “relates to the interplay between a game’s rules and the player’s interaction with them which, in combination lead to an aesthetic of gameplay”. This description emphasizes how the concept of gameplay offers an interaction design perspective on games (and thus the design thereof). Furthermore, thinking in terms of and applying the concept of gameplay allows designers to at least temporarily abstract from e.g. technical, business or artistic issues of development and implementation (Fullerton 2014; Schell 2014). Instead, the game designer may focus on the elements and structures that constitute and support certain gameplay experiences, which may be defined in a number of different ways: mechanics (Sicart 2008); mechanics, dynamics and aesthetics (Hunicke, Leblanc & Zubek 2004); gameplay design patterns (Lankoski & Björk 2011); players, objectives, procedures, rules, resources, conflict, boundaries and outcome (Fullerton 2014); mechanics, story, aesthetics and technology (Schell 2014); or components, actions and goals (Lankoski & Björk 2015a). All of these frameworks emphasize and de-emphasize different aspects of gameplay, but they all share the small or non-existent role of technology as a central aspect and the simultaneously structured and unpredictable character of gameplay through (inter-)activity.

Design games

Why might design tools with gameplay elements, or games designed for use (and user experiences) as design tools, i.e. design games, be meaningful? Brandt (2010) argued that the ease of most people to relate to games and the simultaneous structuredness and negotiability common to both games and design make design games useful for exploration. While Brandt’s focus is especially on co-design with the concept of “participatory design games”, a tentative definition is offered which sheds some light on the meaningfulness of design games. According to this definition, collaborative play directed and focused by rules, roles and materials support the generation of design options through exploration and establishment of potential present and future practices. In Brandt (2006), Brandt elaborated on the capacity of games to facilitate players (who in this case are also designers) in staging possibilities, conceptualizing activities, (ex-)changing perspectives and negotiating issues.

Similarly, Habraken & Gross (1988) argued that players must navigate limitations to adapt existing configurations into new, negotiable arrangements and to project future configurations, thus drawing a resemblance between (at least certain) games and design situations. While the games discussed by Habraken & Gross were “not meant to be tools for designing, nor are they made to help teach designing”, it was stated that design games can can help in learning more about designers and design processes. Some issues are explicitly constrained contexts and the possibilities therein, how designers approach, relate to and organize around design problems and contexts and what alternative design processes may be or may have been possible. Kultima et al (2008) argued similarly in their discussion of three design games, relating them to

the notion of the “magic circle” by culture historian Johan Huizinga. In brief, design games are considered meaningful because they, as games in general, have the capacity to instill an experience of suspension of certain aspects of reality in their players, thus facilitating new activities that were previously (perceived to be) complicated or even impossible. Beck, Segura & Waern (2017) also illustrated the meaningful possibilities of integrating playful elements into a structured a design process, with a model describing the use thereof in conforming to, exploring, creating or transgressing existing and new structures.

Serious and critical games

When discussing design games, the notion of serious games is meaningful to introduce. As stated in Kultima et al (2008) about game idea generation games (which reasonably fits within the wide category of design games, albeit for a specific purpose and domain, which is in fact mentioned by Kultima et al): “game idea generation games can be considered to be part of *serious games*.” Serious games may be understood as games which are designed for other primary goals than entertainment, often forms of education beyond rote memorization of facts, but where the entertainment (or in a broader sense the gameplay, which may support other aesthetics than strictly entertainment) of the game is the means by which those primary goals are achieved (Susi, Johannesson & Backlund 2007; Laamarti, Eid & El Saddik 2014). Areas of application of serious games include but are not limited to military, government, educational, corporate, communication and healthcare games for purposes such as training and monitoring aspects of those areas.

A subcategory of serious games, if understood as games intended to achieve goals beyond engaging gameplay through engaging gameplay, of interest for the purpose of this thesis is that of critical games. Critical games offer critiques of different subjects through their gameplay (Grace 2014). The critiques offered by critical games can range from different conventions in games to social and political issues. In the words of Grace, “Critical games use the medium [of games] to critique the medium”: they critique “the myriad of entities and relationships that define digital games”, including “their relationship to the societies in which they exist”. To understand and design for critical games, Grace developed a framework consisting of two axes: the reflective-recursive axis and the continuous-discontinuous axis. The first axis related to whether and to what extents the critique of a critical game is social (reflective play), aimed at society and culture around the game, or mechanical (recursive play), directed at existing and conventional mechanics in games. The second axis related to whether a critical game delivers its critique throughout the game experience, but perhaps with some variation, (continuous critique) or if the critique is delivered at a single point (discontinuous critique).

3.2 Previous work

There have been many attempts to augment the design process with different design tools. These design tools have many different forms, from the completely physical to the completely conceptual with many overlaps between and variations within those, and many different uses. In this subsection, a number of design tools will be presented to give the reader an impression of

the range tools available. Emphasis will be on design tools with gameplay elements and games intended as design tools, i.e. design games[5].

3.2.1 Design tools

Design tools can be understood as artifacts designed and/or used for augmenting design processes. Not only are there many different design tools, there are also many different kinds, supporting different phases of design processes or simply the designing for different kinds of contexts, uses and user experiences. Aside from the very basic tools, such as pens, paper, scissors and so on, there are physical design tools in the shape of for example paper cards, complex combinations paper cards and boards, a box of digital equipment or even series of tubes (Alves & Roque 2011; Lucero et al 2014; Deng, Antle & Neustaedter 2014; Bekker & Antle 2011; O' Leary et al 2017; Kun 2013; Szymaszek 2014; Wetzel et al 2009; Dietz, Reyes & Kim 2014). Many of these physical design tools are explicitly based on some conceptual framework for design.

Of course, non-physical artifacts can also be design tools. The most straightforward category of these virtual design tools is digital design tools, such as all manners of digital sketching and modelling software. But drawing on activity theory, methods and frameworks can be regarded as tools, if virtual, as well (Verenikina 2010). There are of course many design methods, some of which are collected in works such as Martin & Hanington (2012), Lazar, Feng & Hochheiser (2017), Preece, Rogers & Sharp (2015) and Fullerton (2014). Some examples of design frameworks can be found in Lundgren et al (2015), Schell (2014), Benford et al (2009), Brandt (2006) and Hassenzahl (2004).

3.2.2 Games as tools

Games as metaphors for structured interactive processes with unsure outcomes can be found in many areas, as for example in reflections on the process of writing a master thesis (Liu 2016a). In a post about finding a master thesis on Liu's blog, an illustration features cards from an imaginary version of the classical board game The Game of Life with writing a master thesis at Chalmers University of Technology as the theme. While not developed into a full game anywhere, Liu's blog also features a collection of all the posts on that blog under the title "Gimmy's Life in Sweden Game" (Liu 2016b), where the collection is visualized with a combination of board tiles adapted from The Game of Life as well as from Monopoly.

More than just metaphors, games are used as actuals tools intended to tackle different problems, such as gender inequality in workplaces (Acaroglu 2016), teaching different subjects (SG4Adults 2016; Dancz et al 2017) and performing research (Habraken & Gross 1988). These games are described below.

[5] A survey of related works and literature indicates that there is no clear consensus on a term for design tools with gameplay elements and games intended as design tools. For the sake of brevity, "design games" is used in this master thesis. One alternative term is "designer games".

The Gender Equity Toolkit by Leyla Acaroglu

Acaroglu's Gender Equity Toolkit (Acaroglu 2016) seeks "to bust biases and build new experiences" to counter gender inequality: "Fighting for gender equality is serious business, but the Gender Equity Toolkit makes it fun." The toolkit features materials for four different group activities:

1. Empathy Building: Pairs of people take turns revealing if they associate attributes written on the cards of this activity with a gender and why or how they associate the attributes. The activity can be prolonged by swapping pairs and cards if the participants have run out of cards within the pairs.
2. Connected conversations: The players are handed cards, with one conversation topic on each card, and the objective is for participants to "collect" five stories from other participants to which they could personally connect. The stories can but do not have to be related to the conversation topics on the cards, those merely act as suggestions.
3. Scenario testing: The participants are divided into pairs where one receives a card with a scenario and a goal connected to it, and the other participant is simply given the role of "the boss". The two participants roleplay with each other, where the objective for the person with a scenario and a goal is to achieve that goal (with their scenario as a motivation), and the objective for "the boss" is to deny, or say no to, the other participant five times. The participants also swap roles.
4. Mentoring x map: This activity revolves around the participants interviewing one another about current challenging experiences. While interviewing the other participant, each participant must write down at least four insights about the experiences of the other participant. Then, based upon these insights, the interviewer shares ideas about actions, tactics, opportunities and potential challenges and strengths with the interviewee.

Each activity in the Gender Equity Toolkit relates to one of four themes, as described by Acaroglu: Fostering Empathy; Creating Connections; Role Playing; and Exploring Organic Mentoring.

Biz-e-bee by SG4Adults

Biz-e-bee, by SG4Adults[6], is a board game with the main aim of teaching vocational trainees entrepreneurial skills and competences (SG4Adults 2016). The game is played competitively between teams who take turns rolling dice and moving across one of the three game boards. After every move, a game master draws a question card from a deck corresponding to the current game board and asks the current team the question on the card. The questions that come prepackaged with the game are related to entrepreneurship (aside from a few cards with a bee theme, which the rules do not explain), however the rules recommend that the questions be adapted to the educational context of the game. Among the question cards there are special cards which may give the current team an advantage or a disadvantage. Another team may intervene just before the game master poses the question in two ways: Either by challenging or by collaborating with the team being asked, each of those intervention requiring challenge or

[6] Short for "Serious Games for Entrepreneurship Skills of Adult Learners" (SG4Adults 2016).

collaboration cards to be played, respectively. In the standard case and during a challenge, the team getting the question right receives a reward card and the tile on which the team currently stands is blocked for other teams. When collaborating, the team playing the collaboration card receives a card with which they can unblock tiles if they successfully collaborate with the current team.

After collecting a certain amount of reward cards, a team may decide to move towards one of the exit tiles on the current game board. Once they reach that tile, they may decide to move to the next game board, upon which they will receive questions from a different deck, and they can no longer interact with the teams on the previous board. Teams on the lower board, however, may still intervene when the team on the upper board receives questions. There are also "multiplier cards" in the game which are supposed to multiply the rewards from the questions, however the rules of the game do not specify when or how they can be deployed.

The group which first finishes the third and final game board wins. However, the game does not end there. At the end of the game, the game master is supposed to lead a debriefing session with the players with questions and discussions that relate entrepreneurship to the content of the question cards as well as to the gameplay itself. The game master is also encouraged to perform shorter "debriefings" during the game to relate specific questions, actions, tactics or events to entrepreneurship through discussion. Generally, the role of the game master is central to this game and its gameplay, as they are supposed to have a good understanding of the game and are, according to the game rules themselves, entitled to make judgments over whether a team deserves a reward card or not and over other issues.

Concept mastery assessment board games by Dancz et al

Dancz et al (2017) described board game design as a method for knowledge retention, specifically concept mastery, among students in a university course in construction management and engineering. Over multiple instances of the course, Dancz et al instructed groups of students to design board games with concepts from their education in mind, games which peers of the students would later test and evaluate. In their paper, Dancz et al only explicitly reported on two examples of games developed by students: One was an adaptation of the game Chutes and Ladders (also known as Snakes and Ladders), where positive and negative construction concepts replaced the chutes and ladders of the original game; the other was a quiz game, where players were required to answer questions about construction concepts, and answering a certain number of questions correctly granted victory.

The most interesting aspect of the paper of Dancz et al, and its relevance to the subject of games as tools, is a dual insight about games as tools (specifically for learning, in this case). The results of the paper indicate that first, designing games about already known concept is a better method for retaining that knowledge than some traditional methods (such as studying for an exam). Second, playing games that are designed for expressing and testing knowledge on a subject can provide a more engaging experience than some traditional learning methods and are experienced as informative and educational.

Concept design games by Habraken & Gross

Habraken & Gross (1988) designed nine games to explore and demonstrate the use of games as tools for research, specifically in design theory and methods, what they call concept design games. They claimed that games “offer a means of isolating certain aspects, or concepts, of designing for purposes of scrutiny” because they provide environments “for a group of players, acting with individual goals and a shared program, to make and transform complex configurations, free of functional requirements.” Furthermore, they assembled a “game box” containing, in addition to the nine games they designed, material for others to design their own concept design games. Similarly to Dancz et al (2017), they found that both the designing of games (although they use the term “game development” rather than “game design”) and finished games themselves are useful tools for learning. Dissimilarly to Dancz et al, the findings of Habraken & Gross about learning and game design were connected to games and game design as methods for research rather than teaching and knowledge retention.

While Habraken & Gross, yet again similarly to Dancz et al, did not detail their individual concept design games, they did describe a few characteristic aspects of their games. These aspects were important to the designing of the concept design games. In brief, these were: the components or pieces players control (“Technical universe”); the ways in which these pieces can be controlled (“Control distribution”); the ways in which the players can exercise direct or indirect control over the space or territory of the game board (“Territorial organization”); overarching victory conditions exceeding any individual goals of players to at least partially negate competition, a property important for but not exclusive to design games (“Program”); the adaptation of a design game by designers using or playing the game, or in other words the continuation by the “player-designers” of the design process staged by the “developer-designers” (“In-play development”); and finally, the adaptability of a design game to the size of a design team (hinging on the claim of Habraken & Gross about design inherently being a group activity) or the complexity of a design context (“Many players, many pieces”).

Important to note is that while Habraken & Gross used the term “design game” to describe their games, the games should not be confused with what is denoted by the same term and is described in the next section. The games of Habraken & Gross are neither “meant to be tools for designing, nor are they made to help teach designing.”

3.2.3 Design games

Games as design tools, or design games, have been designed and used for different phases and aspects of the design process and for different kinds of design processes (Realize n.d.; Gustafsson 2007; Chang 2013; Disrupt Design 2017; Acaroglu 2018; Gispen 2017; Brandt 2006). These examples of design games are described below.

The Creativity Game by Ida Gustafsson

The Creativity Game (“Kreativitetsspelet”) by Gustafsson (2007) is a competitive ideation board game for three to 15 players. It was partially based on Gustafsson’s analysis of The Idea Game

(Idéspelet)[7] by the company Realize (n.d.), on whose behalf Gustafsson designed The Creativity Game. To start the game, the players must first formulate a problem which all players agree on and which is kept visible to all players during the game session. Once, the common problem is agreed on, players generate ideas on how to design for the problem inspired by Person cards and attach notes with the ideas to the corresponding Person card. The Person cards feature images and short descriptions of a (fictitious) person. Players can then, on their turn, do the following: Draw a new Person card to create new ideas; Draw an Update card to update an existing idea; or engage in "battle" with other players to increase the level of their ideas to a maximum of three or gain the idea of another player. Sometimes, Update cards may not be applicable to any of the ideas of a player, in which case that player may place that card at the bottom of its deck and draw a new card (and repeat this until an applicable card is found). A player cannot perform the same action two turns in a row.

Engaging in battle, arguably the key feature of the game, begins with selecting an idea to send into battle and selecting the opponent and the idea of theirs (which must be on the same level as one's own) which one wishes to engage with. Next, the challenging player must decide what to battle for, i.e. whether in an attempt to increase the level of an idea or to gain the idea of the challenged player. The actual battle is performed by both players presenting their respective ideas to the other players in 30 seconds, wherafter the other players reward the presentations one Point card each (of one, two or three points). The point cards for each combattant are shuffled and then counted, and the player with the most points wins the battle. When playing for levels, the loser may no longer increase the level of the losing idea. The level of the winning idea increases by one and the winner may draw and apply an Update card immediately. If the result is a draw, nothing happens unless both ideas receive at least one three point Point card, in which case both players may perform the same actions as winners. In a battle for another player's idea, the loser surrenders their idea to the winner and the winner may also draw and apply an Update card immediately. Nothing happens at a draw. Finally, the game ends when at least one player has three ideas at level three, and the player with most victory points, the sum of the levels of all ideas of a player, is the winner of the game.

Design Play Cards by Eco Innovators

Design Play Cards is a card based design game for idea generation with a design theme of ecological sustainability coupled with a number of recommended game modes (Chang 2013; Core77 2013; Eco Innovators 2013)[8]. The cards themselves are divided into three categories: "Design Problem", which as the name implies present problems for designers to solve; "Design Inspiration", which are different real life cases of sustainable design; and "Design Strategy", which provide more general strategies applicable in sustainable design. All the suggested game modes are played competitively in groups of different sizes, where winners are selected by the entire group or by all the groups together when there are multiple groups. Furthermore, the idea generation processes in all game modes are based on combining cards of the different

[7] In Gustafsson (2007) referred to as "The Idea Card Game" ("Idékortspelet").
[8] Neither the product (http://www.designplaycards.com/) nor the original designers and developers (www.ecoinnovators.com.au) have working websites (Accessed on 17 March 2018).

categories, and they all feature some degree of randomness as to the cards made available to players. However, they vary in what the players may control. In some of the modes, the players can control what cards, of at least some of the categories, are combined to form new ideas and solutions. While in other modes, the players have very little or no control at all over the cards made available as basis for a new solution.

Game Changer Game by Leyla Acaroglu

Leyla Acaroglu's Game Changer Game is a competitive card-based ideation game for the design of social and environmental campaigns (Acaroglu 2018; Eco Innovators 2013). The game is played by multiple players and the players can either play as individuals or groups. It works by one of the players drawing one of 15 quest cards and reading it to all other players. To read the card, however, the player must fill in a few missing words to form a complete quest formulation (the writing on a quest card might for example be: "How can we get _____ to change _____?"). Once the quest card is read, all players draw an approach, an example, a scenario or a persona card from the respective decks of six cards, and supported by their drawn cards, the players must generate a solution to the quest within three minutes. The players then vote for their favorite among each other's solutions (but not their own), and the solution with most votes receives an idea token. This process of reading a quest card and generating solutions with the help of approaches, examples, scenarios and personas is repeated five times, and the player with the most idea tokens at the end of the game session wins.

Moral Agent by Jet Gispen

The game Moral Agent by Jet Gispen is a part of Gispen's toolkit Ethics for Designer's (Gispen 2017). It is a competitive ideation game for multiple players which requires a pre-existing design case to be played. At the beginning of a game session, each player is randomly assigned one of 20 value cards, each card carrying the description of a different moral value (e.g. safety, equity and inclusivity). Once the players have read their respective moral value card, they have 15 minutes to write down ideas of where their moral value are applied to the pre-existing design case. These ideas are written down separately from each other and hidden from the other players. When the time is up, the ideas are shuffled and players take turns presenting randomly drawn ideas. Players are allowed to completely distort the idea being presented, and once the presentation is over, any player can claim the idea by being the first to place their hand in the middle of the table where the game is being played. The purpose of this is to claim ideas with one's own value on them without revealing it to the other players and simultaneously trying to figure out the values of other players. When all idea cards have been claimed (or put aside due to no player claiming them), the point counting begins. Players receive 4 points for each successful guess of the value of another player, 1 point for each idea card in their possession which the other players agree represents their value, and 2 negative points for each card the group does not agree represents the player's value.

Exploratory Design Games by Eva Brandt

Eva Brandt analyzed and summarized a number of exploratory design games in the context of participatory design (Brandt 2006). Aside from the analysis and summary of the individual

games, no definition of “exploratory design games” is offered beyond the following statement on the players and their interactions: “Participants in exploratory design games often have different interests and preferences but instead of utilizing this by competing[,] the aim is to take advantage of the various skills and [expertises] represented and jointly explore various design possibilities within a game setting.” However, such a definition wass offered in Brandt (2010), summarily defining exploratory design games as spatially and temporally confined multiplayer design games removed from the player’s everyday setting, aimed at exploration and idea generation, refinement and presentation around present and future practices, and “guided by simple and explicit rules, assigned roles and supported by pre-defined gaming materials.” Both Brandt (2006) and Brandt (2010) deemphasized competition as gameplay elements of exploratory design games, instead emphasizing the common goal of generating and working with design ideas.

No new design games were presented in Brandt (2006) as such, but aside from the description of individual, existing design games, it introduced concepts and frameworks for understanding and designing exploratory design games. The analysis resulted in four inspirational and non-categorical groups of games: games to conceptualise designing; the “exchange perspective”-design games; the negotiation and work-flow oriented design games; and the scenario-oriented design games. These groups illustrate variations in purpose (of participation), framing and staging. Furthermore, Brandt presented characteristics of powerful exploratory design games: the creation of common images of the intended user; staging exploratory as-if-worlds; and enacting scenarios.

3.2.4 Game design games

Design games have also been specifically designed for game and gameplay design (Kultima et al 2008; Wetzel 2017; Svedäng n.d.; Schell 2014; Triantafyllakos, Palaigeorgiou & Tsoukalas 2011). A number of game design games are presented in this subsection.

Game Idea Generation Games by Kultima et al

Kultima et al (2008) described three game idea generation games, VNA, GameSeekers and GameBoard, and strengths and weaknesses of those games. VNA, or Verbs, Nouns and Adjectives, consists of three decks of cards corresponding to the three word categories in the name of the game. The game is played collaboratively by players taking turns to draw cards from the decks in order indicated by the name of the game, each player drawing from the next deck. For each card, the player drawing the card describes a game idea using the content of the card and the description of the previous player, starting with verbs and game mechanics. After the three cards have been drawn and read, the players can keep discussing the game idea or put it to the side and start creating the next idea.

GameSeekers is also a collaborative card game but with a focus on casual games and four different types of cards instead of three: Red meaning cards, featuring people, objects or abstract themes; purple pattern cards, featuring black and white patterns; green game structure

cards, featuring descriptions of genres or social aspects or features; and blue so called “idea action” cards, featuring actions which can be performed by the designers while actually playing GameSeekers. The game is played by dealing a number of cards to each player and the players then taking turns to freely place one card at a time on the table, and the game ends when no player takes any more actions. The cards on the table by the end of the game represent a game idea to be developed.

Unlike the previous two collaborative game design games, GameBoard is a competitive game idea generation game, where players may cooperate on one idea or generate individual ideas. The game starts with the players placing a number of “Core cards”, cards featuring themes or mechanics, and then discussing the cards for a shared understanding of the common idea or a clearer understanding of the individual ideas. The players then take turns playing different “Gameplay cards”, which help defining different aspects of the idea(s) or can be used to affect the actual gameplay session the designers are engaged in. Through playing different cards, the players collect points, and whoever has the most points by the end of the game wins.

A central notion in the discussions in Kultima et al surrounding the games was “the magic circle” introduced by culture historian Johan Huizinga. The discussions of that notion were focused on how it offers powerful support for creativity but must, to an extent in contrast to the notion itself, be directed for productive purposes.

Mixed Reality Game Cards by Richard Wetzel

Richard Wetzel’s Mixed Reality Game Cards is a collaborative card game for ideation which can be used to generate new ideas or refine and expand existing ideas (Wetzel 2017). Aside from a few blank cards which allow players to extend the deck, the cards are divided into three groups (in descending order of number of cards): Opportunity cards; Challenge cards; and Question cards. Opportunity cards feature design elements of mixed reality games and function as “building blocks” of game ideas. Challenge cards feature common issues within location-based experiences such as mixed reality games and thus prompt the designer to consider how the issues apply and how one might solve them in one’s design. The Question Cards are similar to Challenge cards, but instead of (potentially) negative issues in mixed reality games, they raise questions which encourage designers to reflect more deeply on different aspects of their design.

The first game mode, generating new ideas, can be played in two ways: Either by each player drawing three cards and taking turns to play one of their cards and explain the effects thereof on the design until everyone has played a card; or by all players drawing and revealing three random cards collectively and then creating a game idea based on those three cards. Wetzel even suggests that the game may be combined with cards from other games such as Dixit[9] to expand the possibilities and challenges of the game. All generated ideas are written down in a short format and the game is repeated until a large number of different ideas have been generated. The second game mode, refining and developing ideas, is played by applying the

[9] https://boardgamegeek.com/boardgame/39856/dixit (Accessed on 28.03.2018)

card types to a pre-existing idea in the order Opportunity, Question and Challenge cards. By systematically applying the different types of cards, the designers are able to expand and refine their existing ideas.

A Series of Interesting Choices by Erik Svedäng

A Series of Interesting Choices by Erik Svedäng (n.d.) is a game design game for quickly and competitively generating game ideas with the help of gameplay design patterns and playtesting.[10] Players are challenged to design games based on a number of gameplay design patterns drawn by each player from a deck of cards describing such patterns by each player. The design is recorded on a form demanding information such as number of players, end conditions and victory conditions. Once the limited time the players have for this task has passed, the players pass their game design forms on to another player and collectively take turns to play the designed games for a limited amount of time (with the same maximum amount for each game).

During the playtest, the designer-player must not explain their game design beyond what is written down on the game design form. After all games have been played, all the gameplay design pattern cards of all players are collected into a deck (separate from the original deck), and cards are drawn from this new deck one by one by the group. For each card, the group guesses which designer-player originally drew it, and correct guesses award points to the designer-player as well as the other players who guessed correctly. The number of points per gameplay design pattern for the designer-player varies with the complexity of the gameplay design patterns, through which gameplay design skills are taken into account to an extent. The guessing players who guessed correctly receive points in a negative relation to the number of correct guesses that round, i.e. the fewer correct guesses from other players the more points for the player making the correct guess.

[10] The description of this design game is based on a playtesting workshop on the game design game as part of the course TDA580 Gameplay Design at Chalmers University of Technology on November 23rd 2017 and personal correspondence with designer Erik Svedäng on November 28th 2017. The game has since the iteration described in this thesis been finalized and published: https://eriksvedang.com/aseriesofinterestingchoices (Accessed on 16.11.2018)

4. Methodology

Hunicke, LeBlanc & Zubek (2004) claimed that “[all] artifacts are created within some design methodology.” Thus, for the sake of answering the research question and reaching the intended aims of this master thesis, a number of different methodological frameworks and methods are planned to be applied, and these are described in this section. This section continues with descriptions of concretes methods and concludes with reflections on ethical considerations within this master thesis.

4.1 Frameworks

The research question and intended aims of this master thesis point towards two primary methodological areas: a) research through design and design research, and b) game and gameplay research and design. These are expounded on as frameworks in this section.

4.1.1 Research through design

This master thesis in interaction design aims to answer a number of stated research question through a design project. Thus, it could be regarded as an instance of research through design. It is, however, not enough to define frameworks (theoretical, methodological or otherwise) simply on an etymological basis. In his review of and contribution to the discussion on research through design, Gaver (2012) claimed that research through design is a context wherein “design practice is brought to bear on situations chosen for their topical and theoretical potential”, wherein resulting designs constitute ways to address these situations of interest and allow “a range of topical, procedural, pragmatic and conceptual insights to be articulated”. The insights may be connected to accounts of practice from the design process but may be of a more generalized character, such as methods and theories. The insights generated through design practice are, according to Gaver, “provisional, contingent, and aspirational” and should be “considered as annotation of the artefacts that are its fundamental achievement.” This, Gaver argued, is a strength of research through design, as this means that the field “may develop not only through increasing agreement [i.e. by building on the results of others], but also through discursiveness and elaboration [e.g. subversion, variation and innovation]”, equally applicable to “concepts, methods, processes, artefacts and approaches to evaluation”.

Design research

Research through design is but one approach to design research. Martin & Hannington (2012) summarized, in addition to research *through* design, the following: research *into* design, research *for* design and research (as) design. If research *through* design entails generating insights through research, then research *into* design is any kind of research on or about design and different aspects thereof, such as its history. Research *for* design, on the other hand according to Frayling (1993), is a practice where insights are “embodied in the artefact”. Finally, design (as) research was characterized in the summary of Martin & Hannington as

simultaneously similar to and different from research through design. While they both share that the design processes involved generate insights related to research questions, design (as) research emphasizes the designing as such in contrast to a user-centred approach, an issue to which research through design is neutral.

4.1.2 Gameplay research and design

There are many methodological approaches possible to consider in a design project involving games (Fullerton 2014; Schell 2014). Games can for example be approached as software and hardware engineering, as business, artistic or storytelling endeavors. However, from an interaction design point of view, games are most interesting for the behaviors the games and their users (“players” or even “gamers”) exhibit and the user experiences of playing games, i.e. the gameplay experiences or simply gameplay. From a gameplay perspective, all other perspectives (e.g. engineering, business or art) do play a role in so far that they contribute to the gameplay, and obviously, they contribute differently under different circumstances. Furthermore, while there is some overlap, the approaches to the field of gameplay can be divided into two areas, gameplay design, exemplified by Fullerton (2014) and Schell (2014), and gameplay research, exemplified by Lankoski & Björk (2015b). Examples of overlap between the two approaches can be identified in theoretical frameworks for gameplay design, such as gameplay design patterns (Björk, Lundgren & Holopainen 2003; Lankoski & Björk 2011), the MDA framework (Hunicke, LeBlanc & Zubek 2004) and the concept of game mechanics (Sicart 2008) which can all be used to both theorize about and design games and their gameplay. Below, the gameplay design process and the two former frameworks for gameplay design, gameplay design patterns and the MDA framework, are introduced.

Gameplay design

The key to good a gameplay design process, according to both Fullerton (2014) and Schell (2014), is the basis of any design process: iterative ideation, prototyping and evaluation. Furthemore, Fullerton talked about a “playcentric” approach to game design to describe this iterative approach, adding the importance of involving players from as early on in the process as possible through playtesting. This approach is similar to that of for example human-centred design in the design and development of digital systems in general where active user participation in an iterative design process is essential (Maguire 2001). Involving the user, or the player, as early on as possible is a method for supporting the designers in reaching their design goals, especially the goals related to, in the case of games, gameplay experience (Fullerton 2014; Schell 2014). Whether or not the goal is for the game to be “fun” in a traditional sense or to have any other gameplay experience is secondary.

One specific issue raised by Fullerton (2014) related to both the player experience as well as to the playcentric approach to game design was that of “designing for innovation”. Fullerton claimed that the playcentric approach “is the key to designing innovative, emotionally engaging game experiences.” Because innovation is tied so closely to the playcentric game design process by Fullerton, it is meaningful to present what was meant by it:

- *Designing games with unique play mechanics—thinking beyond existing genres of play*
- *Appealing to new players—people who have different tastes and skills than hard-core gamers*
- *Designing for new platforms such as smartphones, tablets, gestural and multitouch interfaces*
- *Creating games that integrate into daily life, real-world spaces, and the systems around us*
- *Embracing new business models for games such as free to play or subscription*
- *Trying to solve difficult problems in game design such as*
    - *The integration of story and gameplay*
    - *Deeper empathy for characters in games*
    - *Creating emotionally rich gameplay*
    - *Discovering the relationships between games and learning*
- *Asking difficult questions about what games are, what they can be, and what their impact is on us individually and culturally*

Gameplay design patterns

Gameplay design patterns[11], formerly known as game design patterns, is a framework for understanding the design concepts involved in games and gameplay and how these concepts relate to one another (Björk, Lundgren & Holopainen 2003; Lankoski & Björk 2011). An important feature of the patterns is that they, like the concept of gameplay itself, focus on interactions and their effects on experience, and furthermore, the patterns are not tied to any specific medium. The latter important feature, the independence of the patterns from specific mediums, does however not mean that certain patterns cannot describe design concepts that are more or less relevant depending on the choice of medium when designing a game. A pattern such as “Game Servers”[12] is for example only applicable on games that do require systems “*running individual game instances*”, but can on the other hand be applied to any kind of system, digital or mechanical, running such instances. Every pattern is characterized by its use (and choices it may involve), its consequences for gameplay and by how it relates to other patterns (through instantiation, modulation and/or conflicts).

The MDA framework

The MDA framework is a framework for understanding games as consisting of mechanics, dynamics and aesthetics (Hunicke, LeBlanc & Zubek 2004). According to this framework, the player and the designer have opposing perspectives on games, comparable to the mental models of designers and engineers in contrast to those of users (Preece, Rogers & Sharp 2015): Designers design and combine different mechanics, i.e. rules of and conditions for what players may and may not do within a game. These mechanics give rise to “dynamic system behavior” (Hunicke, LeBlanc & Zubek 2004), the interactions between system, or game, and player during play. Finally, according to the framework, the dynamics lead “to particular aesthetic experiences”, that is, certain “desirable emotional responses evoked in the player”. For the players, on the other hand, “aesthetics set the tone, which is born out in observable dynamics and eventually, operable mechanics”.

[11] Also available as an online database of patterns on http://gameplaydesignpatterns.org/ (Accessed on 12.03.2018)
[12] http://virt10.itu.chalmers.se/index.php/Game_Servers (Accessed on 12.03.2018)

The purpose of the usage of “aesthetics” as a part of the MDA framework is to make it possible to discuss the gameplay experience more concretely than for example just “fun”, and the authors presented a non-exhaustive list of aesthetics: Sensation; Fantasy; Narrative; Challenge; Fellowship; Discovery; Expression; Submission. Furthermore, as described above, the three components of the framework, mechanics, dynamics and aesthetics, are connected, and they can be used to support the generation of one another. Hunicke, LeBlanc & Zubek used the example of games with a competitive aesthetic to argue that such games require dynamics which make players emotionally invested in the winning over other players. This allows the designer to draw the conclusion that that would require the game to feature multiple players and mutually exclusive victory conditions. And from there on, the designer can work on what specific e.g. rules and actions they will include in their games to support that.

4.2 Methods

The design process of this master thesis will utilize multiple methods for the different purposes of ideation, prototyping and evaluation. While it may not be possible to completely anticipate all methods which will be used, a number of expected methods will be described here.

4.2.1 Ideation

Ideation, or idea generation, can be related to what Fullerton (2014) called “conceptualization” or to John Chris Jones’s divergence stage (Hileman 1998). As its name suggests, it is the stage in a design process wherein designers generate and explore ideas with few if any limitations. Methods involved in ideation will be described below.

Literature review

“Literature review”, “secondary research” or just “research”, this method essentially consist of studying literature related to the project within which the method is performed (Martin & Hannington 2014; Fullerton 2014). The purpose is seldom to perform an exhaustive, systematic review of all possibly relevant literature, although there are occurrences thereof. More often, the purpose is to inform the current design (or research) project of previous theoretical and practical work on related topics. Furthermore, more than just supporting the establishment of a sound theoretical and methodological basis for a design project, research may act as a source of inspiration, as Fullerton (2014) suggested.

Brainstorming

Brainstorming is a method which can help designers, both alone and in groups, to systematically generate ideas: “Often, when you are working as a creative professional, there is no time to wait for that moment of inspiration to hit; you need a more formalized system of idea generation—what is called “brainstorming.” (Fullerton 2014) The main idea of brainstorming is to articulate as many ideas related to a certain theme or problem statement as possible (Preece, Rogers & Sharp 2015; Fullerton 2014; Benyon 2013; Maguire 2001). However, it is useful to record the ideas on sticky notes which are also easy to document photographically and can be transferred to other methods such as affinity diagramming.

Aside from a clearly stated focus for the brainstorming session and documenting the ideas in visually reviewable manners, it is also important not to self-censor during brainstorming (ideas can be modified and discarded afterwards) and to create an environment which does not hamper one's imagination (this can be a simple change of environment, standing up in front of a whiteboard instead of sitting at a desk or creating a playful environment through props of different kinds).

Affinity diagramming

Affinity diagramming is a way of spatially organizing individual data, ideas and insights by clustering for example unorganized sticky notes into groups based on affinity. (Preece, Rogers & Sharp 2015; Martin & Hanington 2012; Maguire 2001) Once all e.g. ideas have been organized into clusters, these clusters can be analyzed to determine the common themes for each cluster which may then guide research, design or other activity.

Mind mapping

When mind mapping, one generates and organizes ideas simultaneously in a non-linear fashion. (Fullerton 2014, Martin & Hannington 2012) The method is performed by first noting down a core concept or issue on a surface such as a whiteboard or a sheet of paper and then branching out from the center by writing down and connecting related concepts. The method works recursively, as each new concept can act as the core of a new sub-map.

Skewing

Skewing is a method formulated by Lundgren & Gkouskos (2013), wherein the designer explores and generates different ideas by "shifting, changing, [...] turning" or "deliberately [changing]" properties from frameworks chosen by the designer. The method is summarized in five steps: Selecting an artifact to (re-)design; Selecting a framework; Analyzing the artifact with the framework; Performing the skewing process, by skewing one or more properties; Selecting among the generated ideas and then exploring them.

4.2.2 Prototyping

Prototyping, or in different ways "envisioning", designs is vital to a design process; it is helpful for designers themselves to materialize their design concepts and without it, it is impossible to have the designs tested in any significant way (Preece, Rogers & Sharp 2015; Fullerton 2014; Benyon 2013; Martin & Hannington 2012; Maguire 2001). According to Martin & Hannington, it "is the tangible representation of artifacts at various levels of resolution, for development and testing of ideas within design teams and with clients and users." Similarly, Benyon described prototypes as "a concrete but partial representation or implementation of a system design."

Prototypes have many different different approaches, techniques and aspects to them. For example, they may be passive, such as sketches, moodboards and non-interactive physical models, and they may be active, where some sort of interaction or active participation is required, perhaps with a moderator playing the role of the system (as in the "wizard of Oz"

technique) or by simply having implemented some parts of the design to already be functional. Some other aspects and issues of prototyping are described below.

Prototype fidelity

While bearing some similarities to the “activeness” of a prototype described above, the fidelity of a prototype is something different. Furthermore, it is not necessarily the same as whether the prototype is physical or implemented in software, although in interaction design and other practices involving digital technology, they are often related (some authors e.g. Fullerton (2014) and Maguire (2001) only differentiate between physical and software prototypes). A prototype may be of low or high fidelity (Preece, Rogers & Sharp 2015; Benyon 2013). Low fidelity, or lo-fi, prototypes are usually made in other, simpler materials than the materials intended for the design concept. A central aspect of lo-fi prototypes is that they should be quick to produce, modify and discard. This is important, as lo-fi prototypes are generally created early in a design process when generating many possible design ideas is important, and these prototypes should support that generation activity. Furthermore, the quickness of lo-fi prototypes aid the focus on fundamental design concepts rather than on specific functional or aesthetic details and implementations. On the other hand, high fidelity, or hi-fi, prototypes are intended for closer evaluation of specific details, usually in the intended material or on the intended platform of the design concept. Rather than supporting the generation new ideas, hi-fi prototypes generally support the transformation of already decided upon ideas. An important issue to keep in mind with hi-fi prototypes is the risk of being perceived as complete, which means that any test user might be less prone to focus on the issues the designers want to evaluate and that they are more likely to regard it as a finished product.

Horizontal, vertical and full prototypes

As with any design activity, when creating prototypes, compromises are a consequence of material reality. One important compromise, especially when it comes to interaction design, concerns the completeness of the functionality of a prototype (Preece, Rogers & Sharp 2015; Benyon 2013). What this means is that designers need to decide whether they prototype a wide array of functionality but with low details, called a horizontal prototype; a small volume of functionalities with a high level of detail for each functionality, called a vertical prototype; or a prototype with many functionalities with high levels of detail but at a cost of performance, called a full prototype.

4.2.3 Evaluating

In any serious design process, evaluating generated designs is a necessity. Evaluations are done on different aspects of designs, such as usability and user experience, and the evaluations themselves can have different characteristics (Preece, Rogers & Sharp 2015; Martin & Hannington 2012; Benyon 2013; Maguire 2001). They can for example involve users or be so called expert evaluations, using different models to draw conclusions about the design, and they can be formative, generating new insights to inform upcoming iterations of the design process, or summative, performed at the end of a design process. Some methods and aspects of evaluating are described below.

Playtesting

When designing a game and its gameplay, playtesting is a central evaluation method to utilize (Schell 2014; Fullerton 2014). According to Fullerton, it “is the single most important activity a designer engages in”, while Schell called it “[not] just good, necessary”, as it is the most direct way of evaluating the gameplay of a game. When playtesting, there are numerous things to consider. A simple model for planning playtesting presented by Schell (2014) is to pose five questions (cf. “The Why, What, Where, and When of Evaluation” in Preece, Rogers & Sharp 2015):

- *Why?*
- *Who?*
- *Where?*
- *What?*
- *How?*

The question “Why?” is as simple but fundamental as the purpose of the playtesting (Schell 2014). In other words, before playtesting, one or more questions to be answered by that playtesting must be posed. The questions should be as specific as possible, although questions with more general characteristics can also be meaningful.

“Who?” relates to who the playtesting will be performed by. There are a number of constellations of playtesting participation (Schell 2014; Fullerton 2014). Playtesting can be performed by the designers themselves (and non-designer members of a potential design team), which is a cost-effective method of finding fundamental problems with a game design. Next, another method is to perform playtesting with friends and colleagues (outside of the design team), which is also cost-effective and might reveal new and undiscovered aspects. However, the feedback received will very likely be influenced by the personal relationships with the playtesters. Finally, it is also possible to perform playtesting with strangers. These participants are more likely to be honest about their experience of testing the game design and will also have a good chance of providing completely new insights. With at least the two latter types of testers, acquaintances and strangers, it is possible to choose between performing repeated tests or to only let a tester test one iteration of the game design.

“Where?” is of course where the testing will be performed, with many aspects to consider. Some of those are what kinds of resources are available, what aspects of the game design are being tested and what kinds of users and test environments are desirable (Schell 2014).

“What?” concerns what is being looked for during playtesting, of which Schell (2014) described two: “Things You Know You Are Looking For” and “Things You Don’t Know You Are Looking For”. The first category is based on the “Why?” question(s) of the playtesting, and the playtesting session must be designed in ways which will generate answers to those questions. On the other hand, the content of the second category does not influence the design of the playtesting in any meaningful way. Instead, it requires of the designers performing the

playtesting to pay close attention to the behaviours of the test participants and to be prepared for surprises and to try to understand them.

Finally, “How?” is the question of how the desired information will be acquired, or how the playtesting will be designed and performed in practice (Schell 2014; Fullerton 2014). Some issues here include the interactions between designers and test participants, the actual methods of data collection and how to begin and end the session.

Think-aloud

It is not enough to perform activities such as playtesting sessions, data must be captured as well. One way of capturing said data is by asking participants to think aloud, i.e. to verbally communicate to an evaluator what they are doing and thinking as they perform the tasks involved in a test (Preece, Rogers & Sharp 2015; Martin & Hannington 2012; Benyon 2013). This method can be performed concurrently with the test and retrospectively by asking the participant to comment on video recordings of them. It is useful for capturing certain data and generating certain insights which would otherwise be hard to achieve through methods such as observations and interviews.

Observations

Observation as an evaluation method consists of attentively and systematically recording anything that may help designers answering questions about their design, whether those questions are the ones explicitly guiding the evaluation or not (Preece, Rogers & Sharp 2015; Martin & Hannington 2012). When performing observations, both factual events and personal reflections are meaningful to note down, but it is important to differentiate between the two. Furthermore, when noting down data during observations, the approach may be structured or semi-structured, where the first alternative involves the use of checklists or similar tools.

Interviews

Another example of a data capturing method is interviews, which is a method used in many disciplines and which in its simplest manifestation is a conversation between evaluator and participant (Preece, Rogers & Sharp 2015; Martin & Hannington 2012; Benyon 2013; Maguire 2001). There are multiple ways of varying the method. Interviews may utilize open or closed questions, meaning that the questions may have predetermined answers for the interviewee to choose from (often “yes” or “no”). Furthermore, interviews may be structured or unstructured, that is whether the interview is supposed to strictly follow script (on the side of the interviewer, at least), or if the interviewer may explore unexpected topics (but which usually still relate to some central topic for the evaluation). Interviews may for example also be performed in groups of different sizes and be recorded only by note taking, by other evaluators observing or by recording audio and perhaps even video. A technique that can be employed during interviews is laddering (Martin & Hannington 2012). Laddering is a technique for connecting obvious physical properties of a design to one or more personal motivational values by asking questions which connect attributes of a design to consequences thereof for a user, and then by asking why those

consequences are important. Finally, Cote & Raz (2015) claimed that interviews, especially more in-depth ones, are a good fit for projects featuring constructivistic epistemologies.

Content analysis

After capturing data, that data must also be analyzed. Data may be analyzed quantitatively, for example by counting occurrences of different elements, and qualitatively, among others by identifying themes and categories in the data (Preece, Rogers & Sharp 2015; Martin & Hannington 2012). Analysis can be performed inductively, by systematically reading the material and gradually generating themes and categories, or deductively, by applying categories decided on prior to the actual analysis. Analysis of this kind can be applied on the content itself as well as on the form and structure of the material.

4.3 Ethical considerations

Some ethical issues of the proposed project include the common issues of involving other persons in a research and/or design process, such as informed consent and anonymity (Cote & Raz 2015; Preece, Rogers & Sharp 2015). Anonymity may play a special role in this thesis because of the reflective character of the intended design game. It might lead to some participants sharing personally sensitive personal information or even information that might make participants easily identifiable. Furthermore, this same reflective character of the design game might also evoke emotional discomfort in some participants. To mitigate this, the right of the participants' to cancel their participation at any time and without explanation must be made clear and accessible. Additionally, a debriefing activity could be planned for the participant at the end of the design or research activity as a whole

Another issue is the pre-existing relationships to the students intended as design and research participants. This will require measures to be taken to support the generation of valid and applicable data, to mitigate biases in any direction with the participants.

5. Process

The following section describes the actual design process of the master thesis as it developed. In general, the process featured consecutive stages of divergence, transformation and convergence as described in Jones's model of design processes (Hileman 1998). Furthermore, different phases of the design process were iterated on a number of times. Finally, the design process as a whole was guided by three aspects of the master thesis:

1. Research question
2. Design challenge
3. Theoretical frameworks

These three aspects were regularly consulted during the process. As Fullerton (2014) says, game designers must have a gameplay experience in mind to guide their game design processes, and the intended gameplay experience of this project is contained within those aspects. Below follows an account of the different general phases of this design project: ideation; design; and evaluation.

5.1 Ideation

The intention of the ideation phase was to generate a number of game concepts from which to select one or two to design (in parallel if two were to be selected) and to evaluate. This phase may be regarded as having consisted of three sub-phases: mapping the design space; a first iteration of generating or ideating game concepts; and a second iteration of ideating. The original plan was to generate five concepts through ideation among which to choose one or two, however the plan was modified during the process itself to first generate 10 concepts to transform into the five concepts from which to choose the one(s) to design and evaluate. In the end, the first iteration of ideation actually resulted in 13 concepts instead of 10.

5.1.1 Mapping the design space

The mapping of the design space was performed in two steps: finding the dimensions or parameters of the design space; and finding possible values for those dimensions. These two steps largely correspond to two concrete activities which were performed: Review of the research question, the design challenges and the theoretical frameworks of the thesis; and brainstorming based on the results of the review. The rough results of the review, the dimensions of the design space, can be found in Appendix B. Three design dimensions were synthesized from those results: Game mechanics, comparable to mechanics in Sicart (2008) and in Schell (2014), player actions in Lankoski & Björk (2015a) and procedures in Fullerton (2014); physical and mechanical components, comparable to mechanics in Hunicke, Leblanc & Zubek (2004), components in Lankoski & Björk and resources and boundaries in Fullerton; and conceptual and thematic components, largely based on the three aspects of the master thesis

listed in the introduction to the process section. These three dimensions were then brainstormed on, and figure 3 illustrates a late stage in that brainstorming process.

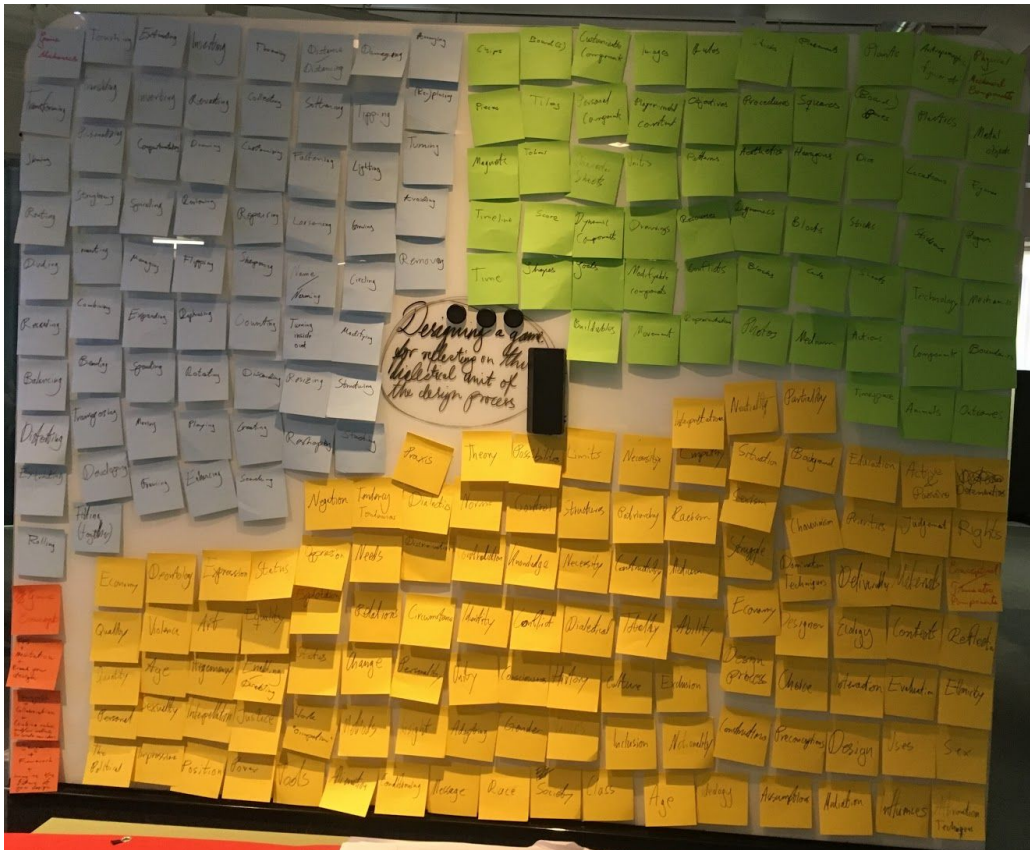

Figure 3: The post-it notes represent in clockwise order, starting from the upper-left corner: Game mechanics; physical and mechanical components; and conceptual and thematic components. In a later stage, the third category of post-it notes was removed to make room for more notes in the two former categories. The small collection of four post-it notes in the lower-left corner are three small game concepts (one concept per post-it note and a fourth note with the title of the category: “Game Concepts”). These concepts came from an ideation workshop performed in parallel with the individual brainstorming work. The workshop is described in a separate subsection in this text.

Once these dimensions and possible values had been generated, it was possible to begin the next step in mapping the design space and in the general design process, namely finding meaningful values and combinations thereof for the design dimensions. In other words, it was time to generate actual design concepts, or game concepts, as in the case of this master thesis.

5.1.2 Group design workshop

In parallel with the mapping of the design space described in the previous subsection, an ideation workshop was performed with three other students from different years of the master programme MPIDE Interaction Design & Technologies. The planning of the workshop is described in Appendix A. Performing the workshop in parallel to the individual mapping of the design space allowed for the generation of game concepts to begin before the design space

was mapped. A possible alternative could have been to perform the workshop after the mapping was already complete and use the mapped design space as input into the workshop, however this alternative would not have provided the benefit of starting the game concept generation earlier. The workshop was performed as planned aside from some smaller time adjustments of some of the moments of the workshop, and resulted in five game concepts from the participants, three of which were variations of one another. In brief, the process of the workshop consisted of an introduction of the participants, an introduction to the topics of the master thesis (roughly corresponding to the areas covered in the theory section of this report), brainstorming on a question based on the research question of this master thesis, combining the brainstormed ideas and elements, elaborating on the combinations to generate small game concepts and a concluding sequence for reflections on the workshop.

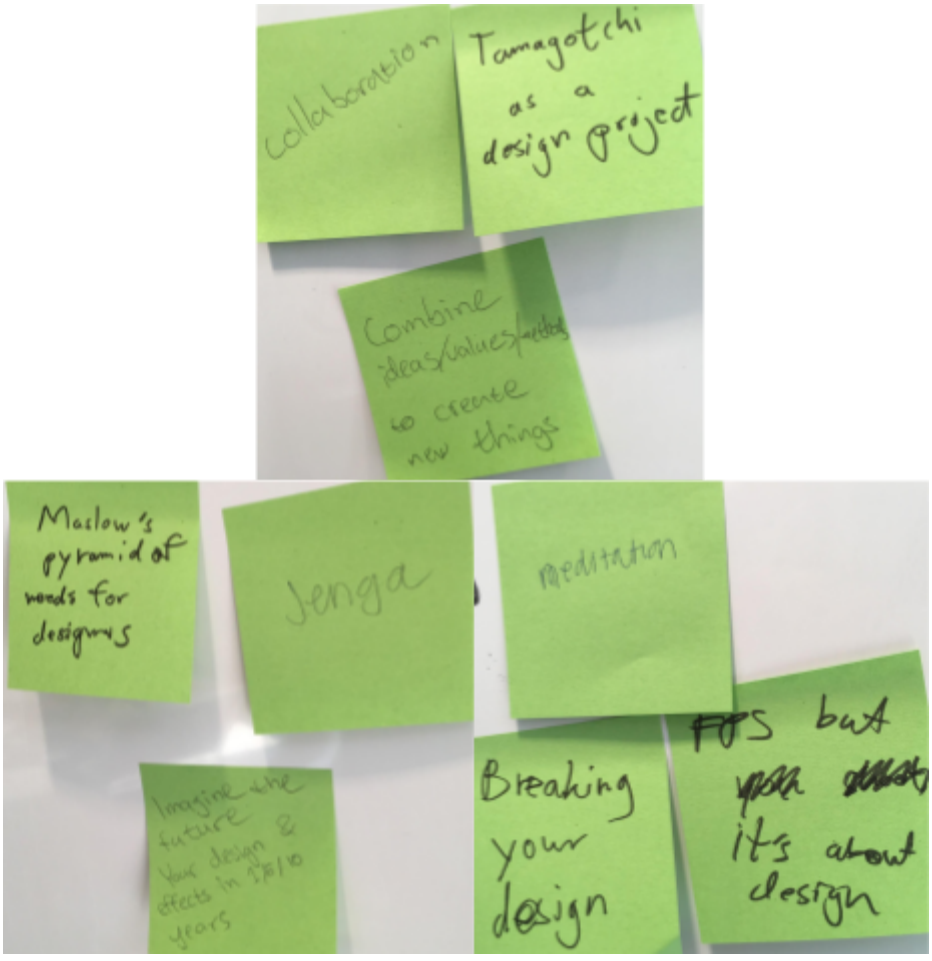

Figure 4: The three concepts that resulted from the brainstorming during the workshop.

Figure 4 illustrates the three concepts generated by combining brainstormed ideas, which the participants then elaborated on, shown in figure 5. The concept which was elaborated on three times (i.e. one time each by the three different participants), was the concept in the lower-left of figure 4 of combining Maslow's hierarchy of needs (discussions in the workshop led to it being replaceable or combinable with other frameworks for understanding human needs, behaviors

and values), the game Jenga and the concept of imagining the future of one's design and its effects in one, five or 10 years. The other concepts were based on the following ideas and elements: collaboration, the game Tamagotchi but as a design project and combining ideas/values/methods to create new things; and meditation, breaking your design and the game genre FPS.

Figure 5: The workshop participants elaborating on the brainstormed game concepts.

5.1.3 First iteration of concept generation

As previously noted, the intention was to generate 10 small game concepts from which to later generate five slightly more well developed concepts. After the mapping of the design space, there were already some concepts as a result of the design workshop which was performed in parallel with the mapping. This fact reduced the remaining number of concepts to generate from the original 10. However, an initial mistake in counting the concepts generated through the workshop as three instead of five led to the understanding that seven additional concepts remained to be generated rather than just five concepts. Furthermore, in addition to the seven systematically generated ideas of this iteration of concept generation, another concept was generated outside of but in connection to the actual ideation activities, resulting in eight concepts generated.

The procedure for generating the seven intended concepts was as follows: Three elements were randomly selected from each one of the three categories, or design dimensions, generated in the mapping of the design: Game mechanics; mechanical and physical components; and conceptual and thematic components. These elements were combined in a table to generate the seven ideas (as seen in table 1).

Concept number	**Game mechanics**	**Mechanical and physical components**	**Conceptual and thematic components**
1	Building, sharpening, surrendering	Cogs, vehicles, transportation	Constructionism, education, conditioning
2	Avoiding, managing, resizing	Elevations, land, markers	Judgements, priorities, ambitions
3	Reviewing, planning, protecting	Barriers, non-player entities, chips	Rights, assumptions, designer
4	Negotiating, enhancing, detaching	Rails, goals, dice	Ideology, determinations, relation
5	Generating, repairing, spending	Aesthetics, evolving components, directions	Design, praxis, activities
6	Removing, launching, compartmentalizing	Joy, photos, towers	Preconceptions, background, affirmation
7	Stacking, lighting, distorting	Passive components, timeline, tokes	Interaction, constitution, ecology

Table 1: The concepts generated by combining randomly selected elements from the three design space dimensions.

This procedure continued by elaboration on every concept through fast sketching and scribbling on paper and even through instances of spontaneous feedback from other students. The theoretical frameworks of the master thesis were used as supportive guidelines in the elaboration of the concepts, e.g. to help connecting the game concepts to useful concepts in gameplay design or reflection. Once the seven game concepts had been elaborated on, they were combined with the other game concepts (the five game concepts from the design workshop and the game concept which was generated outside the systematic ideation process) and analyzed to find commonalities which could form the basis of the five concepts of the next iteration of concept generation. The commonalities included but were not limited to gameplay

design patterns, how the game concepts supported reflection and evaluation and how they represented the concepts of designer, design and design process. This process is illustrated in figure 6.

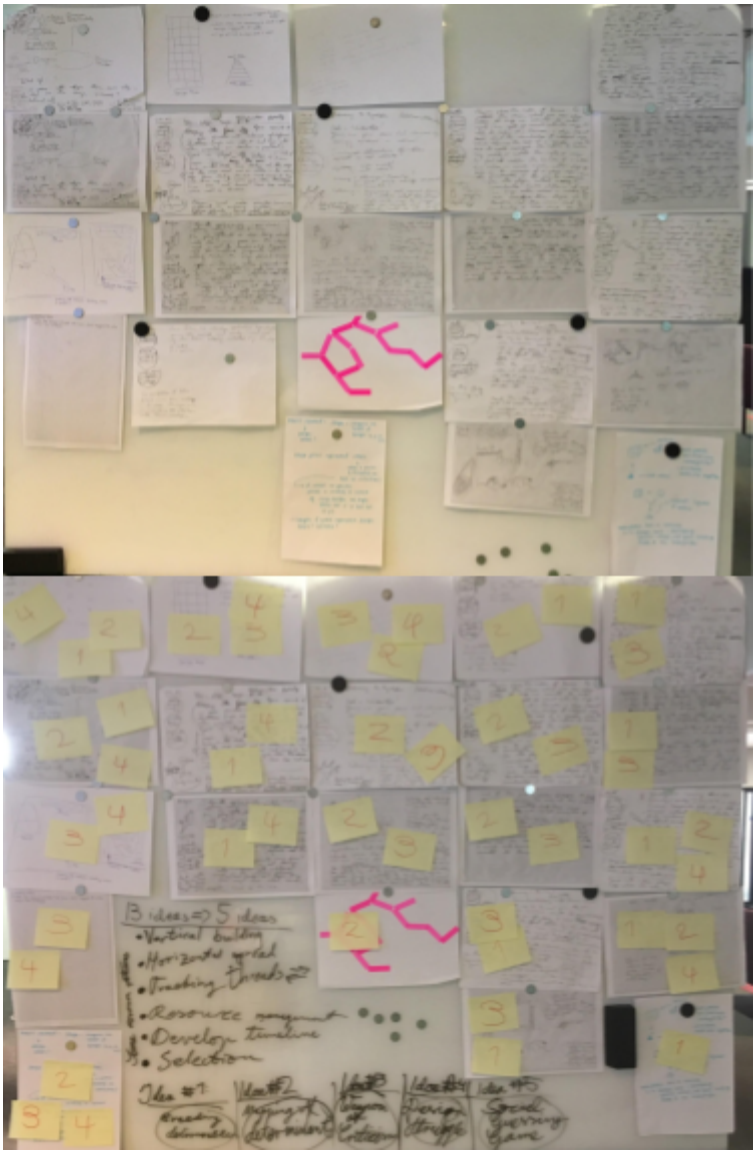

Figure 6: Top: The sketches and scribbles of the 13 game concepts posted on a whiteboard. Bottom: The game concepts analyzed and annotated with post-it notes featuring a number from one to five, depending on which of the five game concepts of the next iteration they form some manner of basis of.

The five game concepts, described in the next subsections, were titled the following: *Breeding Deliverables*; *Mapping of Determinations*; *Weapon of Criticism*[13]; *Design Struggle*; and *Social Guessing Game*.

[13] It may be decent to mention that this game title is drawn from the following introduction: https://www.marxists.org/archive/marx/works/1843/critique-hpr/intro.htm (Accessed on 27.11.2018)

5.1.4 Second iteration of concept generation

Similarly to the first iteration of concept generation, each concept was elaborated on using sketches and notes. However, in this iteration, some more structured ideation methods were deployed for each idea, such as brainstorming and mindmapping. Furthermore, the elaboration was not only guided by the general theoretical framework and a few design elements as in the previous iteration, but by the results of the previous iteration as well. So for example the elaboration of the first game concept, *Breeding Deliverables*, was also guided by the game concepts in the previous iteration which in some way formed the basis of the concept and had been marked with a post-it note with the number one. Figure 7 shows what a mindmap of a game concept, in this case *Breeding Deliverables* (however temporarily under the alternative name *Breeding Alternatives*) again, could look like in the process.

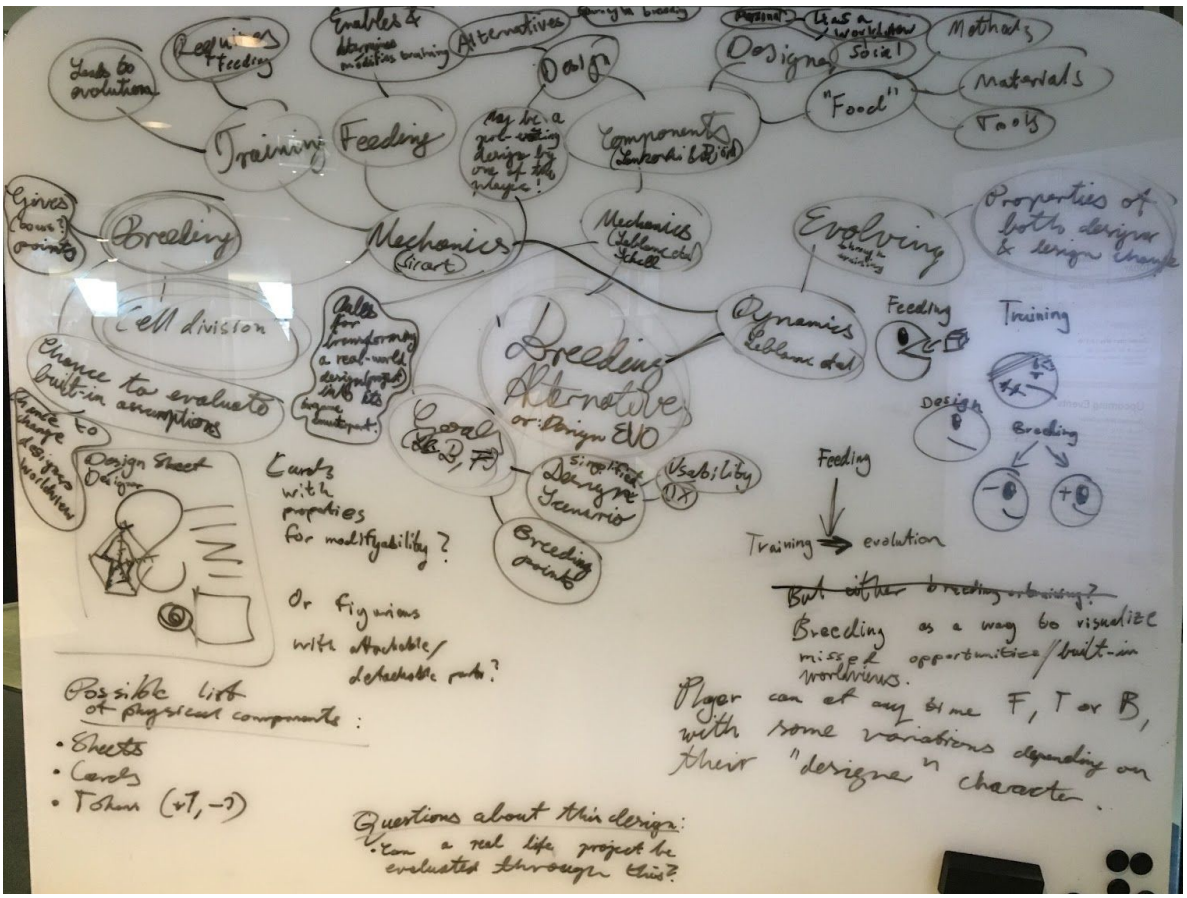

Figure 7: An annotated mindmap of the game concept Breeding Deliverables, temporarily under the name Breeding Alternatives, in progress.

When all five game concepts had been elaborated on, they were evaluated on the basis of how well they related to the research question, the design challenge and the theoretical frameworks. The evaluation also involved the concept of innovation as described by Fullerton (2014). This evaluation, together with a subjective designerly judgement, led to the following results: the

game concepts Social Guessing Game and Design Struggle being discarded; the concepts *Mapping of Determinations* and *Weapon of Criticism* being combined into a single game concept; and finally the concepts *Mapping of Determinations*/*Weapon of Criticism* and *Breeding Deliverables* being selected for parallel prototyping.

5.2 Game concept prototyping

This subsection describes the development of the game concept through designing prototypes and playtesting those prototypes. The prototyping phase continued where the ideation phase concluded, with iterations of the two game concepts *Mapping of Determinations*/*Weapon of Criticism* and *Breeding Deliverables*. These two concepts were physically prototyped and playtested with other students from the master programme MPIDE Interaction Design & Technologies. Analogue and digital sketches on paper and, in the case of one of the concepts, pieces of foam board and colored paper, were the main materials used in the first iteration of prototyping. All prototypes were intended to be tested in workshops where the participants would test the prototype for a brief time period while also commenting on their experience. After the brief play session, the participants would be prompted to discuss through elements of interview and modify the prototypes, and then repeat this two-step process of testing and modifying. Pens and sheets of paper were also provided for the participants to note down e.g. thoughts, questions and criticism while they were playing, and when the participants consented to it, the sessions were audio recorded as well. The contents of the audio recordings and of the notes of all involved parties were analyzed for insights both deductively and inductively. In describing the playtesting sessions, the words participant and playtester will be applied interchangeably. For an overview of the composition of playtest participants, see appendix C. Finally, the feedback from the playtesting sessions is summarized at the end of the description of each session in lists titled “Negative Feedback” and “Positive feedback”. The separation of feedback into “negative” and “positive” categories was in reality not clear cut and potential alternative categories could e.g. have been “critical” and “constructive”, but the chosen labels are largely applicable and provide a general sense of the character of the feedback. Furthermore, the quantity of a certain category of feedback is not representative of the general reception of a game concept, i.e. a long list of negative feedback does not correlate with rejection by playtesters of a concept, and vice versa.

5.2.1 Playtesting Weapon of Criticism

The first playtesting session tested a prototype of *Weapon of Criticism* (the first part of the name, *Mapping of Determinations*, was dropped during the prototyping process) with four participants with no prior experience or knowledge of the design project on May 2018 between 10:00 and 11:00. In this iteration, some elements such as components and rules were still not in place in the game prototype, but the general concept of the game was the following: Starting from the central tile on the game board (consisting of 37 hexagonal tiles, corresponding to three rings of tiles surrounding the central tile), players move around the game board to occupy tiles by answering questions written on cards (see Figure 8 for an in-game view of the game). Three

different types of questions were included in the game, asking the player to describe aspects of a final deliverable in a design project, to explain aspects of the design process and to reflect on e.g. their personal values and the design context, respectively. Players were to draw different types of cards depending on which of the three rings they stood on, and aside from the questions, the cards also differed in the number of points they awarded the player, which was equivalent to the number of the tile ring the player was currently attempting to occupy. The goal was for players to collect 15 points this way to win. No rules for handling conflicts had been decided upon, but were among the issues intended to be designed together with the playtesters.

In this specific session, the playtesters elected to deviate from the plan and to not redesign the game to play it for another round but instead they decided to discuss different aspects of the game and its gameplay for the remainder of the session. The playtesters were also asked different questions during their discussions, e.g. to elaborate on some critique or suggestion they had, to attempt to give answers to their own questions about the game and its gameplay, and to give feedback on specific issues which were already prepared before the session or which arose during the session.

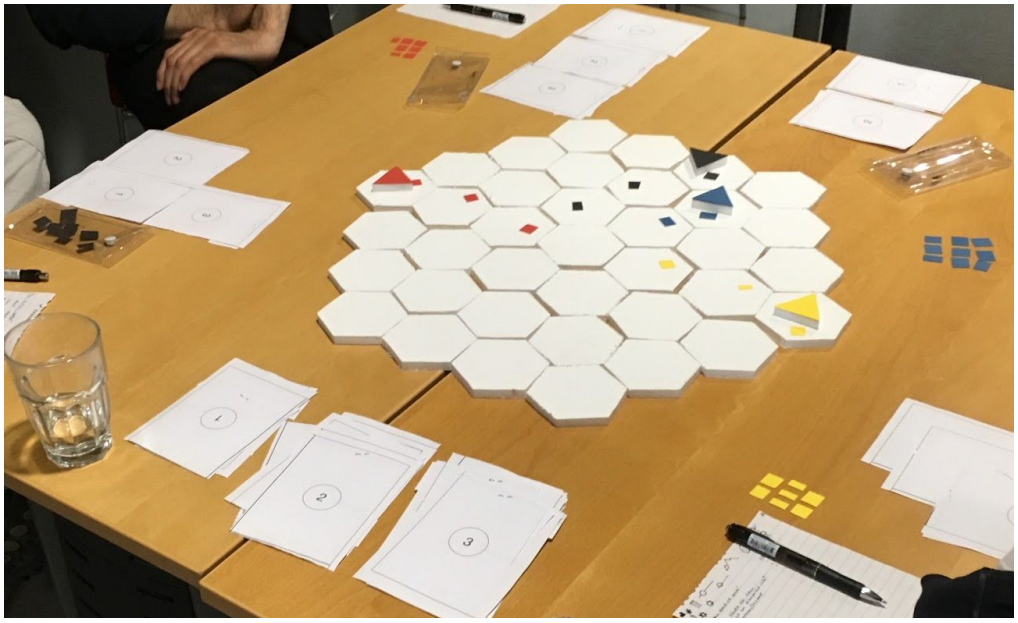

Figure 8: A view of the game Weapon of Criticism during the playtesting session. The board, the question cards and the player pieces and tokens are all visible here.

In general, the feedback was mixed, with most of the negative feedback on specific aspects of the gameplay, contributing to an experience of disconnect between gameplay and purpose, and most of the positive feedback on the design concept as a whole.

Negative feedback

- Slow general gameplay pace
- Poor score system
    - Lack of meaningful connection to the rest of the gameplay

    - Only used for mechanically tracking progression towards end of game
    - Physically and visually cumbersome
- Uninteresting mechanics of competition, interaction and reflection
    - Lack of tactical considerations
    - Linear progression to end of game through victory for one of the players
    - Occupying other players' tiles does not offer interesting inter-player interactions
    - Other players easily ignore reflections of currently answering player
- Poor game board design
    - Division into rings corresponding to types of questions not apparent
    - No purpose of staying in inner rings (i.d. answering questions with lower score)
    - Slow to move across large board

Positive feedback

- Interesting design concept
    - Playtesters could consider playing a similar design game for reflection
    - Props other than questions and prompts for reflections, such as the game board, contribute to sense of engagement in gameplay
- Space for improvement
    - Increase focus on game board
    - Involve other players by picking questions and prompting actions

5.2.2 Playtesting Breeding Deliverables

The second playtesting session on May 17 2018 at 14:00-15:00 tested a prototype of the game concept *Breeding Deliverables* with four participants, two of whom participated in the group ideation workshop earlier in the design process. In this iteration of this concept, all elements were present but not all meaningful details were extensively elaborated. The concept revolved around the players playing designers, each of whom metaphorically developed a design of their own through the metaphors of "feeding", "training" and "breeding" and where this process influenced both designer and design in different ways. Feeding was a metaphor for choosing design methods, represented by "feeding cards" divided into the categories "Ideation method", "Research data", "Prototyping tool" and "Evaluation framework", each with different properties. Training was a metaphor for performing design work, and breeding for ending an iteration, or "generation" as it was called in this prototype of the design game. The properties of the different feeding cards were all different effects that came into play after breeding was performed, and all effects influenced properties, "stats", of the designer and the design. These stats, which were kept on sheets similar to character sheets used in role playing games, determined how designers could perform the available actions during their turn, e.g. the "feeding ability" of a design determined how many feeding cards a designer could place in their feeding pile in one turn. The gameplay goal of the game was for a player to be the first one to have their design reach generation six.

The participants of this session re-designed the prototype once by tweaking the start of the game to make it more dynamic from the beginning by giving the designers and their designs randomly generated variations in their stats. Both game sessions, the break in-between and the time after the second game session were accompanied by heavy discussions.

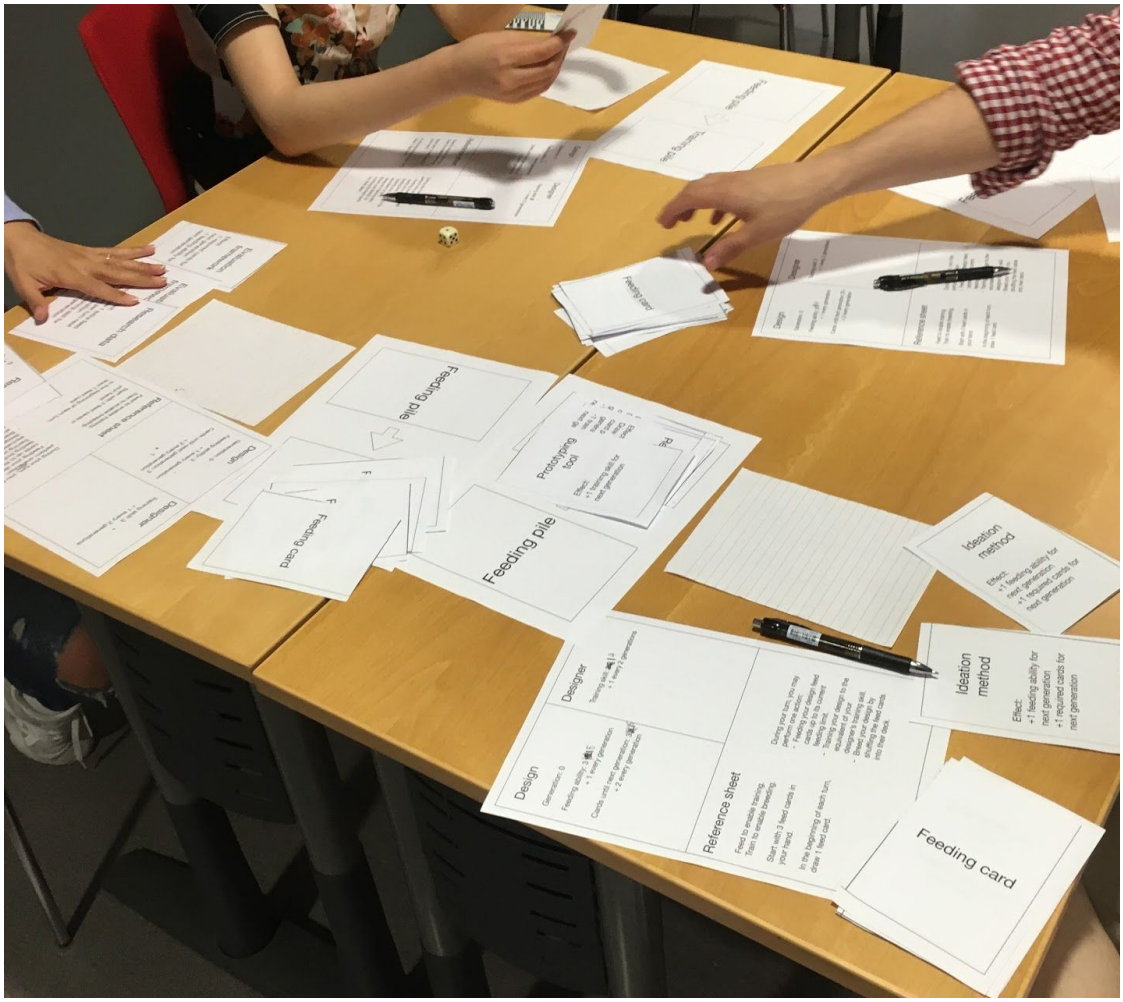

Figure 9: A view of the game *Breeding Deliverables* during the playtesting session. “Character sheets” with the stats of designers and design and reference sheets, feeding cards and the sheets with the feeding pile and training pile are visible in this image. A player was currently drawing a card from the deck of feeding cards.

In general, the feedback from the participants was that this prototype was an interesting concept but needs heavy refinement, as they could not yet see themselves voluntarily playing a game such as this in the future.

Negative feedback

- Disconnect between gameplay and purpose of reflection as a design game
    - High level of abstraction with little to no guidance
    - Easy to disregard thematic content in favour of mechanical content of props

    - Reference sheet insufficient for explaining gameplay and establishing connection between gameplay and purpose
- Slow gameplay pace
    - No interactions between players
    - Waiting during other players' turns

Positive feedback

While there was no substantial positive feedback in this playtesting session beyond the design concept being interesting, there were pieces of constructive feedback which were not expressed in the negative and which reflected a positive potential for improvement of the design game.

- Feeding cards could also be used to generate different starting stats for players
- New properties, for example "ethics", which modify gameplay could be introduced
- Collaboration, competition and other types of interactions related to elements such as the metaphorical designs or the designerly stats could be introduced
- More physical props and elaboration on existing props could simplify gameplay and make it more engaging

5.2.3 Evaluating the first iterations and designing the second

After the playtests of *Weapon of Criticism* and *Breeding Deliverables*, both the common and the separate conceptual and practical foundations of the two design concepts were revisited. Among other important questions, in one particular needed to be answered: Whether to continue playtesting both design concepts in new iterations or to proceed with only one design concept. The main drawback of redesigning and playtesting both concepts for another iteration was the cost in time. However, this disadvantage was not considered substantial enough to warrant the reduction of concepts being tested to only one in the second iteration of playtests.

As for the foundations of the design concepts, aside from what was gathered and explicitly touched upon through the playtesting sessions, the two main issues were identified as the form and content of the reflections intended as a result of the gameplay. These issues were revisited mainly through the works of Sengers et al (2005) (with some help from the result of Kun's (2013) work) on reflection and Gispen (2017) on ethics. The reviews were performed by formally analyzing the works, finding what seemed to be the core aspects related to reflection and ethics, respectively. Following the review, the question of how those findings may be applicable to the design project and to issues generated by the playtests was briefly explored. The exploration was performed through a modified and focused form of brainstorming where the findings were rapidly and creatively applied conceptually to either the design project as a whole or to either of the specific prototyped design game concepts. Chiefly, the conclusions of this exploration were not about concrete design decisions for the second iteration of the two concepts but instead more general in character. Of these general conclusions, two central ones were the following: that the aim of the gameplay, reflection, and the intended focus of those reflections, the (dialectical) relationship between designer and design process, must be apparent to the players

and easily accessible through the gameplay; and that the works of Gispen could serve as more concrete sources of inspiration for the two game concepts. How these conclusions were actually applied in the (re-)design of the game concepts is described in the following subsections.

5.2.4 Playtesting WoC II: CRITCON

With the feedback from its first playtest, the game concept *Weapon of Criticism* was redesigned and given a new working title: *CRITCON*. The name was derived from the alert system of the United States Armed Forces, DEFCON[14], and was adopted because additional sets of question cards were made available as the game progressed. The new concept, *CRITCON*, was similar to the old concept in many ways but differed in some regards: The board was reduced in size from three rings of hexagonal tiles around the central tile to two, decreasing the number of tiles from 37 to 19 (see Figure 10); the player starting positions were were modified, from all players having started in the middle of the board to starting with equal distance from each other in the outer ring; the victory condition was changed from 15 points to seven occupied tiles; and the procedure for occupying a tile was revised. In the new procedure, if a player wished to occupy an unoccupied tile, instead of letting the active player draw a card from one of the decks of cards with questions, the other players picked one card each and shuffled them together in a small pile. The current player then randomly picked one of these cards to answer the question written on that card, and the players from whose hands that card came (more than one player could pick the same card to be answered) were allowed to pose follow up questions and judged whether the answers were satisfactory or not. Attempting to occupy a tile already occupied by another player worked similarly, but in this case all players in the game picked cards to shuffle in a pile, and then the two players in combat, the aggressor and the defender, randomly picked one card each. The cards these players picked would then serve as the basis of a criticism, or "crit", duel (hence the "CRIT" in the name *CRITCON*) judged by the remaining uninvolved players. Furthermore, the question themes were also slightly changed from the categories "the final design", "the design process" and "values and context" to the similar "what" (e.g. what did you design), "how" (e.g. how did you design it) and "why" (e.g. why did you design it/the way you did), drawing in form and content on concepts used in Gispen's ethical toolkits for designers (2017). Not only the categories of questions but the questions themselves drew on those concepts. Finally, a detailed reference sheet with rules and *CRITCON* levels was designed and given to each participant.

[14] The alert system for defense readiness condition, DEFCON, of the United States Armed Forces, where successive DEFCON levels indicate higher perceived threat levels requiring higher levels of defense readiness (see e.g. https://fas.org/nuke/guide/usa/c3i/defcon.htm, accessed 31.5.2018). There is also a digital war game of the same name, wherein competing players are successively allowed by the game to act with increasing belligerence towards the other players for each DEFCON level until they are finally allowed to launch nuclear weapons towards one another (http://www.introversion.co.uk/defcon/, accessed 31.5.2018).

Figure 10: A view of the game *CRITCON* during the playtesting session. As can be seen in the image, the game board was smaller than in the previous iteration of the concept (under the title Weapon of Criticism). Each player had their own reference sheet with core rules and mechanics of the game and a hand of cards of questions they could issue to another player when that player was attempting to occupy a tile. When the image was taken, all players had already occupied one tile each, and the red player was attempting to occupy the yellow player's tile in a criticism, or crit, duel.

The format of the workshop was similar to the previous workshops: On May 21 2018 between 16:00 and 17:00, playtesters without previous experience of the project were asked to try the game out, to think aloud and discuss as they played and to take breaks for more thorough discussions. However, rather than taking a break to redesign parts of the game, aspects of the game were modified as the playtesters were playing to try out new configurations. Only after the playtesters had played for some time were they informed about the purpose of the design game.

The participants of this session had meaningful critical feedback, despite pieces of feedback contradicting one another, and the prototype was generally experienced very positively by the participants, with claims that they could see themselves playing a design game like this.

Negative feedback

- Board too large and other players too easy to avoid
- Unclear whether individual designers should reflect on own design projects or if a design group should reflect together on a common design project
    - And also unclear whether to reflect on the same design project throughout gameplay session or not

- Question cards too visually identical
    - Differentiation through e.g. shapes and colours could improve identification of the different categories of cards
- Meaning of content of question cards not always self-explanatory
    - Inclusion of examples or brief explanatory text of the questions could improve gameplay flow
- Usage of props not sufficiently explored
    - Other props could be introduced, e.g. signs for approval or dismissal of answers, sand clocks to limit time for different actions, paper slips for anonymous voting
- Gameplay at times simultaneously unclear and undifferentiated
    - Main example being gameplay surrounding occupying a tile, and occupying a free tile compared to occupying an already occupied tile, especially differences between roles of occupying and resisting player and rules for judgement
- Role of non-answering/non-occupying players too inactive
    - Insufficient actions for players when not occupying or answering question
- *CRITCON* levels experienced as limiting to gameplay experience
    - Removing them could support a more varied and dynamic, and ultimately more engaging, gameplay experience
- Currently possible and not discouraged to judge other players' answers as unsatisfactory out of spite, which was deemed problematic
- A minor issue that such a game was not deemed to have any meaningful uses in the middle of a design process in non-evaluation phases
- Further engagement of all players in occupation and duel mechanics was recommended
- Placing question card being answered face down could facilitate interesting dynamics and open up for new gameplay mechanics related to guessing

Positive feedback

- Physical game props were highly appreciated (especially the game board), seen as contributing very strongly to an engaging gameplay experience and central to motivating the reflective activity
- Playtesters could see more than one meaningful use case for the game concept
    - As recreational intermission during an design process to reflect on previous experiences/refresh old knowledge, e.g. to work through a "designer's block"; or as part of an evaluation phase of a project being finished to bring individual and collective experiences to the surface, both of the artifact/system designed and of the design process as such (and thus also supporting designers' capacity to communicate and potentially defend their design choices)
- Categories of the question cards of "what", "how" and "why" experienced as meaningful
    - MDA model in game(play) design suggested as another basis for the questions
- CRITCON levels an interesting concept despite negative feedback
- Engaging all players in submitting question cards for occupation or duel was appreciated
- Placing question card being answered face up facilitated follow-up questions and voting

5.2.5 Playtesting BD II: Baphomet's Design

Similarly to previous playtesting workshops, four participants were selected to test the game in this session on May 25 2018 at 11:00-12:00. Two of the participants were the same two who had participated both in the group design workshop and the playtesting of the first iteration of Breeding Deliverables. As previously, playtesters were asked to think aloud and discuss as they played and were informed that there would be breaks in which the playtesters would have the chance to redesign the game. However, no such break was taken due the remarkable experience of the playtesters of the game, which will be described more in-depth as part of their feedback below after the description of the game.

After playtesting the prototype of *Breeding Deliverables*, the concept of the game was re-designed using the feedback gathered from the playtesting, and this new design was nicknamed Baphomet's Design[15]. As with the previous iteration, the new game design involved players role playing abstract designers with cards as the central gameplay component, but instead of "feeding cards" they were called "design process cards". All cards had three gameplay properties: one of three "types"; one of five "values"; and one of two "value mediations". The types were based on the ideation, prototyping and evaluation stages of a design process, and the value mediations were either a plus or a minus sign. The values were loosely based on concepts from Gispen's toolkit (2017), specifically the two called Moral Value Map and Moral Agent, and were generated through an application of affinity diagramming with all the moral concepts from the toolkits: Equality; Superiority; Control; Stimulation; and Harmony. Each of these five values had three "subvalues" respectively, also drawn from the moral concepts and included with the aim to make their respective values multifaceted and (as an intended consequences) easier for players to relate to. The significance of the three properties of a design process card depended on which of three "contexts" they were put into play in.

[15] The nickname *Baphomet's Design* (originally *Design of Baphomet*, but rearranged to match the abbreviation of the first nickname, "BD") was vaguely inspired by the mental image of the player-designers procedurally contributing to a central design circle to generate a design and the likeness of this act to a hypothetical scenario of a group of people conjuring up an occult deity. Baphomet is a goat-headed figure from western occultism (Strube 2016), and the goat-head of Baphomet has in some instances been depicted fitted within a pentagram (de Guaita 1920).

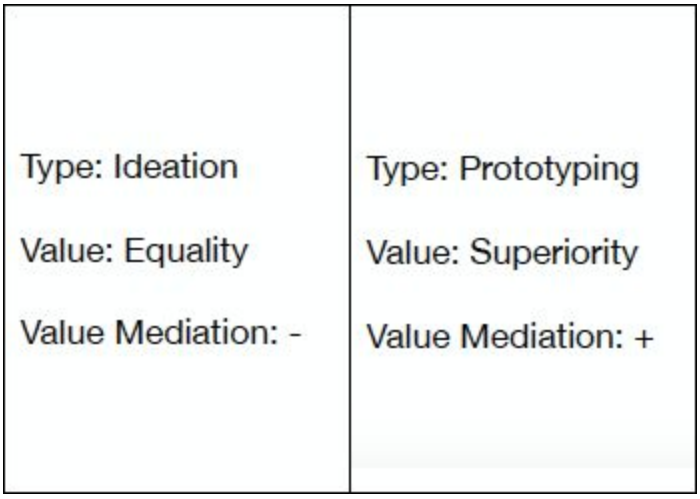

Figure 11: Two examples of design process cards of different types, values and value mediations.

One such context was the “designer sheet”, which could be conceptually compared to character sheets from pen-and-paper role playing games and were improved upon from the previous iteration, Breeding Deliverables. The intention with the designer sheets were to differentiate players’ in-game motivations, strategies, tactics and actions from one another by supporting individual and randomly generated settings for each player. These settings, or stats, were “designer strength” and “weakness”, “positive” and “negative personal values” and “personal intentions”. In this iteration, designer stats were generated by randomly placing two design process cards face up in the spaces corresponding to the first four aspects on the designer sheet and one card face down in the space corresponding to personal intentions. Cards placed by a player in the first four spaces of their designer sheet contributed positively or negatively to the effects of cards played by the player, while cards in the final space determined the victory condition for that player.

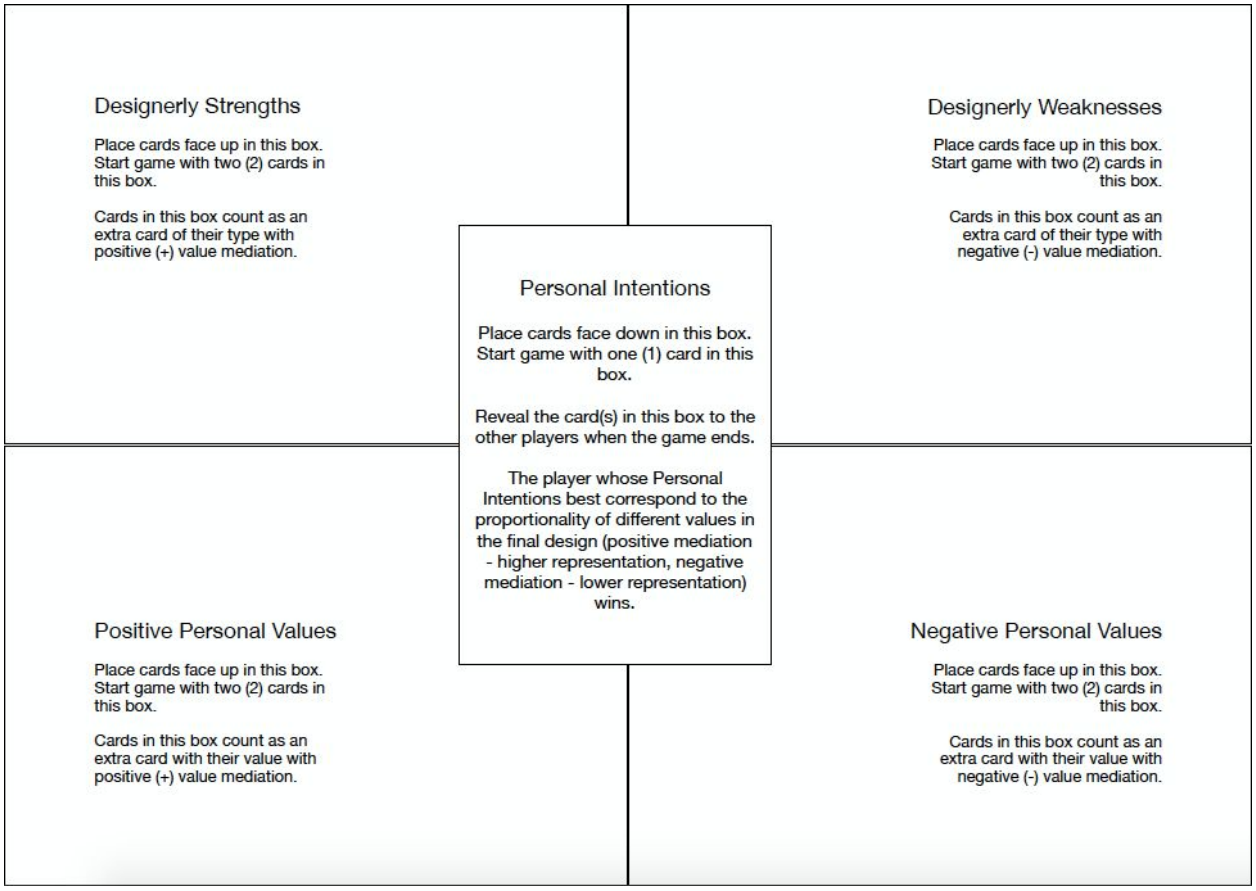

Figure 12: The designer sheet and its “context” for the design process cards, the different properties of the designer.

The second context was the so called “design circle”, carrying the most visual aesthetic connection to the eponymous fictional being of the game with an upside down pentagram inside a circle. This design circle was similar to the designer sheet in that it featured spaces corresponding to different stats: “negative” and “positive design contexts” and “positive” and “negative design intentions”. Unlike the stats or properties of the designer sheets, these aspects were relevant for all players. The first two affected the effects of cards played by any player while the second two determined the common end conditions for the game (not to be confused with individual victory conditions).

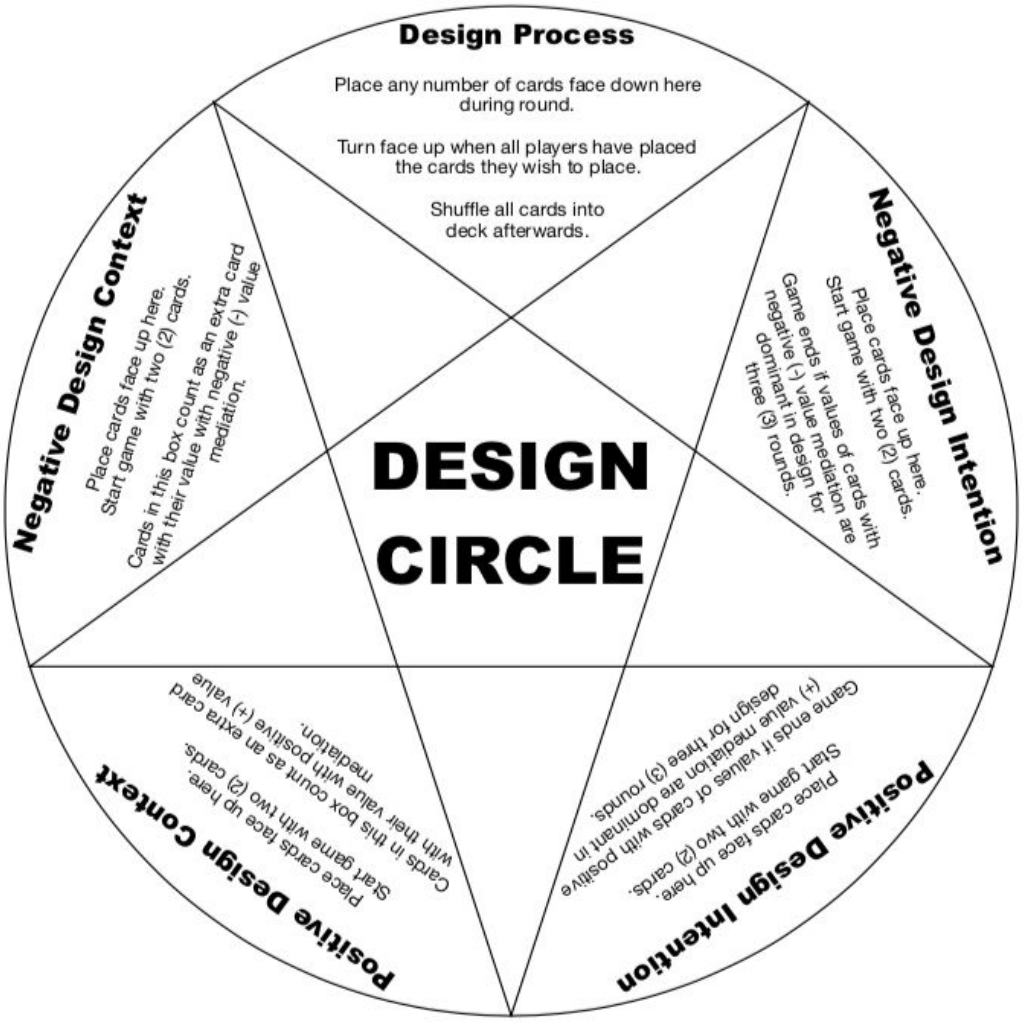

Figure 13: The design circle and its “contexts” for the design process cards, the four lower corners of the circle and the upper corner of the circle.

Finally, the third possible context for the design process cards was physically the close to the second context, the design circle, but was distinguished as a part of the gameplay. One of the areas of the design circle not yet mentioned was labeled “design process”, where players placed cards each round to influence the progress of the game. As previously described, the effect of the played cards were modified by individual and common positive and negative properties. Once all players placed their desired number of cards in the design process area, their effects were computed and executed whereafter the cards were shuffled back into their deck and a new round began. The effects took place on a “value sheet”, where each of the five values described above was represented with a square, on which the players placed dice and rotated those dice to represent the quantity of a certain value. These quantities were the triggers of the end and victory conditions in the game. Most elements of the game featured brief explanations on them, and a separate reference sheet of the game and its gameplay was available for each player.

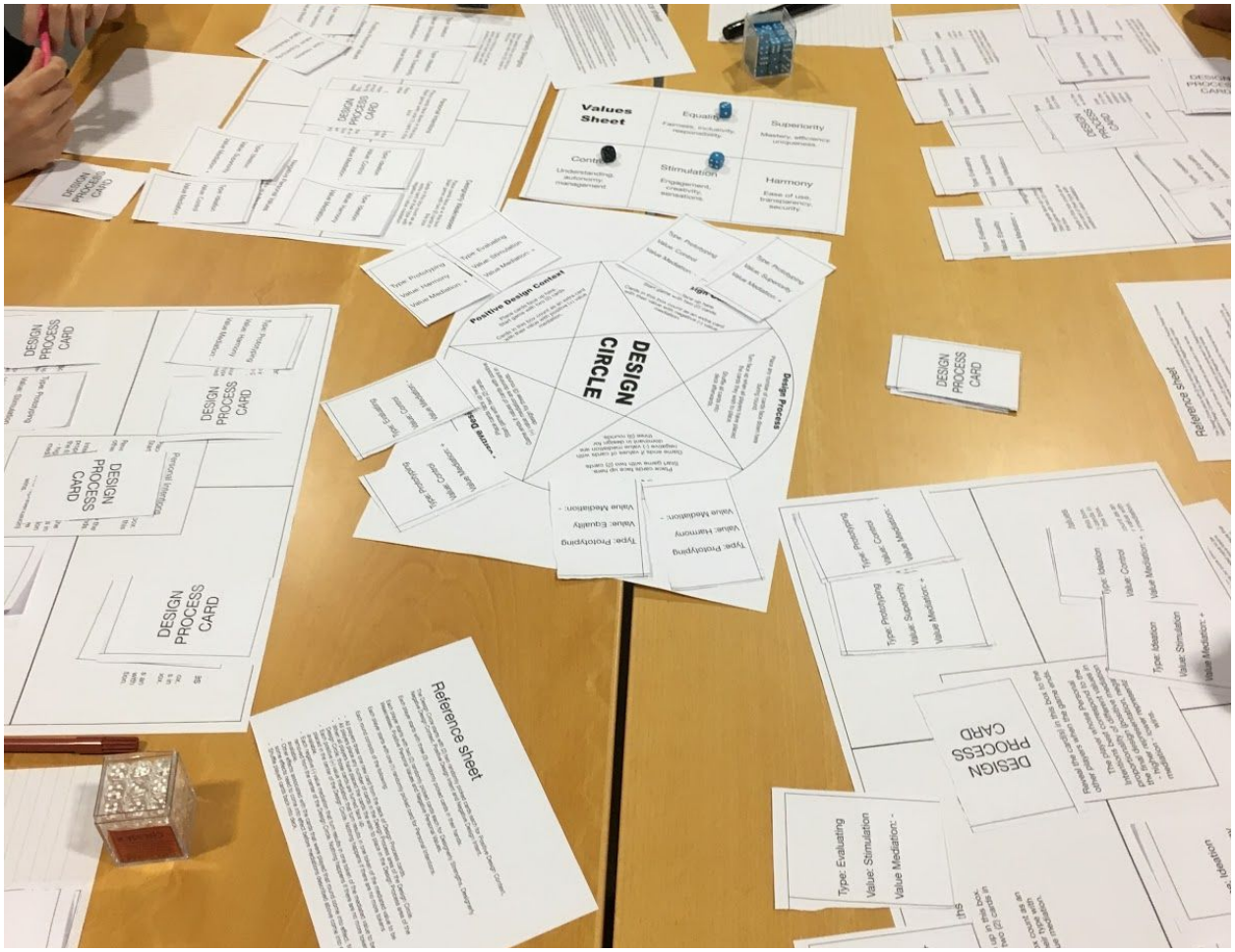

Figure 14: A view of the game *Baphomet's Design* during the playtesting session.

The playtesters, as previously stated, had a remarkable experience of the game during the playtesting session, in that they found the game remarkably complex and difficult to play. They expressed this both while playing the game and in the discussion afterwards, and this high level of complexity and difficulty also made it harder for the participants to suggest concrete changes to elements of the game. However, the playtesters nonetheless managed to provide some useful feedback on the gameplay in addition to the previously mentioned general grievance, although many of them connected to those grievances in one way or another.

Negative feedback

- Gameplay, especially end and victory conditions, and purpose felt unclear due to complexity, randomness and lack of control, heavily affecting gameplay engagement negatively and consequently hampering the extrinsic aim of reflection as well
    - Could be mitigated by allowing conscious choices when generating designer stats in the beginning of the game, especially to have a chance to match stats to individual victory conditions (while also giving players an easy way of avoiding uninteresting clashes between negative and positive stats)

    - Props such as the design process cards and the dice overloaded with redundant information and use areas with too few distinguishing visual aesthetical properties as guidance
    - Too large amount of calculations required from the players in each turn
- Too little in-game interactions between players
    - For example manipulating and maneuvering other players in different ways
    - Post-game interactions, e.g. discussions, could be facilitated by different winner categories

Positive feedback

- The playtesters suggested that more in-game interactions between players in combination with the existing practice of descriptive text on physical game elements would strongly contribute to reduced complexity.

5.2.6 Playtesting Weapon of Criticism III

The third iteration of *Weapon of Criticism* did, unlike the second iteration, *CRITCON*, not have a unique name, which could be explained in part by the fact that this iteration was to a large extent only a refinement of certain aspects of previous iterations. All questions from iteration two, CRITCON, were refined to much more strictly adhere to insights from earlier material review, and questions from the first iteration, *Weapon of Criticism*, were adopted and rephrased to also be compatible with the new character of the questions of the game. All the question cards were also given minor aesthetic updates to direct players' attention to the essence of each card, that is whether the task given by the card was to describe, explain or reflect on a certain topic and what the central aspect of that topic was.

The playtesting of this prototype on June 1 2018 between 14:00 and 16:00 differed slightly from other playtestings as well as from the original intention with the playtesting, as two of the four participants who had been recruited for the session did not join the session in the end. While this posed a unique challenge, it was partially remedied by participation of the facilitator (and author of this report) as a playtester, at least raising the number of participating playtesters to three. An active choice made as a consequence of this situation was to remove, to a very large extent, the formal boundaries between strictly playtesting, speaking aloud, discussing and redesigning. Of the two ordinary participants, one had previously tested other prototypes and the other did not have any experience with the previous prototypes of the project.

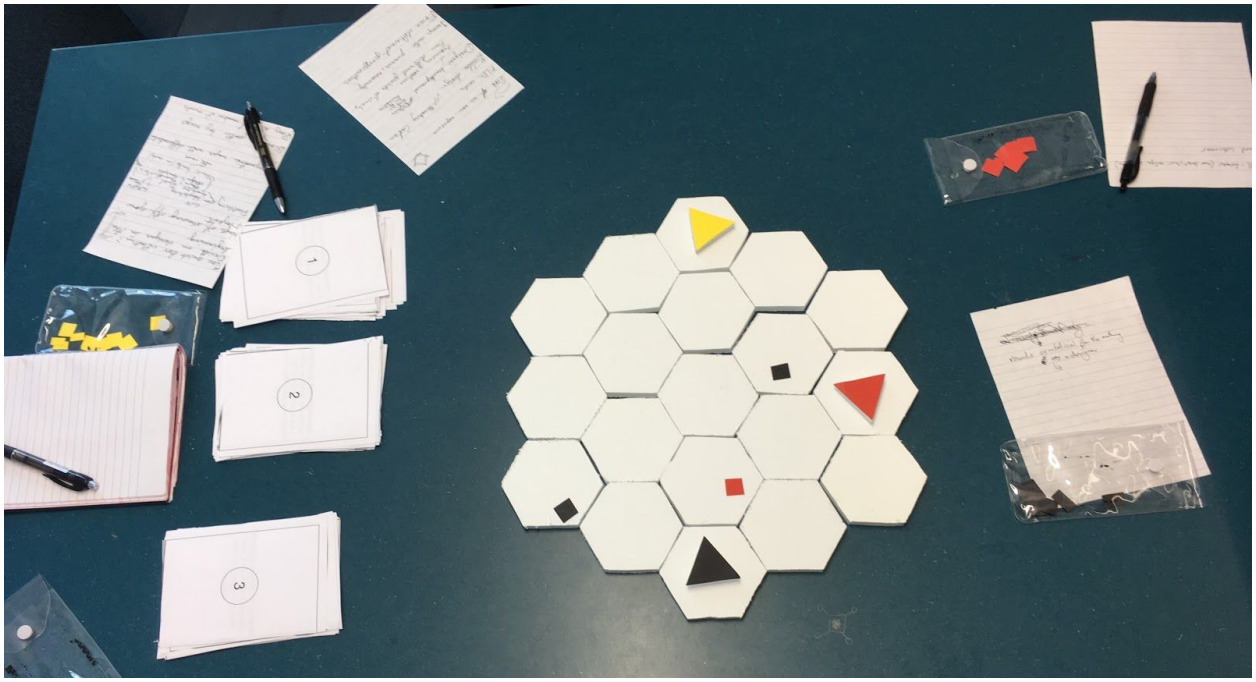

Figure 15: A view of the game *Weapon of Criticism III* during the playtesting session.

Despite the problematic setup, the playtesting session generated ample feedback on a number of interesting aspects, some of which had already been addressed in previous sessions and some not, and some of which dealt with refining existing the existing gameplay elements and some with the transformation of the gameplay as a whole through addition or removal of elements.

Negative feedback

- Risk of player isolation and players not paying attention to other players' answers
    - Additional mechanics for intervening (e.g. by giving the active player a task in addition to or instead of answering a question)and rewarding follow-up questions (and potential interventions) could alleviate this
- Mechanics in occupying a free tile and an already occupied tile lack in differentiation
    - Specifically designed mechanics (e.g. components such as question cards and rules regarding them) for the different contexts could benefit the general gameplay as well as the designerly reflections
- Mechanics related to occupying a tile too simplistic
    - Expansion of the system of placing tokens on game board tiles to signify occupation suggested, for example making an occupied tile impassable or completely unoccupiable for other players. Further discussions included the possibility of letting tokens of different players be stackable, or that the pieces should be more complex to allow combinations in various ways.
- Missed opportunity to more strongly relate mechanisms such as the "CRITCON levels" to concepts such as designerly maturation.
- Gameplay experience of insufficient depth

    - Recommended to explore applications of concepts of such as rich experiences (Fokkinga & Desmet 2013) and playfulness (Lucero et al 2014)
- Conflicts between gameplay and activity of reflection
    - Judgment of other players' performance when attempting to occupy a tile or resist occupation influenced by whether a player wanted to win the game or perform and encourage deep reflections on designerly practice
    - Gameplay potentially too quick for reflections, especially if designs to reflect on are not properly decided upon early in the game
- Insufficient variation in tasks to perform when attempting to occupy a tile, especially an already occupied tile
    - Suggestions were e.g. various very rapid prototyping and analysis challenges, interpretation of questions cards explicit part of gameplay and concrete references to (different) designerly identities and practices of players

Positive feedback

- A positive general experience
    - Good use of props as a means to achieve player engagement
    - Questions on cards and rules for player interactions meaningful basis for designerly reflections

6. Result

The following section describes the main final outcome of the design process associated with this master thesis: *Weapon of Criticism*, a competitive board game to be played by interaction designers in group to elicit reflections on their designerly practices through questions about previous design processes they have participated in and artifacts and systems they have designed. Primarily, the game is ultimately intended to encourage reflections on how properties of the designer and the design context affect design processes and designs. As such, it is the design result of an attempt to answer to the research question of the master thesis:

> *How can a game be designed to support designers in evaluating and reflecting on the influence they and their circumstances have on their design processes?*

The (attempt at an) answer is expressed in the design of the game through questions which reflect aspects of the research question of the master thesis and which players must answer to progress towards the end of the game. Furthermore, the attempt at answering the research question, i.e. the master thesis work, simultaneously generated a general research result. This latter result corresponds to the insights of the answer to the research question of the thesis. As this thesis is a work of *research through design* (see subsection 4.1.1), it should be noted that "its theory [should be] considered as annotation of the artefacts that are its fundamental achievement", and furthermore "that theory underspecifies design" just as well as "theory is underspecified by design," (Gaver 2012). As previously stated, the design result, the board game *Weapon of Criticism*, provides one possible design answer to the research question. Expressed in another way, the design game is motivated by and provides one possible expression of the more general insights generated by the research-through-design process of this thesis. Simultaneously, the "design theory" of the thesis (i.e. the research result) only accounts for a limited number of dimensions of the design result, *Weapon of Criticism*.

The first subsection gives a detailed description of the design result, i.e. the board game, supported by terminology from literature on gameplay design; the second subsection elaborates on the research result, i.e. the insights generated through the design process and which answer the research question, motivating the design of the game by relating it to the research result and to its theoretical foundations. This section is concluded by a subsection on a number of possible improvements applicable to the current design of *Weapon of Criticism*.

6.1 Design result

The design result, *Weapon of Criticism*, is a reflective design game for three to four players, with player actions and interactions mainly revolving around a game board on one hand, where players compete over spatial control, and question cards on the other, the essential means for competition. The goal of the competition is to control a portion of the game board of a certain

size. Furthermore, the aim of the game as a designed artifact is to elicit reflections on their designerly practices through questions about previous design processes they have participated in and artifacts and systems they have designed. Primarily, the game is ultimately intended to encourage reflections on how properties of the designer and the design context affect design processes and designs. This subsection describes the components of the game and how the game is played by how it set up and how the central game mechanic, occupying a tile, is played out. Moreover, the end of a game session, the post-game, is presented as well as some possible variations of the game. For a “print-out kit” featuring all rules and components ready for play, please see appendix D.

6.1.1 Game components

The game includes the following physical components:

- 19 hexagonal game board tiles
- 4 triangular player pieces in red, black, yellow and blue
- 40 circular player tokens in red, black yellow and blue (10 of each color)
- 72 question cards (3 copies of 8 unique cards in each category: description, explanation and reflection)

List of questions on question cards

Every question in each category is featured three times in the game (see figure 12 for an illustration of what the fronts and backs of the cards look like).

- Description cards (carrying the number “1” on the backs of the cards)
    - Describe a recent artifact or system you have designed with an emphasis on what it does.
    - Describe a recent artifact or system you have designed with an emphasis on what type of artifact or system it is.
    - Describe a recent artifact or system you have designed with an emphasis on what it looks like.
    - Describe three different deliverables from a recent design project.
    - Describe at least one similar product to a recent artifact or system you have designed.
    - Describe the design process of a recent artifact or system you have designed.
    - Describe some usability goals of a recent artifact or system you have designed.
    - Describe some user experience goals of a recent artifact or system you have designed.
- Explanation cards (carrying the number “2” on the backs of the cards)
    - Explain how people (might) use a recent artifact or system you have designed.
    - Explain how a recent artifact or system you have designed supports its usability goals.
    - Explain how a recent artifact or system you have designed supports its user experience goals.
    - Explain the interactions of a recent artifact or system you have designed.

    - Explain the uses prescribed by a recent artifact or system you have designed (e.g. a speed bump prescribes slowing down).
    - Explain some choices you had to make in the design process of a recent artifact or system you have designed.
    - Explain some challenges you experienced in the design process of a recent artifact or system you have designed.
    - Explain how you prototyped or otherwise expressed your design in the design process of a recent artifact or system you have designed.
- Reflection cards (carrying the number “3” on the backs of the cards)
    - Reflect on why a recent artifact or system you have designed exists.
    - Reflect on what your personal intentions were with a recent artifact or system you have designed.
    - Reflect on how your personal values affected a recent artifact or system you have designed (or the design process thereof).
    - Reflect on the ethical consequences of a recent artifact or system you have designed.
    - Reflect on how the design context affected a recent artifact or system you have designed (or the design process thereof).
    - Reflect on how your personal experiences affected a recent artifact or system you have designed (or the design process thereof).
    - Reflect on how you were affected by the design process of a recent artifact or system you have designed.
    - Reflect on what values might be mediated by a recent artifact or system you have designed.

6.1.2 Setting up the game

To set the game up, players start by combining the hexagonal board tiles into a larger hexagonal board. Then, players select one of the four colours (red, black, yellow or blue) each, collect the player piece and the player tokens of that colour and place their player piece on the outer ring, two tiles apart from one another. If the question cards are not yet sorted in their corresponding pile, players sort them, place them next to the game board and collect three description cards, labelled with “1” on the backs. Finally, players may roll a die, play rock-papers-scissor or perform some similar actions to decide who starts. An illustration of what the game may look like when set up, ready to be played, can be seen in figure 16. An additional preparatory step for the players which is not always applicable is that they should decide whether they wish to only focus their reflections on a common design project in which all have participated previously or if players should be free to reflect on any design project.

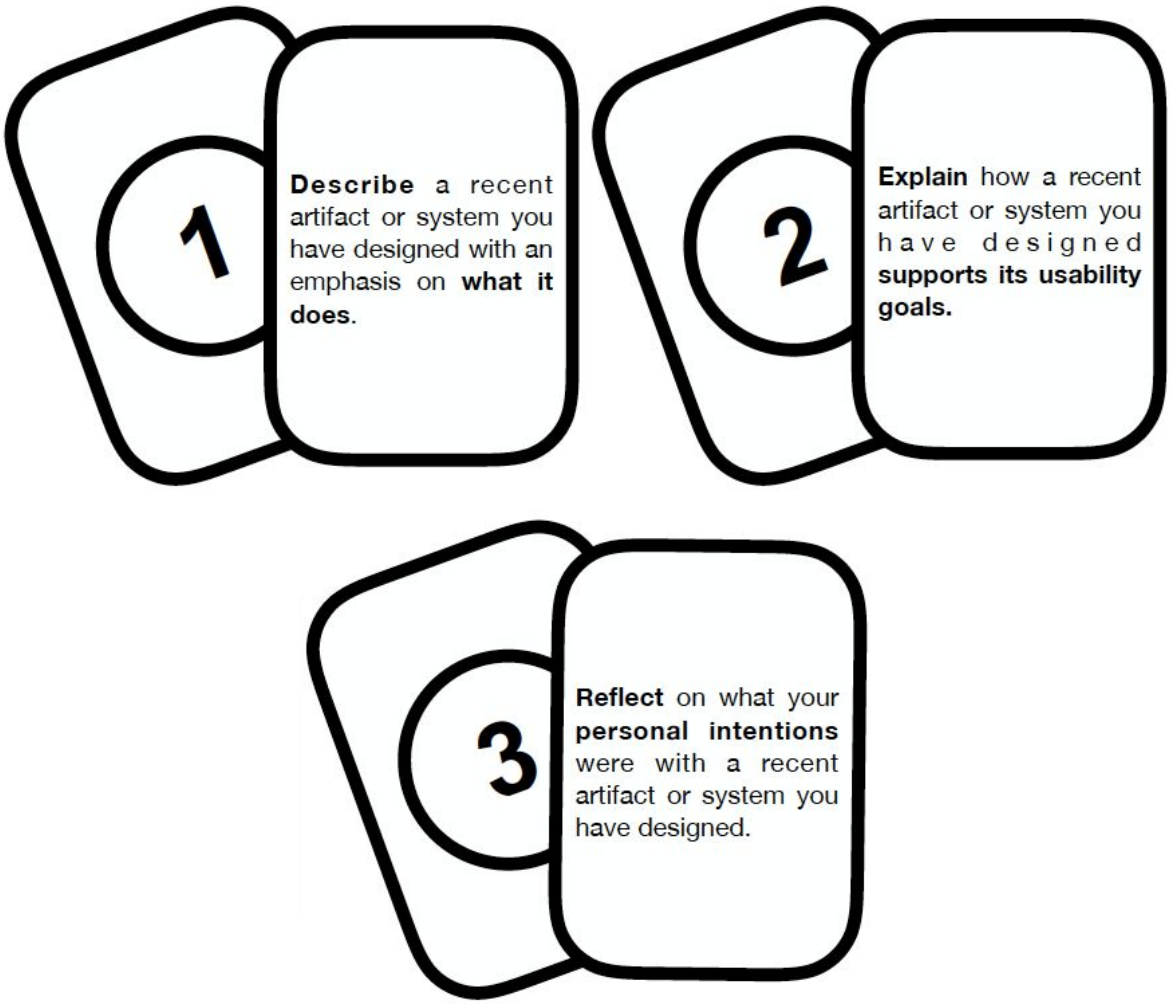

Figure 15: Illustration of front and back of question cards from the three different categories: Description (1), explanation (2) and reflection (3).

6.1.3 Gameplay description

During their turn, each player may move their piece from its current tile to an adjacent tile and attempt to occupy that tile. There are two different procedures involved in attempting to occupy at tile, depending on whether it is empty or already occupied by another player (indicated by the presence of a player token); these are described below. Independent of the outcome, all players draw a new card each at the end of a turn according to the following pattern: after the first player's first turn, players may only draw cards labelled with the number "1"; after the first player's second turn, they may also draw cards with the number "2"; and finally, after the third turn, they may draw any card. The game ends when one player manages to occupy five tiles simultaneously.

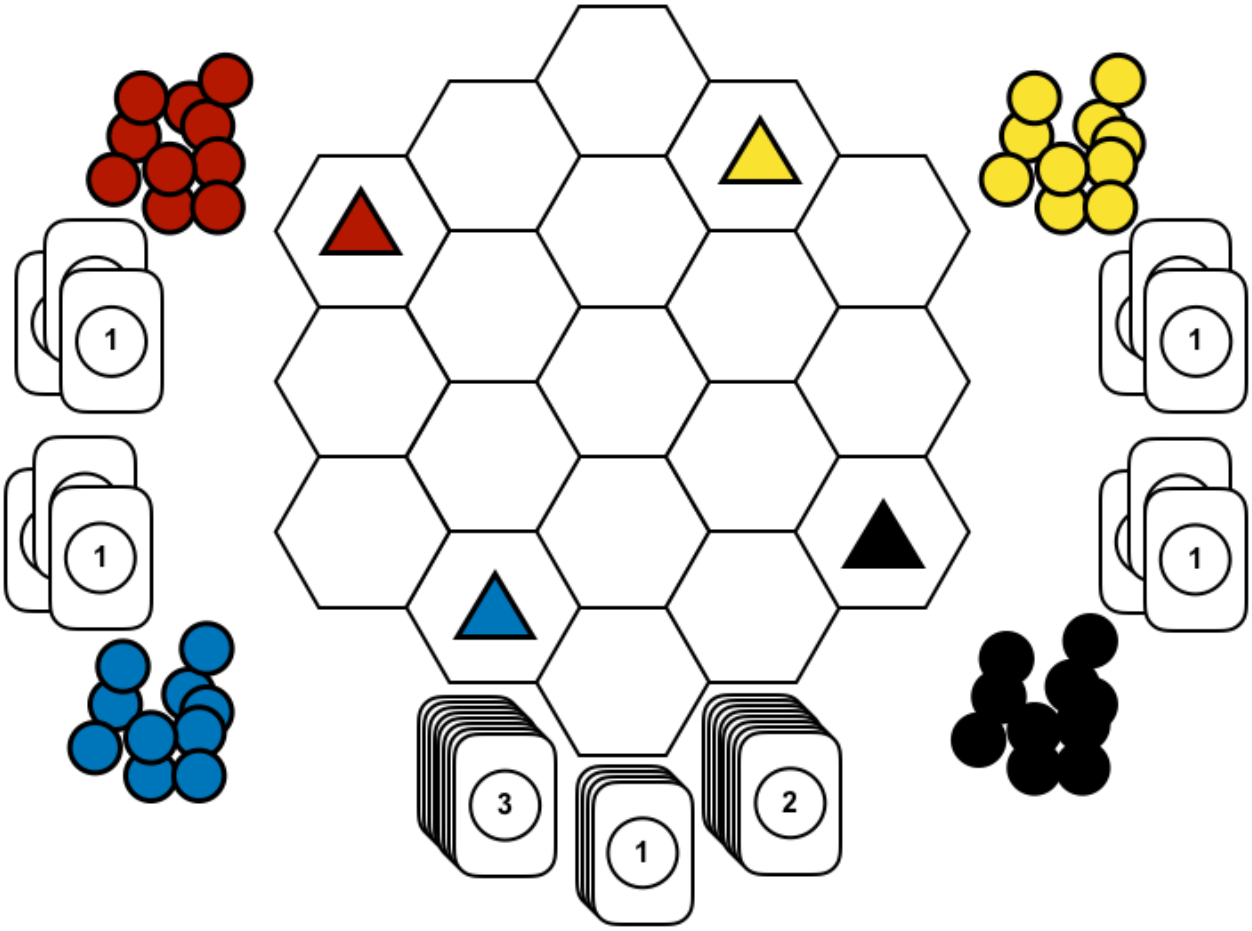

Figure 16: Illustration of game set up for four players and ready for playing.

Attempting to occupy an empty tile

When a player attempts to occupy an empty tile, the other, non-occupying, players choose one card each from their hands and place them face down in a pile. Once all non-occupying[16] players have placed their cards in the pile, the pile is shuffled randomly so as to make it harder (or actually impossible) for the occupying player to tell which other player selected which card. The occupying player then picks one card from the pile at random, and places the remaining cards into their corresponding question card piles next to the game board. The contents of the selected question card is then read aloud by the occupying player and the card itself placed face up somewhere so all players can see the contents of the card. Then, the non-occupying players who played that card (up to three players may potentially play the same question card, as there are three of each card in the game) identify themselves and are thus given a special role in the current attempt to occupy a tile. Now, to attempt to occupy the tile, the occupying player answers the question written on the question card to the best of their abilities, and the non-occupying players who identified themselves as the ones having played that card may now

[16] The term “non-occupying player” is an attempt at shortening the expression “player currently not attempting to occupy a tile”. An issue with denoting players as “active” and “inactive” is the active role non-occupying players play in the success of an occupying players attempt to occupy a tile.

ask follow-up questions which relate to the content of the question card. For example, if the question (or task) was “Describe a recent artifact or system you have designed with an emphasis on what it does”, then the follow-up questions should relate either to the act of describing (e.g. asking to expand on the description in some manner) or to the what the artifact or system does (e.g. asking more about some actions), or both. When there are no more follow-up questions left, all the non-occupying players (whether or not they posed follow-up questions) individually decide whether the occupying player answered the question card in satisfactory manner, taking into consideration the actual contents of the question card, e.g. if the occupying player actually provided a description when a description card is in play. If the decision is positive, then the occupying player successfully occupies the tile being attempted to occupy, and a circular player token (of the successful player’s colour) is placed on the tile. A potential draw between votes (e.g. if there are three players in total, resulting in one occupying player and two non-occupying player in each turn) equals a decision in favour of the occupying player.

Attempting to occupy an occupied tile

Attempting to occupy a tile already occupied by another player works in some ways similarly to attempting to occupy a free tile, but with some differences. When a player attempts to occupy a tile already occupied by another player, all players choose one card each from their hands and place them face down in a pile. Once all players have placed their cards in the pile, the pile is shuffled randomly so as to make it harder (or actually impossible) for the occupying and resisting player to tell which other player selected which card. The occupying and resisting players then pick one card each from the pile at random and place the remaining cards into their corresponding question card piles next to the game board. The contents of the question card selected by the occupying player is then read aloud by the same player and the card itself placed face up somewhere so all players can see the contents of the card. Then, the occupying player answers the question written on the question card to the best of their abilities, and the resisting player may now ask follow-up questions which relate to the content of the question card, identically to the non-occupying players when the tile under an attempt of occupation is free. When there are no more follow-up questions left, it is the resisting player’s turn to read the contents of their question card aloud and to answer it and follow-up questions from the occupying player to the best of their abilities. Then, it is up to the players who are not involved in the duel to individually decide who of the occupying and resisting player answered their question card in the most satisfactory manner, taking into consideration the actual contents of the question card. The winner among the occupying and resisting player gets to occupy the contested tile (i.e. the occupying player gets to replace the resisting player’s player token on the tile with a player token of their own if they win, and the resisting player gets to keep the their player token on the tile if they win instead). In case of a draw, the resisting player counts as the winner and gets to keep their tile.

End of game

As mentioned in the introduction to this subsection describing the gameplay of *Weapon of Criticism*, a session of the game ends when one player occupies five tiles simultaneously (i.e. it

is not enough for the player to have occupied five tiles in total throughout the gameplay session). While the game is then formally over, for the sake of enhancing their reflections and for facilitating the reflections in having a lasting effect, a post-game debriefing among the players is encouraged. Specifically, players are encouraged to document insights from the session, whether those insights were encountered through their own answers or through those of other players, and also to discuss insights and questions about issues touched upon in the gameplay session with other players. To support the debriefing, the players can ask themselves and one another the following question: “What did you learn about the relations between yourself as a designer and your design practices?” They may also use make use of the question cards for the post-game debriefing, for example by revisiting questions they answered during the gameplay session.

Possible game variations

Any artifact or system may be varied in virtually infinite ways in its uses by the final users far beyond its intended uses, and in extension, user experiences. While this applies to *Weapon of Criticism* as well, there are some variations that are still conducive to the purposes the game has been designed for (Subsection 6.3 presents some larger issues with the current design of *Weapon of Criticism* which are of consequence to possible variations of the game and its gameplay.).

The game board consists as previously stated of three concentric rings of hexagonal tiles (or two such rings around a singular tile). In reproducing the design game, one may choose between creating a single solid board with the 19 hexagonal tiles marked on the board or creating 19 separate hexagonal tiles. The latter option allows players to reconfigure the game into other regular or irregular shapes than a large hexagon, opening up for new dynamics between the players themselves and between the player and the gameplay mechanics. However, a single solid board simplifies the setting up of the game substantially.

As the rules are described, the game ends as soon as any player is occupying five tiles simultaneously. This may be changed by players to a lower or a higher number of tiles as method for varying the (expected) length of a gameplay session. Players may also combine this with variations in the rules of how easy it should be to occupy a tile, how harshly judgements should be made and how judgements or votes should count towards success or failure to occupy a tile. For example, reducing the number of tiles required to win might be combined with harsher judgements on whether a question was given satisfying answers and with a unanimous vote to be required for success. Another way to extend the gameplay session is to allow any non-occupying player to pose follow-up questions during an attempt by a player to occupy a tile, and not only the non-occupying player who played the question card being answered as part of the attempt.

Finally, players may vary the game by introducing question cards of their own. While there are no blank question card templates to be used for such a purpose, they are easily produced. If players do not already have new questions they would like to introduce to the game, they may

analyze the existing questions and generate new ones from the analysis, a task which should be fairly straightforward for most designers (the intended user group of *Weapon of Criticism*).

6.2 Research result and design motivations

Design theory and artifacts mutually underspecify one another. At the same time, however, artifacts embody design theory and design theory motivates artifacts or “give dimensionality to [their] design space” (Gaver 2012). The design theory of this master thesis corresponds to the research result of the thesis, which as stated is the answer to the research question:

> *How can a game be designed to support designers in evaluating and reflecting on the influence they and their circumstances have on their design processes?*

This research result, or design theory, has two sources: the practical design process involving different forms of ideation, prototyping and evaluating (especially through playtesting), and the theoretical frameworks identified by studies of theoretical literature and practical work of others. These two sources are simultaneously also what motivate the final design of the design game *Weapon of Criticism*. While the practical aspects motivated design details both large and small in dialogue with the theoretical aspects, the theoretical aspects motivated the design project as a whole.

This subsection presents the practical and theoretical aspects as design motivations of *Weapon of Criticism* organized after the three areas identified in section 3. These aspects are however analogous to and generalizable as aspects of the research result (or design theory). For sake of ease, this subsection concludes with a summary of general research results not expressed in terms of the design result *Weapon of Criticism* or thematically organized after the underlying theoretical frameworks.

6.2.1 Motivations from design process

Weapon of Criticism was designed through an iterative design process with multiple occasions for evaluations and external input, and the one topic which was consistently raised (explicitly and implicitly) through this process was that of gameplay engagement. Two interrelated dimensions that were important in improving the gameplay engagement of *Weapon of Criticism* through the design process were those of the pace of the game and the extent of player-to-player interactions. Diminishing the game board to its current size and involving other players in the active player’s turn are two measures that were both suggested in critical feedback first and later commended with positive feedback by players.

Furthermore, much of the theoretical motivations of the design game below is very concretely supported by insights generated in the design process, such as the usefulness of gameplay as means for the simultaneously structured and unpredictable activity of reflection. The “gamefulness” of props such as the board, the different pieces and tokens and the question

cards, together with the social and competitive dynamics, works well to break down barriers between the designers and designerly reflections. For example, while the mechanism of only progressively allowing access to all categories of question cards received some slight criticism, the general concept of laddering reflections through the selected categories (as well as the categories themselves) of questions to drive the reflections was heavily appreciated.

6.2.2 Motivations from theoretical frameworks

One way to conceptually understand the whole of *Weapon of Criticism* as composed of parts is the following: 1) A design game 2) for reflection 3) on designerly practice (which in turn can be understood as consisting of designer, design context, design process and the design itself as well the relations between those components). Below is a brief summary of the theoretical frameworks of those parts which motivated the design process and ultimately motivates the final design of *Weapon of Criticism*. The summaries are also accompanied by (non-exhaustive) examples of how the frameworks motivate the design.

The relations of designer, design context, design process and design

On a fundamental level, the intention of the game, encouraging reflections on certain relations between designer and design, is motivated by the understanding that human practice and its results are influenced by properties of the individuals and (physical, digital or intellectual) tools involved in the practice and the (social, cultural, physical etc.) contexts of the practice. This understanding is supported by the human-artifact model of Bødker & Klokmose (2011), which builds on the tradition of activity theory of e.g. Vygotsky (1978), by theories on assumptions and values “built into” artifacts and systems of Sengers et (2005) and Grace (2014) and by the constructivist theory of developmental psychology as expressed in for example Papert & Harel (1991).

While the design process of *Weapon of Criticism* involved moments where the idea of representing these concepts and their relations in the mechanics and dynamics themselves was highlighted (and even explored to an extent), this theoretical basis is currently present in and motivated the content of the question cards, i.e. the questions. It may be argued that the first two categories of questions, description and explanation, touch upon this part of the theoretical background (e.g. they mention designs, design tools and design processes), it is primarily in the third category, reflections, where it is extensively expressed. The cards in the reflections category explicitly pose questions on topics such as the influence of personal values and intentions and of design context on the design process and the design.

This way of handling the intended topic of the game can be contrasted with e.g. A Series of Interesting Choices (Svedäng n.b.), the concept design games of Habraken & Gross (1988) and the Gender Equity Toolkit (Acaroglu 2016). These games, unlike *Weapon of Criticism*, all have in common that they do not (mainly) transfer intended experiences and insights to players through text (although text and also speech may have important roles in the game) but through the gameplay mechanics and dynamics themselves. In other words, they allow players to

roleplay behaviours, design games and explore design concepts as means to support practicing non- or anti-sexist behaviours, game design and design research. In this sense, *Weapon of Criticism* is more closely related to games such as Biz-e-bee (SG4Adults 2016) and Moral Agent (Gispen 2017), which thematically feature entrepreneurial skills and competences respectively ethical and moral values as game components as means of supporting experiences intended to transfer certain knowledge. A number of thematic ideation games have the same as the latter two games in common with *Weapon of Criticism*, however they arguably also differ in supporting the intended transfer of thematic experience through mechanics and dynamics as the three former games do.

Reflections

The reflections being encouraged are structured around the question cards, the design of which is in turn motivated by the framework for reflection by Fleck & Fitzpatrick (2010), and to some extent that of Sengers et al (2005). Central to these frameworks is that it is in the final instance people, whether they are users or designers, who perform reflection, and thus that reflective experiences can ultimately only be designed for and not designed themselves. The framework of Fleck & Fitzpatrick emphasize the importance of considering the purpose of, the conditions for and the behaviours and activities associated with reflection, and provides a range of the latter divided into five levels, ranging from the lowest, description, to the highest, critical reflection. This framework is comparable to models frequently used in education, such as the SOLO (Structure of the Observed Learning Outcome) taxonomy as described by Biggs & Tang (2011). The taxonomy can be described as consisting of five levels of understanding, where the first actually corresponds to a lack of understanding. The remaining four correspond well to the five levels of reflection from Fleck & Fitzpatrick (2010), with the fourth level of the SOLO taxonomy corresponding to a combination of the fourth and fifth level of reflection.

This is most explicitly expressed in the design of *Weapon of Criticism* through the three levels of questions cards (description, explanation and reflection). Furthermore, the game medium of *Weapon of Criticism* as a tool for reflection provides a level familiarity and direction for the activity of reflection. Finally, the presence of and interactions with the other players, as well as the succession of content of the different question cards, also act to provide conditions for reflections, in a sense laddering an individual's reflections both dynamically (through follow-up questions from other players) and mechanically (by successively higher levels of reflections prompted by the question cards).

An occurrence of similar gameplay is that of Biz-e-bee (SG4Adults 2016), wherein players answer increasingly difficult questions after passing certain thresholds. However, it could be argued that the categories of question cards do not correspond to different levels of difficulty (even if there is some level of correspondence between category and difficulty), making the similarity only superficial. Some other games featuring some more or less superficial similarities are games such as the Design Play Cards (Chang 2013; Core77 2013; Eco Innovators 2013), the Game Idea Generations Games (Kultima et al 2008) and the Mixed Reality Game Cards (Wetzel 2017). They share the feature of laddering components of different categories, which

similarly to the question cards in *Weapon of Criticism* are not defined by successive levels of difficulty but by conceptual differences. Unlike the question cards, though, the sequential components of those games are designed to support idea generation and not reflection. There is a more interesting comparison to be made with the Gender Equity Toolkit (Acaroglu 2016), which features four activities which can be performed separately but can also be understood as forming a thematic arc. This arc starts with participants fostering empathy and ends with practically applying insights and skills collected through the arc in a mentoring session. While not explicitly intended for reflection as such but for changing behaviours, the Gender Equity Toolkit may be regarded as taking into consideration the ideas and concerns in the framework of Fleck & Fitzpatrick (2010) to support the highest levels of reflection, transformative and critical reflection (even beyond what *Weapon of Criticism* is designed for).

Gameplay

A central property of *Weapon of Criticism* is it being a game for designerly reflection, i.e. a reflective design game, instead of any other possible medium. The choice of a game and gameplay as mediums for reflection is motivated by the powerful capacity of games to provide simultaneously structured and unpredictable gameplay experiences. In this case, this affords players substantial freedom in describing, explaining and ultimately reflecting on their designerly practices in a clearly structured setting. The significant potential of games to support experiences through gameplay is expressed in literature on gameplay in general (Lundgren, Bergström & Björk 2009; Bergström, Björk & Lundgren) as well as in that on the specific game genres of serious (Susi, Johannesson & Backlund 2007; Laamarti, Eid & El Saddik 2014) and critical games (Grace 2014), where the gameplay of a game is designed for purposes external to a strictly aesthetic experience.

Obviously, one foundational design choice motivated by the theoretical framework on games and gameplay summarized in the previous paragraph is mentioned there as well: The choice to design a game. Moving on from the general to the particular, the game features as previously already explained a number of conventional and easily recognized gameplay elements, mainly a board, onto and along which players transport other elements (pieces and tokens), and cards, which players collect and play at different points in a gameplay session. More specifically, the cards, which feature questions related to the purpose of *Weapon of Criticism* as a reflective design game, are the means through which players compete for control over the game board. This leads to the core game mechanic: Battles. While the term “battle” is not explicitly used in other descriptions of the game, it serves well in this context for denoting the process players engage in when attempting to control more of the game board i.e. to occupy a tile. The battles of the game are performed by answering questions on question cards (and from other players). Although they in practice require balancing between challenge and (expectable) player ability to optimally support the intended purposes of the game, battles both in the abstract and in the concrete act as a meaningful and straightforward expression of the key theoretical property of games: simultaneously structured and unpredictable gameplay experiences. Furthermore, the battles of *Weapon of Criticism* are designed in such a way that a battle of any one player may

potentially become a meaningful contribution to the gameplay experience and reflections of other players.

An interesting comparison to make with other design games is with the Creativity Game (Gustafsson 2007), which explicitly features battles as a central game mechanic. While there are many differences between the two games (to begin with, the Creativity Game is as the name suggests a design game for idea generation and not for reflection), there is an interesting similarity between their battle mechanics. Specifically, the battles of both games allow players to win the resources of another player (notes with ideas in the Creativity Game, occupied tiles in *Weapon of Criticism*) and also to potentially win them back. Furthermore, battles are the mechanic in both games which ultimately leads to the end of the game and the victory of one player: *Weapon of Criticism* ends when one player wins by occupying five tiles simultaneously; the Creativity Game ends when one player wins by increasing the "level" of three ideas to three, which they can only achieve through battles (as may be apparent, the battles in the latter game have two different functions which players must choose between when engaging in battle).

6.2.3 Research result

The research result of the master thesis, or the "design theory" generated through the practical and theoretical thesis work, are the general insights serving to answer the research question (as well as annotating the concrete design result). To reiterate, the research question is as follows:

> *How can a game be designed to support designers in evaluating and reflecting on the influence they and their circumstances have on their design processes?*

The simplest answer is that it is done by ensuring that gameplay elements (what those are depends on the choice of framework for gameplay research and design) are arranged in manners which in sum total contribute as much as possible to, and detract as little as possible from, reflections on the issues at hand. This answer can be at least partially summarized by the assertion that "it is ultimately people who do the reflection" (Fleck & Fitzpatrick 2010). The role of gameplay as e.g. "the interplay between a game's rules and the player's interaction with them which, in combination lead to an aesthetic of gameplay" (Lundgren, Bergström & Björk 2009) is to mediate the human activity of reflection. While this general answer does express the answer to the research question, it does not provide substantially more than transforming the research question into a statement and giving brief definitions to "game" and "reflection". The research result of this master thesis can be expanded upon to be more specific without being specified into the actual design result itself. For a game to support reflection on design practice as formulated by the research question, a game must:

- Addressing the subject matter of design practice as directly as possible.
- Engage players in social interactions.
- Focus gameplay on supporting reflections.

Addressing design practice

The findings of this thesis indicate that a game with another primary goal than an engaging gameplay experience, i.e. a serious game, should deal as directly as possible with its primary goal. This primary goal may include teaching or informing about a subject, generating ideas for different activities or reflecting on certain issues (e.g. related to design practice, as with the design project of this master thesis). Furthermore, a game with the purpose of supporting reflections on design practice should deal as directly as possible with that subject. This can be performed in different ways: Either by explicitly addressing aspects of design practice with for example prompts or questions as central elements of the gameplay or by employing gameplay as metaphors for aspects of design practice to be reflected on. Both methods of addressing design practice can in turn be applied in various ways, especially at different levels abstraction. In line with this general guideline to design a game as specified by the research question, the core gameplay can be supplemented with instructions for preceding and succeeding exercises to reinforce to aspects of design practice being addressed. This is especially important the more abstract the method of addressing design practice through gameplay is.

Engaging players

Another important finding was that engaging players in social interactions (or very simply put: getting them to talk) is a very powerful mechanic and an important contribution to the research result i.e. to answering the research question. Encouraging or even forcing players to interact with one another as part of the central gameplay and as the main method of supporting reflections has two strong positive properties: On the one hand it is a meaningful and arguably simple way of supporting engaging gameplay with a relatively low requirement in terms of gameplay mechanics (e.g. rules and props of different kinds); on the other, it allows players to share reflections and insights as well as to push player reflections significantly beyond issues and aspects explicitly prompted by the gameplay elements provided by the designer of the game.

Focusing gameplay

As a third and final finding, coinciding with and overlapping the previous two, to design a game as specified by the research question, gameplay must be focussed on supporting reflections (on design practice, of course). Addressing design practice as directly as possible and engaging players in social interactions are necessary but not sufficient properties of a game. To avoid reliance on chance as a method for eliciting reflections in players on intended aspects of design practice, the gameplay must be focussed on supporting the desired reflections. The implications thereof are twofold: Firstly, gameplay must not only address issues and aspects of design practice in any arbitrary manner, it must necessarily support reflections, to borrow from Fleck & Fitzpatrick (2010), beyond description and preferably even reflective description to at least dialogic reflection, requiring of players to “[look] for relationships between pieces of experience or knowledge”. Secondly, care must be taken to design for gameplay where gameplay elements auxiliary to the reflections, or even significantly independent of them, do not overshadow the reflective activities or at least intrude minimally on them. Expressed differently, the issue to be

aware of in this regard is whether “playing to win” can be made to conflict as little as possible with the reflective purposes of the game, or in the very best scenario be made to in one way or another positively support that purpose.

6.3 Possible improvements of Weapon of Criticism

Three major areas of possible improvements of *Weapon of Criticism* are presented in this subsection: action cards (and additional actions); (other) additional props; and additional questions. Although not all-encompassing, these three areas cover many important issues of *Weapon of Criticism* identified throughout the design process. The former two areas especially cover concrete gameplay issues identified through the playtesting sessions, such as: lack of variation and depth in gameplay and gameplay experience in general and when occupying a tile specifically; lack of differentiation between gameplay of occupying an empty tile and occupying an already occupied tile; and risk of player isolation during other players’ turn. Meanwhile, the third area mainly covers the specific enhancement of the general purpose of *Weapon of Criticism*, i.e. reflecting on implications of objective and subjective circumstances on design processes.

Action cards

The only game mechanical element currently serving as basis for reflection is the different question cards, with the formal rules and procedures of the gameplay encouraging players to motivate others to expand slightly on reflections through follow-up questions. One possible way of providing a greater variation of prompts for reflection is to include what some playtest participants called “action cards”. These action cards would be a separate collection of cards from the question cards. While not necessary, the action cards could have similar rules for being drawn as the question cards, however other rules could can also easily be imagined and designed for, e.g. only letting players draw an action card when they successfully occupy a tile, or letting players draw as many action cards per turn as the number of tiles they are currently occupying. One example of how an action card could prompt more reflections could be through a card with the gameplay effect of turning a tile occupation with only one player into a duel between two players, which otherwise is not a freely available option. Another example of how action cards can provide not only quantitatively more occasions for reflection but also qualitatively different forms of reflection could be through cards which prompt players to perform some other action than mentally reflecting on and verbally answering questions. For example, there could be an action card intended to be played right after a player has answered a question (in a way as a manner of follow-up), allowing the player who played the action card to e.g. ask for a visual illustration of some aspect of the answer (which would require some additional although easily available game props such as pen and paper) or even play it out as a charade.

Obviously, the interesting part of the action cards (especially of the latter example) is the actions provided in addition to verbally posing and answering questions. However, using cards as a medium for these actions has at least two potential reasons: firstly, cards are a historically well established gameplay element for carrying (in fact mediating) necessary information to players,

reducing the need for players to memorize gameplay details; secondly, *Weapon of Criticism* is already a card based (board) game, and although there are arguably already three different collections of cards (description, explanation and reflection cards), they form a single collection of question cards, resulting in only two types of cards for players to keep track of. Whether or not action cards are introduced into the game, additional actions could also be associated with different moments of a gameplay session, e.g. by letting simple occupations function as previously but redesigning the duel mechanics to encourage players to ask each other to sketch, pose or otherwise externalize and practically or theoretically engage with reflections.

Additional props

Additional props include modifying existing categories of props (aside from cards) as well as introducing completely new props. The latter include different methods to directly alter the interactions between players (e.g. physical signs to indicate one's verdict of another player's answer, paper slips for anonymous voting or buzzers to be pressed by a player who wishes to pose a follow-up question or perform some additional action) as well as to change rules and procedures of the gameplay (e.g. sand clocks to limit the time available for players to answer questions). Meanwhile, the former category is essentially the player tokens used to indicate whether a tile is occupied by a player which currently is a simple thin token physically and which has no alternative functions. These tokens could be modified physically to allow for better stacking and for that matter connecting more firmly and in other ways than simple vertical stacking. While changes to the tokens gameplay mechanically, i.e. changing the rules and procedures related to the tokens, do not necessitate physical changes, the new physical characteristics open up for new ways to support engaging gameplay. For example, occupying a number of stacks of a certain height or having tokens present in as many stacks as possible could constitute forms of alternative victory conditions. Furthermore, allowing different physical combinations and configurations of tokens also opens up possibilities for reflection. This could be implemented in combination with the idea in the previous subsection about additional actions, e.g. meaning that players could be asked to assemble their tokens and construct "a public entity", to quote Papert & Harel (1991), as part of their reflective activity. This assembly and construction could also be a part of the end game or post-game of a session of *Weapon of Criticism*. Players could be asked to make use of only the tokens on their occupied to tiles, no matter player color, to construct a figure which they find expresses one or more significant reflection they experienced in the gameplay sessions. Afterwards, the player should also present the reflections, the figure and how they connect to the other players.

Additional questions

While providing sufficient opportunities of different types for reflection is essential when designing for reflection, as the above improvements have the potential to do, it is at least as important to provide proper directions for the reflections when designing for reflection on specific issues. There are other conceivable ways to direct reflections[17], but the method for directing reflections in *Weapon of Criticism* is the questions on the question cards. The current questions

[17] The aborted design concept prototyped in parallel with *Weapon of Criticism*, *Breeding Deliverables*, was an example thereof. Descriptions of that game concept can be found in section 6.

do direct players to reflect on the intended issues contained in the research question of the thesis. However, even without extensive user evaluations and with only a simple but critical review of the questions in the reflection category, it can quite easily be seen that there are opportunities to provide support for further reflections beyond the current questions. This expansion of the questions (which is an evolutionary much rather than a revolutionary modification of the design) could be performed by introducing questions that explicitly prompt players to reflect on specific issues. Specifically, on issues related to the socio-cultural character of design practice and the roles of the designer and their circumstances in the design of new artifacts. However, these new questions would (as any modification of a design, for that matter) require additional user evaluations, as the issues they intend to address are more specific and are thus arguably less likely to be as easy for all interaction designers to reflect on, especially in the context of a competitive game. Further testing and other forms of research will help design new questions in an evolutionary fashion, but they may also provide a revolutionary approach to redesigning how the intended issues can be addressed, whether or not the redesigns involve question cards with additional questions.

7. Discussion

This section discusses the contents of the design project of this master thesis in interaction design by critically relating them to the theoretical and methodological frameworks of the thesis as well previous work, i.e. the games in section 3.2. The design project will also be discussed in terms of the posed research question (section 1.1) and its design challenges (section 2.2). To this end, the section is divided into sections concerning the results and findings of the project, its process and methodology, reflections based on questions from the game *Weapon of Criticism* itself and finally potential future directions for research and design work.

7.1 Result

The final result of the design project is the reflective design game *Weapon of Criticism*, described and explained in section 6. Already in its first iteration (subsection 5.2.1), while heavily criticized for some issues, certain key aspects were positively received. Specifically, the core design concept, a game for reflection on designerly practice, was appealing to the playtesters as well as the combination of gameplay components with explicit connection to the activity of reflection (the question cards) and components without such a connection (the game board and its related props). However, even though the response from playtesters improved significantly with only a few subsequent modifications, the result of the design project, *Weapon of Criticism*, left a number of questions either unanswered or insufficiently answered. These questions will be discussed in this subsection (the reasons as to why they may have been insufficiently answered are touched upon in subsection 7.2 on the design process and its methodology).

7.1.1 Research question

Perhaps the most central question is whether the result of the design project provides an answer to the research question of the thesis presented in subsection 1.1:

> *How can a game be designed to support designers in evaluating and reflecting on the influence they and their circumstances have on their design processes?*

On one hand, *Weapon of Criticism* is first of all in fact a game which playtesters indicated they would be interested in actually playing if finalized and made available to designers and design teams. Thus, it can be (easily) argued that a game has in fact been designed[18]. While that is

[18] It would be possible to discuss whether or not *Weapon of Criticism* is a game at all through the application and comparison of different definitions of what a game is. Most importantly, the concepts of serious games, critical games and design games, introduced in subsection 3.1.3, largely make such a discussion superfluous. Furthermore, even if by some definition *Weapon of Criticism* may not count as a game, e.g. due to the external motive to using it, it remains an artifact with a significant portion of what can both intuitively and theoretically be understood and defined as gameplay elements.

fundamental, the more interesting points are whether it has been designed to support reflection and specifically reflection on the aspects and relations of designerly practice denoted in the research question. Here, too, it may be argued that *Weapon of Criticism* provides a possible answer to the research question: Building off of the theoretical framework and adapting to feedback through the practical design process, the game has been designed to support reflections on design practice, ultimately made manifest by the question cards of the game, and among them primarily the actual reflection cards.

In the attempt to provide an answer to the research question with *Weapon of Criticism,* the design process was not only guided by the research question but by a combination of theoretical frameworks, in turn motivated by background research. Briefly about the background research, it primarily located the master thesis within the field of interaction design and raised the issues implied by the research question and motivated them as issues of the field: the dialectical character of design practice and the need for or potential of reflections for metaphysical awareness by designers. The de facto theoretical frameworks of the thesis, accompanied by an overview of other tools and games, contributed the following: an expansion of the understanding of design practice as on one hand conditioned by strictly technical as well as general socio-cultural circumstances, on the other affecting both the designs resulting from the design practice and the designer engaged in it; concepts and methods for designing for reflection as a practice and an experience as a designer; and how to design for gameplay experiences and how gameplay experiences have been designed by others, especially as a means to support design practice. In *Weapon of Criticism*, the frameworks on reflection are translated into the design of the question cards and the rules surrounding them (progressing from describing through explaining to reflecting). The frameworks on design practice, as well as issues and concepts from the reviewed games and the background research, are translated into the actual subjects of the question cards. Finally, the frameworks on gameplay (and insights from the games of others) together with feedback from playtesting supported the design of *Weapon of Criticism* as a playable and engaging game. The implementation and expression of these different frameworks and their various aspects in *Weapon of Criticism* is summarized in section 7.2.2. Taken as a whole, the frameworks supported the design of a practical answer, *Weapon of Criticism*, to the research question.

7.1.2 Questions not answered

At the beginning of the work with the master thesis, there was not only one but three research questions intended to be answered. The first one was the one finally included as the actual research question of the thesis while the two remaining questions inverted and then built upon the first one. They were as follows:

> *How can a game be designed to support designers in evaluating and reflecting on the influence of their design processes on themselves?*

How can a game be designed to support designers in evaluating and reflecting on the influence of the mutually transformative relationship between designers and the design processes on the produced designs?

To some extent, it can be argued that the board game *Weapon of Criticism* provides answers to the latter two research questions as well. A brief answer to why they are excluded from the thesis is that the answers provided to these latter two questions by the board game are not nearly of the same magnitude as the answer to the first question. In the result itself, the board game, this difference in magnitude is expressed in the questions on the question cards. Of all the 24 questions on the question cards, there are only 1-2 questions each among the explanation cards and the reflection cards respectively which might be claimed to ultimately support reflections on issues related to the excluded research questions rather than the included one. However, even if this motivates the fact these research questions are excluded from the thesis, it does not explain why the result of the design process of the master thesis, *Weapon of Criticism*, was not designed to provide answer to those questions (to the same extent as the first research question). As the design project progressed, the unanswered research questions fell outside of the scope of the thesis for reasons of feasibility. The explanation to why the two questions mentioned here were deselected can be expanded by the fact that the remaining research question was the simply first question be posed in early inquiries and that the question of how people and their circumstances affect their practices was intuitively easier to relate to in performing this master thesis project.

7.2 Process

The design project at the center of this master thesis by and large followed the form of a standard formal design project, with iterative phases of ideation, prototyping and evaluation. Driving this process was a design challenge, more or less encapsulated by the research question (discussed in subsection 8.1 and presented in subsections 1.1 and 7.1) and described in subsection 2.2. However, what constituted this “driving force” of the design project was itself transformed by the design process, through theoretical research, review of previous work of others and insights generated from creating and testing prototypes with other people. This subsection will cover discussions on the design process, reflecting on choices, changes and challenges throughout the project, ranging from overarching methodologies to different phases and concrete methods applied. For more in-depth descriptions of the design process, please see section 6.

7.2.1 Methodologies

The methodological frameworks selected as starting points for this design project at its beginning were *research through design* and *gameplay research and design* (these frameworks are described with sources in subsection 4.1). This selection was not performed arbitrarily, but based on the early proposed idea for the design project (and in the case of *research through design*, to a certain degree motivated by course requirements). Reviewing the design project,

research through design is a fitting category, as the project entailed the application of design practice on an issue of some theoretical potential. Furthermore, the practical result of the design project expresses one way of exploring or addressing the issue and the theoretical insights act as contingent annotations to the practical result. While this fits fairly well as a broad description of the design project resulting in *Weapon of Criticism*, the framework did not contribute significantly in practical terms (as e.g. the second framework of the design project, *gameplay research and design*, did, which is described further down). However, *research through design* did make the significant and positive contribution of lending (additional) fundamental legitimacy to conducting research into a comprehensive issue, one which in the first instance may not self-evidently appear as a practical design problem but which in the last and final instance is of theoretical-practical importance for interaction design as a whole.

In comparison, the *gameplay research and design* approach provided an arguably smaller contribution of a similar fundamental (or for that matter metaphysical) character in adding motivation to regarding games as an area of interest for interaction design practice and theory through gameplay as an aspect of games. Although in contrast to *research through design*, the way in which the approach of *gameplay research and design* was applied in the design project provided more on a practical level. This included re-emphasizing the importance of structuring the design project around iterations of ideation, prototyping and evaluation and the importance of involving other people, especially in testing the gameplay through “playtesting”. In addition, the *gameplay research and design* approach contributed with two specialized gameplay design frameworks (applicable in research contexts as well): *gameplay design patterns* and the *MDA framework*. On the one hand, these two gameplay design frameworks were not rigorously applied in the design project, e.g. there were no detailed MDA diagrams drawn for the various game concepts and prototypes, and no considerable use was made of the formal format for documenting gameplay design patterns either. On the other hand, these two gameplay design frameworks, together with additional ones compiled as part of the theoretical framework of the project, provided meaningful points of departure in performing the different steps and phases of the design process. For example, the *MDA framework* contributed to awareness of multiple levels of an interactive artifact, from mechanics through dynamics to aesthetics (and importantly vice versa!), while the *gameplay design patterns* encouraged awareness of the interconnectedness of different design components and the diverse (and especially affirming or negating) characteristics of those connections. These contributions were especially useful for theoretically and practically exploring how to design gameplay for reflection. A rigorous application of the two gameplay design frameworks could potentially enable the exploration of additional gameplay design possibilities but the considerable effort required to meaningfully perform the application were deemed to outweigh the potential benefits.

7.2.2 Methods

Aside from the essential method of playtesting, no significant methods were drawn from the overarching methodological frameworks of *research through design* and *gameplay research and design* as such. Instead, methods were derived from the (interaction) design corpus of methods

in general. Methods used in the project are described in some detail with references in subsection 4.2., sorted according to phases of the design process. The planned methods were used to different extents. Sometimes with rigour, especially methods such as brainstorming and mind mapping, and sometimes with some liberties taken, e.g. with skewing, where all formalities of the method were not always applied but key aspects of the method were put to productive use. One essential method was of course playtesting, which was put to regular use to evaluate gameplay concepts through prototypes and which was combined with many other evaluation methods such as observations, “think-aloud” and interviews. Two meaningful additions of methods to the design process which were initially not planned for were a group workshop in ideation and a number of informal discussions with one or more other students. These two methods provided a good substitute to a master thesis partner with the added benefit of the other participants having an intellectual and emotional distance to this design project. Especially the group workshop was of a good practical use, as it firstly provided valuable input into the (remaining) ideation phase despite quantitatively only contributing with three out of the ten planned concepts for that part of the ideation, and secondly on its own acted as a prototype for the upcoming playtesting sessions.

7.2.3 Ideating, prototyping and playtesting

On a level of abstraction between the design process as whole, with its methodological frameworks, and the individual methods performed throughout the process are the phases of the design process. As an intermediary area between the two previous ones, some of its aspects and issues have already been introduced and even discussed, but the design phases of ideating, prototyping and playtesting still merit their own discussions.

Ideating

The ideation phases of the design project were in a sense the least problematic ones. In general, methods for ideation were possible to apply in a rather straightforward manner, with varying levels of liberties taken with formally described methods. The activities for ideation, individually as well as in the group workshop performed as part of the project, consequently generated new insights and concrete design possibilities. However, one challenge in the ideation phases, especially later on, was the issue of “breaking the mould” once design concepts had been elaborated upon as prototypes and tested. At this point, ideation still did generate new ideas on the basis of insights from other design phases, but some issues offered greater challenges which in some cases were not resolved within the frame of the design project. These issues largely revolved around how the reflections supported by the design could be directed even more towards topics of interest to this thesis, either through explicit questions or through more strictly considered gameplay mechanical elements.

Prototyping

Similarly to ideation, prototyping was largely a straightforward affair. From abstract ideas, concepts were sketched out and elaborated visually and verbally through sketches, and sketches were transformed into tangible prototypes on the lower end of fidelity; the prototypes were manually created with different paper materials, such as cutouts from foam board and

colored paper or quickly designed digital motifs printed on blank paper. They were all useful for identifying strengths and weaknesses of different design concepts, even when the functionalities of the prototypes were incomplete, i.e. gameplay mechanics such as rules and procedures were clearly missing. It was easier to discard aspects of the physical form of the prototype which had been quickly designed and printed on paper, than the one consisting of physical cutouts, as although the latter was also of low fidelity, it had cost considerably more in time and resources spent. A challenge with all prototypes was how to prototype their written content. In the case of one game concept, *Breeding Deliverables*, the written content was abstract and metaphorical, so it was challenging to decide on expressions to use in the prototype. This was helped by the actual consequent playtesting and the insights it generated, however while the verbal expressions as part of the design concept improved, the key gameplay mechanics and interactions expressed through the written content became the overwhelmingly problematic issue. With the other game concept, on which the actual result of the thesis, *Weapon of Criticism*, is based, the challenge with how to prototype the written content was plainly what questions to pose to players. The prototyped questions were in fact refined throughout the design process, but exploring other ways of prototyping the questions, perhaps separately from the rest of the game in non-playtest workshops, through forms of expert evaluations or by relating them to frameworks and heuristics for reflection, could have contributed additionally to insights on what questions to pose and how to phrase them.

Playtesting

Playtesting was arguably the least straightforward of the phases of the design process. This does not mean that the playtesting sessions were unproductive, but that they introduced the most complexities for their durations. Before diving into the complexities, some other issues merit discussion. Firstly, there were instances of playtesting “within the design team” (in this case consisting of a single member), which helped elaborate aspects of the gameplay and identify questions to try to find possible answers for through playtesting with others. However, in one blatant example, “solo playtesting” failed to identify a fundamental issue with a game concept, i.e. the complexity of *Baphomet’s Design*. Second, as can be seen in the participant matrix in appendix C, certain participants were repeatedly invited to playtests (and group activities in general). All participants were students in the Interaction Design and Technologies master program of different degrees of familiarity. This was both useful, as they were examples of the intended user group of the artifact being designed, and problematic, as it risks biases (in addition to general socio-cultural biases of the participants) related to interpersonal familiarity and the educational context. One way of addressing these issues would be to playtest with (interaction) design students and actual (interaction) designers from or in other locations. As for the complexities of playtesting, aside from what has already been mentioned, they can be summarized by the exaggerated claim that nothing went as planned. Playtesting sessions were initially planned to consist of multiple brief sequences of gameplay interspersed with quick redesigns of the game and its gameplay by playtesters. Instead, the actual playtesting sessions with very little exception became a single, longer gameplay sequence followed by discussions on the playtesters’ experiences, issues prepared beforehand or observed through the playtesting session and suggestions for redesign. One of the more dramatic instances of

change of plans involved a dropping out of two out of four participants in a playtesting session, requiring a dual role of playtester and moderator. While these complexities are possible to address in future processes, the playtesting sessions nevertheless generated meaningful insights.

7.3 Turning the thesis on itself

As one part of the result is a number of questions for (interaction) designers to reflect on their design practice, an opportunity for further discussion on the design process of this master thesis presents itself: turning the questions generated as part of the design project (associated with this thesis) on the thesis itself. This subsection applies the questions on the reflection cards in *Weapon of Criticism* to the the design process of this master thesis. The questions, which are documented in subsection 6.1.1, will not receive answers equally one by one this subsection, but rather in a manner of weighted aggregate.

To begin with, the question of what values are mediated by *Weapon of Criticism* is related to the question, essential for any interaction designer, of what the user experience are. With *Weapon of Criticism*, a partial answer is that values explicitly mediated by it contain competition, engagement and reflection. These were directly or indirectly designed for, through the choice of reflection as a purpose of the design and gameplay as the medium for design, and feedback and insights from playtesting support a claim of those values being mediated by the design. Taking the question a step further, there are two major reflections: On one hand, no meaningful inquiry was made into whether or not playtesters had made any experiences while playing *Weapon of Criticism* that would indicate other values than the ones mentioned above, implicitly or explicitly. On the other, already from only those three examples and from general basic knowledge of the design of *Weapon of Criticism*, some additional conclusions of what the design game mediates can be suggested (if not simply drawn). For example, through leading by example, the design of the game suggests that social and creative activities, such as (collective) reflection, can (and possibly even should) be performed through competition and (fast-paced) gameplay. Furthermore, the selection of topics for reflection, i.e. aspects of designers and their contexts and how they influence design processes and their results, and their status as the third and final level of questions in the game, arguably conveys that not only should designers reflect on their design activities but they should include these topics in their reflections.

This brief discussion on the values (possibly) mediated by *Weapon of Criticism* already connects to the remaining questions for reflection (and as such points to a merit of a dialectical perspective of viewing phenomena as simultaneously consisting of distinct but interrelated parts and the totality of those parts). The design project was motivated by the personal intention to explore how design artifacts, specifically games, can support reflections on design practice as social practice formed by and forming practitioners and their circumstances. In turn, the motivation was motivated by personal values, through interest in and/or appreciation of so called “social” or “socio-cultural” issues, and personal experiences of games in general and specifically as viable tools for exploration (and for other activities as well, for that matter). For

analytical reasons, the question of the design context can be divided into two parts, direct and indirect, or technical and social, contexts. The direct, technical context of for example the master thesis course, the Interaction Design and Technologies master program and its design studio provided meaningful resources and delimitations which shaped the design of *Weapon of Criticism*. Among these count access to interaction design students to recruit to idea generation workshops and playtest sessions, but also other students writing their master theses and university staff to discuss issues and ideas with, as well as a wide assortment of tools and materials. As for the indirect, social context, the contexts mentioned under the previous category, but regarded for their social characteristics, form parts of it, as well as the larger historical, cultural, political and similar dimensions of social reality as a whole. One possible connection from this category of contexts to the design and the values mediated by it, and thus in a way to ethical consequences of the design, is the topic of promoting competition as a viable and possibly preferable form for human activity. The apparent ease with which an artifact for supporting reflection was designed with competition as a central element thereof could be related to the historically situated dominant role of competition as a mode of human interaction. To echo Grace (2014), it could hypothesized that a competitive society makes competitive games and in general mediates other forms of human (inter-)activity through a lens of competition.

In conclusion, one possible answer to the question of how this designer was affected by the design process involved in designing *Weapon of Criticism*, can perhaps be summarized twofold: on the one hand as a reinforced impression of the complexity of exploring issues as those above through research through design and gameplay research and design; and on the other, the reiteration of the self-evident but nonetheless fundamental proposition that the problems of design practice can be solved by design practice alone.

7.4 Future work

Weapon of Criticism provides a possible design answer to the research question of this master thesis. However, the theoretical background combined with insights from the practical design process suggest potential directions for future work related to the combined issues of gameplay, reflection and the relations of design practice. A discussion of potential areas for future research and design on some of the broader issues introduced by this thesis is presented below.

7.4.1 Future research and design

Attempting to look beyond possible improvements of the current design of *Weapon of Criticism* (as presented in subsection 6.3) from the vantage point of the broader issues originally motivating the design project of the thesis, as well as issues encountered as a result of the process itself, one can identify a number of directions to explore. Three such directions are briefly discussed here: the viability of competitive games (e.g. *Weapon of Criticism*) as a medium for reflection; supporting reflections on socio-cultural phenomena as they relate to

design practice; and expanding on and inverting the research question of the thesis, i.e. answering the excluded research questions.

Medium for reflection

Competition and competitive gameplay as media for reflection, as a subject for future research and design is motivated by the literature supporting the thesis as well as by observations and explicit feedback from playtest sessions. The first and theoretical aspect of the motivation can briefly be summarized by a paraphrase of a piece of conventional design wisdom, namely “form determines function” and can be related to what is arguably an axiom of interaction design: any object used by humans has user experiences, whether the user experience has been consciously designed for or not. A significant proportion of the literature referenced in this thesis discusses these issues in one way or another, and much of the literature also relates the two issues to wider implications. These implications include how an artifact is given form and by whom, how the determination of function takes place over time and how user experiences relate to form, function and user, among others. The second and practical aspect of the motivation, the observations and the explicit feedback, appeared to strongly indicate that players were influenced by the competitive gameplay mechanics and dynamics of *Weapon of Criticism*. While players did in fact answer questions involving reflections, they also expressed that their thoughts and actions were influenced by the competitive character of the setting and their interactions. One playtester expressed that they would consider posing follow-up questions and placing votes out of spite for the progress of other players in the game, a sentiment partially shared by some playtesters and warned for by others. One approach to the question of competition as a medium for reflection is to pose it as how competition influences players and consequently their inclination for reflection, specifically. Understanding the usefulness of competition as a medium for reflection is of course to be approached for its design consequences, e.g. through practically exploring in what format competition may be useful as such a medium, or what the alternatives to competition may be.

Socio-cultural reflections

One of the cornerstones of this thesis is the recognition of the social character of design practice (as an instance of human practice in general), meaning in the most basic sense that design processes are affected by the contexts they are performed in. In expansion, this means that design concepts and artifacts are social products, i.e. in different ways expressions and embodiments of the social relations they were created under. Social relations, when not reduced to direct interpersonal relations, include relations described by terms such as e.g. gender, race and class, and are in some parts of the literature of the thesis related to as socio-cultural issues, contexts or phenomena. Given the background and theoretical framework of thesis as well as how the gameplay of *Weapon of Criticism* (specifically the questions) was finally designed, the intention was to support reflections which would potentially touch upon the above.

While playtest results are inconclusive but (very) carefully promising on whether such reflections are supported, and creating and playtesting new and more explicit questions can be one way to address the issue, the topic has potential for further extension. Aside from (or perhaps complementing) a simple introduction of new questions, more invasive redesigns of *Weapon of Criticism* could be explored, for example stages of gameplay before or after the currently existing stage of moving around the game board and answering questions when occupying or duelling for a tile. Such gameplay stages could be mere verbal priming on issues to reflect on and debriefing with the purpose of relating disparate reflections to the intended larger questions. Furthermore, the invasive redesign could also involve partially or completely abandoning the current design of *Weapon of Criticism*. This could entail (re-)exploring a design path such as *Breeding Deliverables*, where the form rather than the content of the gameplay was intended to evoke reflection on certain subjects, or to still have content explicitly tied to the intended subjects but in other forms than questions. The latter could be similar to, or at least could initiate from, design concepts present in the subsection on previous work 3.2, which describes a number of games intended to explore issues, where for example each issue has a separate category of cards to be mixed with other categories for verbal and forms of elaboration.

Beyond the research question

As discussed in subsection 8.1.2, the research question of the thesis can in a sense be inverted to revolve around the effects of the design process (and its circumstances) on the designer instead of the other way around. One issue to explore in the future is whether there are ways to design gameplay which can support players themselves in exploring the question, or if the question is mainly or only possible to explore as an external researcher, in which case gameplay is designed to support a researcher rather a designer, due to the time span potentially required by such a study. Another question, or a way to extend the research questions, is if and how gameplay can support designers in practically acting on insights from reflections on the social and dialectical character of design practice.

8. Conclusion

This thesis aimed at exploring the potential of using games and gameplay as a tool for designers to reflect on their design practice, specifically the relations between designer, design context, design process and designs. A range of interesting issues in this subject area relate to what kind of underlying assumptions, prioritizations and values of design-technical as well as socio-cultural character are carried by designers and their design contexts. In extension, a question of interest is how design practice not only produces designs but also reproduces varying aspects of its design context. Thus, the question is raised of what openings there are for designers to make conscious design choices which affect the way their design practice shapes their own circumstances and ultimately themselves.

The outcome of the thesis is an attempt exploring how a game for designers, a design game, might support designers in reflecting on issues of the above nature, and this attempt is in the shape of a multiplayer competitive board game titled *Weapon of Criticism*. In *Weapon of Criticism*, three to four players compete for control over a game board through answering questions which ask players to describe, explain and reflect on aspects of design projects. A player is allowed to occupy the tile if other players judge their answers positively, and the game ends when a player has occupied a certain proportion of the board. The process of designing *Weapon of Criticism* combined frameworks on reflection akin to those encountered in literature on education with a playcentric design process based on frameworks on gameplay. Reviews were performed on literature on the above described relations between designer and design practice, on reflection and on gameplay, as well as reviews of previous practical (and theoretical) work on games as design tools. Users were involved already in the ideation phase and extensively in the evaluation or playtesting phase, and more than one track of game concepts were explored through multiple iterations of ideation, prototyping and evaluation before the project concluded with *Weapon of Criticism*.

Directions for future research and design work include further evaluation and potential redesigning of *Weapon of Criticism* to reinforce the support of engaging gameplay and reflection. A related issue to explore, taking into consideration the observation that different designs mediate different values, is the effects on reflections of the explicitly competitive mechanism of occupation and duelling. Consequently, one might explore if other gameplay metaphors, especially ones less focused on competition, may be able of providing similar levels of gameplay engagement while better supporting reflection. Another direction would be how the game and its gameplay can be (re-)designed to support in-depth reflections on socio-cultural issues raised early in the thesis, such as gender, race and class. Finally, *Weapon of Criticism* in its current manifestation is only intended to support reflections on how assumptions and values of a designer affect their design process, but questions remain on how the assumptions and values mediated by a designer's design process affect the designer. In other words, how can gameplay be used to further explore the question: *Who will design the designers themselves?*

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Appendices

Appendix A: Group design workshop

This appendix contains the plan for the ideation workshop performed on Friday April 4 between 10:00 and 11:30.

Purpose: Help come up with ideas for a design game
Ask for permission to record and document in different media. Ask for informed consent.

1. Warm-up (15 minutes)
    a. Introduction
        i. Introduce workshop.
        ii. Participants introduce themselves:
            1. Their names.
            2. Project they worked on (different project if they worked on project together, preferably not project they worked on together)
                a. What were the design results?
                b. What did you bring to the design project?
                c. What were some design tools you used?
                d. What do you bring with yourself from the design project?
                e. Have you ever reflected on the effects a design project has had on you?
2. Ideation (30 - 45 minutes)
    a. Introduce central topic: “How can a game support evaluation of the relationship between designers-design tools-designs?”
    b. Introduce issues (15 minutes)
        i. Designer-Design tools-Design
            1. Explain concept(s) briefly.
            2. Answer questions from the participants.
            3. Encourage brief discussion relating to the examples of the participants.
        ii. Evaluation/Reflection
            1. Explain concept(s) briefly.
            2. Answer questions from the participants.
            3. Encourage brief discussion relating to the examples of the participants.
        iii. Game
            1. Briefly explain/describe games in general and design/serious games:

            a. “Structuredness + Unexpectedness = Gameplay experience”
            b. Directing gameplay experience for ulterior purpose
        2. Answer questions from the participants.
        3. Encourage brief discussion.
    c. Brainstorming on topic: “How can a game support reflection/evaluation on the relationship between designers-design tools-designs?” (15 minutes)
        i. Answer participants’ questions before beginning.
        ii. Reminder: ”Yes, and…” and ”What if…”
        iii. Give examples if the session slows down too early, otherwise be passive
    d. Combining brainstormed ideas (10 minutes)
    e. Voting/Ranking (5 minutes)
    f. Elaborate on ideas with materials (15 minutes)
        i. Paper, pens, scissors
3. Cooldown (15 minutes)
    a. Ask questions that appeared during the workshop
    b. Finishing round
    c. Ask if there is something left that anybody would want to comment on or discuss

Appendix B: Design space dimensions

This appendix contains an expression of the result of the material review performed in the ideation phase during the design process. Subsequent reviews of the material and evaluations perform during the design process extended and enhanced the design space with concepts not covered in the list below, especially ones related to the intended content of the reflections to be performed by players, but this list still gives a certain basic idea of the design space dimensions involved in the design project.

1. Analyzing previous work
    a. Medium
        i. Digital
        ii. Physical
    b. Materials
    c. Number of players
        i. One
        ii. Multiple
    d. Roles and relationships of players
        i. Competition
        ii. Collaboration
        iii. Symmetry
        iv. Asymmetry
    e. Structure of gameplay
        i. Open-ended
        ii. Close-ended
            1. End conditions
    f. Progression through gameplay
        i. Linear
        ii. Non-linear
            1. Chance
            2. Skill
            3. Choice
        iii. Uni-directional
        iv. Multi-directional
        v. Player-driven
        vi. Game-driven
            1. Prompts
    g. Components under player control (“Technical universe”) (Habraken & Gross 1988)
        i. Cards / Pieces / Other components
        ii. Collections of components
        iii. Combinations of components

        iv. Augmentations of components
    h. “Control distribution” / the ways in which players exercise control (Habraken & Gross)
    i. “Territorial organization” / control of game board (Habraken & Gross)
        i. Direct
        ii. indirect
    j. Temporality
        i. Duration of game play
            1. Time limits
        ii. Phases of game play
            1. Pre-game
                a. Preparation
                b. Player input
            2. Early game
            3. Mid game
            4. End game
            5. Post-game
    k. Spatiality
        i. Location
    l. Objectives
    m. Victory conditions
        i. “Program” / overarching victory conditions exceeding any individual goals (Habraken & Gross)
        ii. Scoring
    n. “In-play development” / the adaptation [...] by designers using or playing the game (Habraken & Gross)
    o. “Many players, many pieces” / adaptability of a design game to size of design team or complexity of design context (Habraken & Gross)
    p. Randomness/Uncertainty
    q. Reflection
    r. Relationships
        i. Antagonistic
        ii. Symbiotic
    s. Rules
2. Analyzing theoretical frameworks
    a. Representations
        i. Designer
            1. Design practice and theory
                a. Assumptions within them
                b. Elevation and marginalization of thoughts, values and practices
            2. Sharing practice, understanding and experiences
                a. Developing shared practice

3. Socio-cultural context
    a. Connected to other people
    b. Connected to institutions, traditions etc.
4. Individual attributes
    a. Worldview
5. Choices
    a. Conscious or unconscious
    b. Design tools and methods

ii. Design process

iii. Design tools and methods
1. Tools
2. Methods
3. Medium
    a. Physical
    b. Virtual
        i. Digital
        ii. Conceptual
4. Uses and user experiences
5. Built in values/Values optimized for

iv. Design

v. Mediation

b. Reflection
i. Purpose
ii. Necessary conditions
iii. Behaviours and activities of different levels of reflection:
1. description
2. reflective description
3. dialogic reflection
4. transformative reflection
5. critical reflection

iv. technologies and techniques:
1. Presenting
2. Prompting
3. Encouraging
4. Revealing
5. Enriching
6. dissecting information

c. Gameplay
i. Structure
ii. Unpredictability
iii. Interactivity
iv. Frameworks
1. Mechanics

2. MDA
    a. Mechanics
    b. Dynamics
    c. Aesthetics
        i. Sensation
        ii. Fantasy
        iii. Narrative
        iv. Challenge
        v. Fellowship
        vi. Discovery
        vii. Expression
        viii. Submission
3. Patterns
    a. use (and choices it may involve)
    b. consequences for gameplay
    c. how it relates to other patterns (through instantiation, modulation and/or conflicts)
4. players, objectives, procedures, rules, resources, conflict, boundaries and outcome
5. mechanics, story, aesthetics and technology
6. components, actions and goals

v. Design game
1. collaborative play directed and focused by rules, roles and materials support the generation of design options through exploration and establishment of potential present and future practices
2. facilitate players (who in this case are also designers) in staging possibilities, conceptualizing activities, (ex-)changing perspectives and negotiating issues
3. layers must navigate limitations to adapt existing configurations into new, negotiable arrangements and to project future configurations, thus drawing a resemblance between (at least certain) games and design situations
4. explicitly constrained contexts and the possibilities therein, how designers approach, relate to and organize around design problems and contexts and what alternative design processes may be or have been possible
5. the capacity to instill an experience of suspension of certain aspects of reality in their players, thus facilitating new activities that were previously (perceived to be) complicated or even impossible
6. conforming to, exploring, creating or transgressing existing and new structures.

vi. Serious game
    1. Other goals than gameplay through gameplay as a means
vii. Critical game
    1. critiques of different subjects through their gameplay
    2. reflective-recursive axis
        a. Reflective / Social / aimed at society and culture around the game
        b. Recursive / Mechanical / directed at existing and conventional mechanics in games
    3. continuous-discontinuous axis
        a. Continuous / critique throughout the game experience, but perhaps with some variation
        b. Discontinuous / critique is delivered at a single point

Appendix C: Participant matrix

This matrix gives an overview of how participants P1-16 were distributed across design activities involving other people.

	Ideation Workshop	Weapon of Criticism	Breeding Deliverables	CRITCON	Baphomet's Design	Weapon of Criticism 3
P1	x		x		x	x
P2	x		x		x	
P3	x					
P4		x				
P5		x				
P6		x				
P7		x				
P8			x			
P9			x			
P10				x		
P11				x		
P12				x		
P13				x		
P14					x	
P15					x	
P16						x

Appendix D: Print-Out Kit

This appendix consists of a self-contained “print-out kit” of the game *Weapon of Criticism*, including rules, reference sheets for players and all necessary gameplay components.

The contents of this kit are as follows:

- Rules
- Player components
- Game board
- Question cards
    - Description cards (with the number “1” on their backs)
    - Explanation cards (with the number “2” on their backs)
    - Reflection cards (with the number “3” on their backs)

Print the rules and player components as single-sided pages on A4 sheets. If possible, print the game board on an A3 sheet of paper, otherwise print it on an A4 sheet for a smaller game board or use the most complicated option of printing the game board across multiple A4 sheets to be assembled into a single physical game board after printing. Finally, print three copies of the question cards as double-sided pages on A4 sheets.

After printing, cut the player components from their sheet of paper, and optionally glue them to a thin sheet of cardboard paper (or another material of your choice) for improved ease of handling. Furthermore, you may do the same with the game board, however this is also optional. Finally, cut apart the question cards from one another.

Rules of *Weapon of Criticism*

Summary of the game rules:
Move your player pieces around on the game board, attempt to occupy tiles by answering questions, succeed in your attempts by winning the approval of the other players, win the game by simultaneously occupying five tiles.

Setting up the game:

1. Place the game board between yourselves.
2. Pick one of the four available colors of player components.
3. Collect your respective components.
4. Place your player pieces (the triangular player components) on a hexagonal tile on the board with an equal number of tiles between you and the player closest to you.
5. Sort the question cards face down into three piles according to the numbers on their backs.
6. Draw three description cards (the cards with the number “1” on their backs) each.
7. Decide who plays first, for example by letting the oldest among you start.

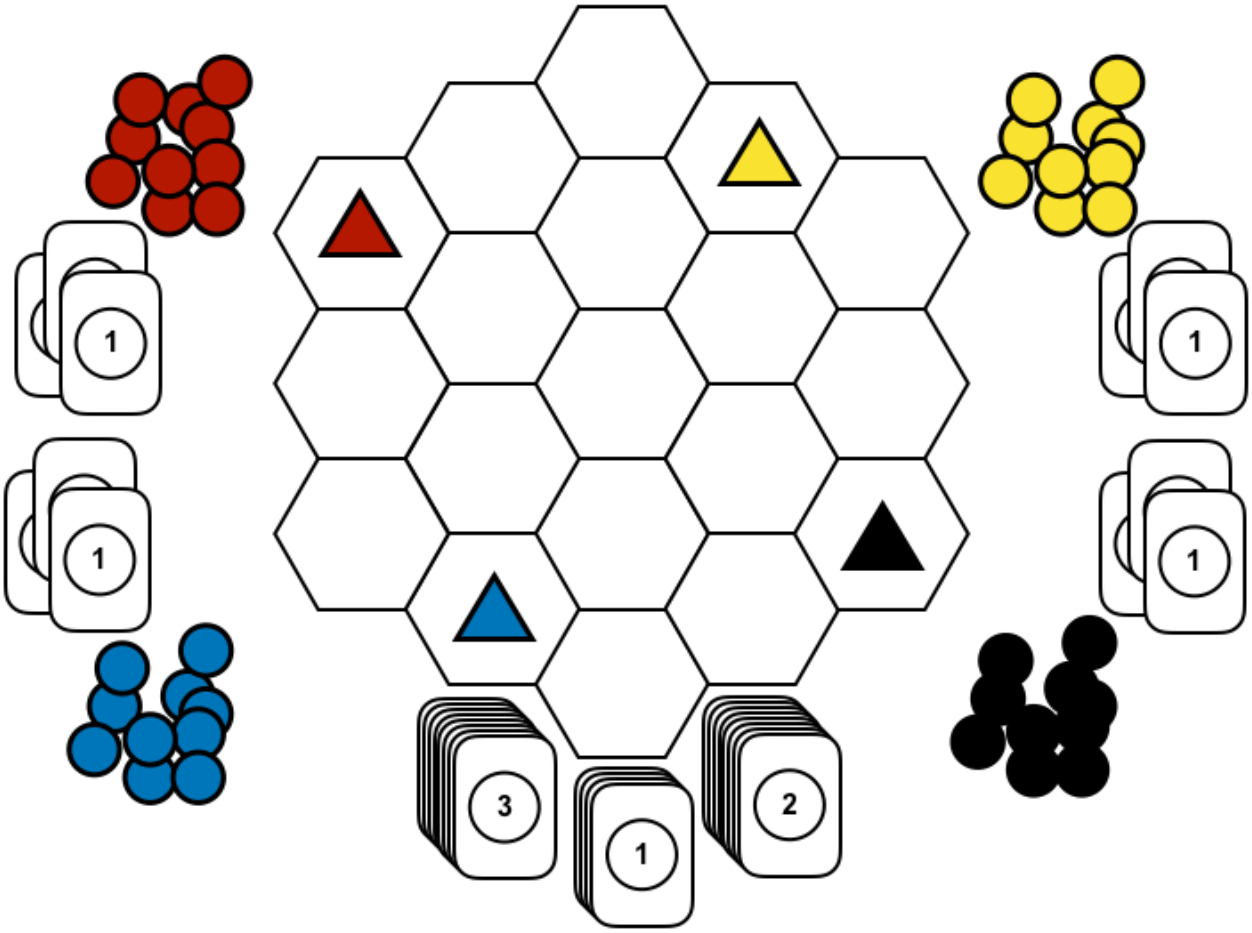
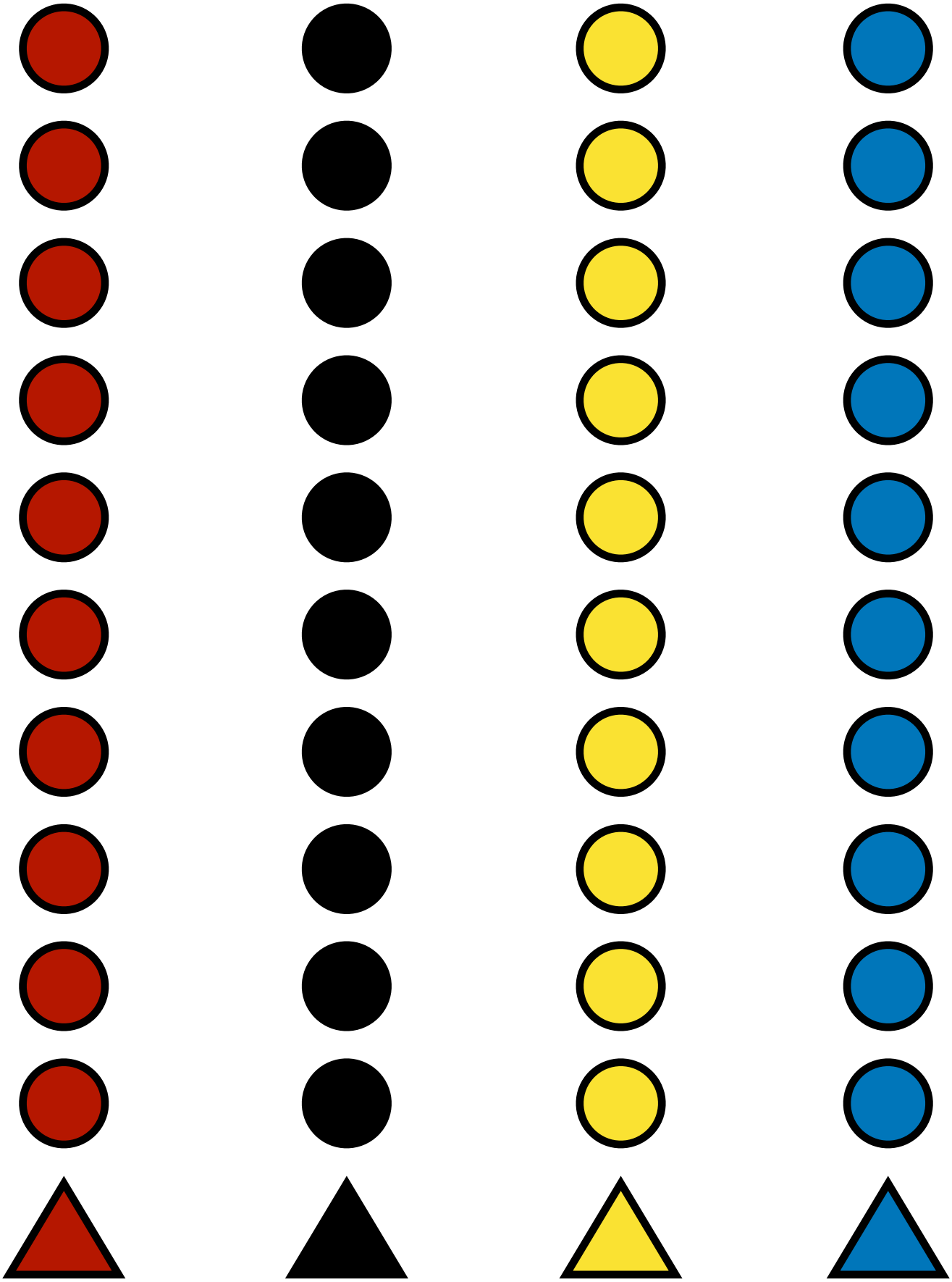
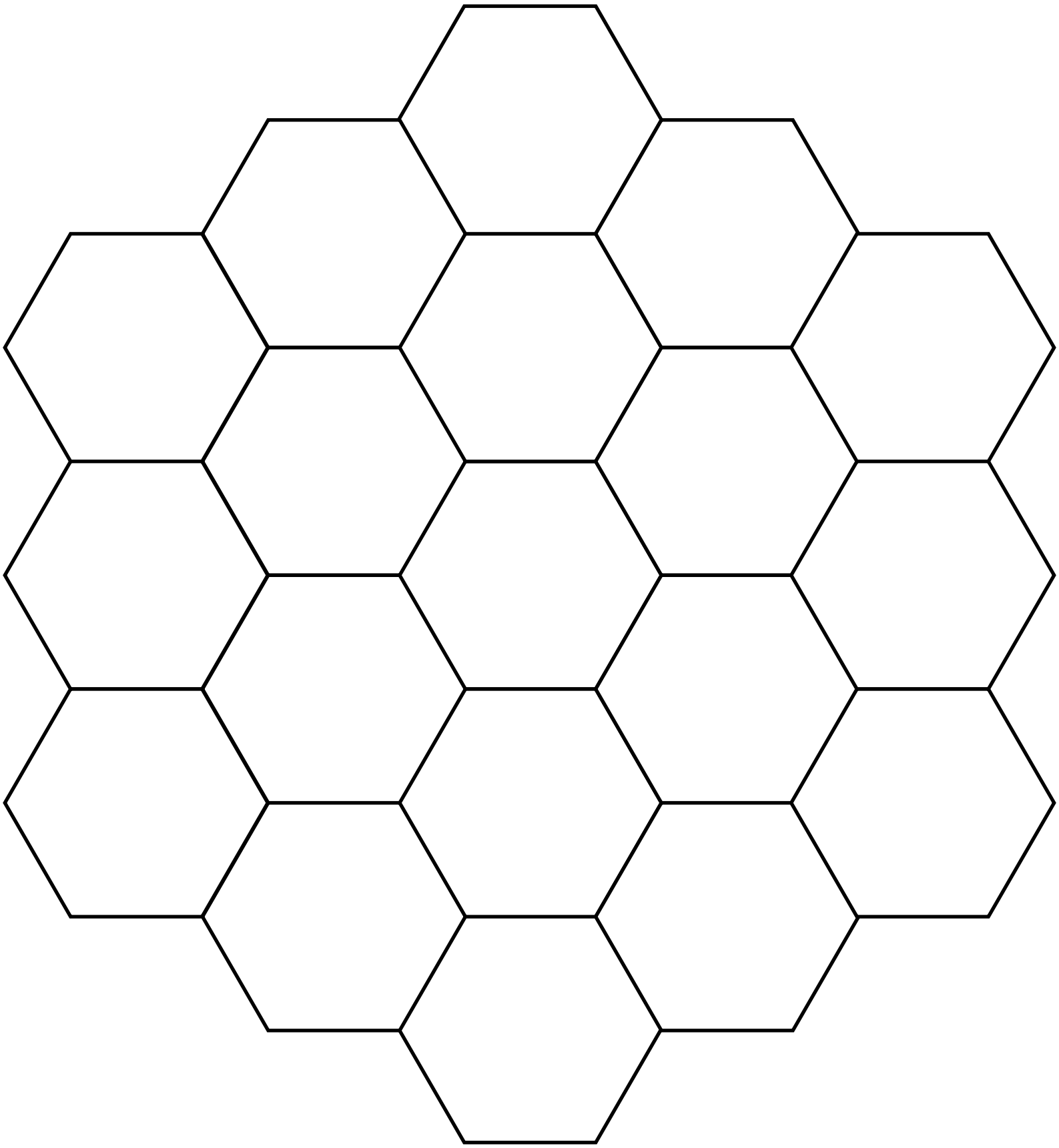


Illustration of all game components of *Weapon of Criticism* after setup and before actual gameplay.

During your turn:

1. All players draw a new question card.
    a. Before all players have played one turn, only draw description cards.
    b. When all players have played one turn, draw description or explanation cards.
    c. When all players have played more than one turn, draw any type of card.
2. Move your player piece an adjacent tile not occupied by you (optional if already standing on such a tile).
3. If you moved your player piece to an unoccupied tile:
    a. The other players choose one card each from their hands and place them face down in a pile which is then shuffled randomly.
    b. Draw a random card from the pile and place the remaining cards at the bottom of their corresponding piles.
    c. Read the drawn card aloud and place it so all other players can see its contents.
    d. The player who played that card identifies themself and is allowed to pose follow-up questions once you have issued an answer to the question on the card (if more than one player played a card with the same question, they all get to pose follow-up questions).
    e. Answer the question on the question card and any follow-up questions by other players.
    f. The other players vote on whether or not your answers were satisfactory, taking into consideration the original question you had to answer. They are also allowed to comment on your answers.
    g. If they vote in your favour (or the result is a draw), you have occupied the tile and must place a player token on the tile. If they do not, nothing happens.
4. If you moved your player to piece to an already occupied tile:
    a. All players choose one card each from their hands and place them face down in a pile which is then shuffled randomly.
    b. You and the defending player draw one random card each and place the remaining cards at the bottom of their corresponding piles.
    c. Read your card aloud and place it so all other players can see its contents.
    d. The defending player answers the question and any follow-up questions by you.
    e. Repeat the process with reversed roles.
    f. The uninvolved players vote on whose answers were most satisfactory, taking into consideration the original questions you had to answer. They are also allowed to comment on your answers.
    g. The winner occupies the contested tile. In case of a draw, the resisting player counts as the winner and gets to keep their tile.
5. Your turn ends.
    a. If you are simultaneously occupying five tiles by the end of the turn, you win and the game ends. Otherwise, the player to your left starts their turn.



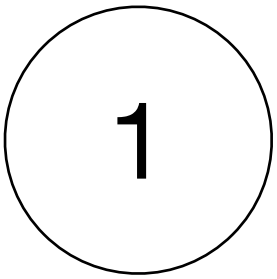


Describe a recent artifact or system you have designed with an emphasis on **what it does**.

Describe a recent artifact or system you have designed with an emphasis on **what type** of artifact or system it is.

Describe a recent artifact or system you have designed with an emphasis on **what it looks like**.

Describe three different deliverables from a recent design project.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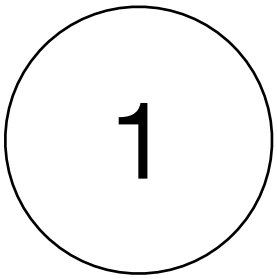
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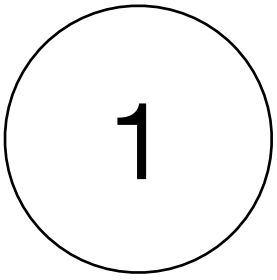
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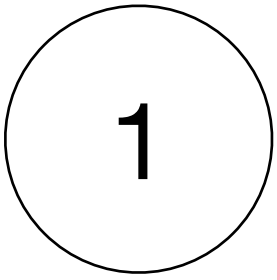
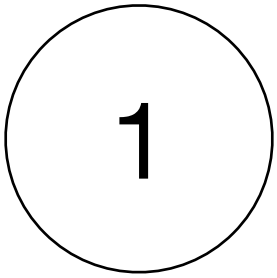

1

Describe at least one **similar product** to a recent artifact or system you have designed.

Describe the **design process** of a recent artifact or system you have designed.

Describe some **usability goals** of a recent artifact or system you have designed.

Describe some **user experience** goals of a recent artifact or system you have designed.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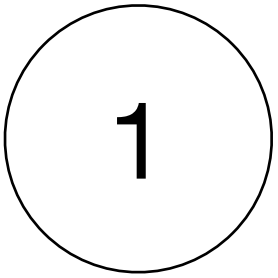
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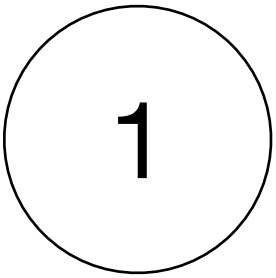
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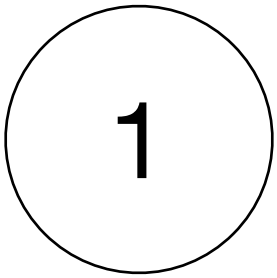
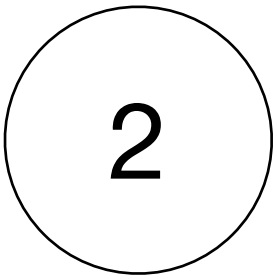

1

Explain how **people (might) use** a recent artifact or system you have designed.

Explain how a recent artifact or system you have designed **supports its usability goals**.

Explain how a recent artifact or system you have designed **supports its user experience goals**.

Explain the **interactions** of a recent artifact or system you have designed.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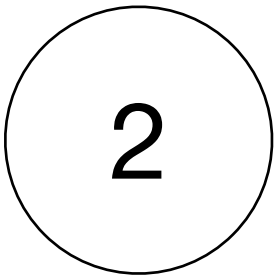
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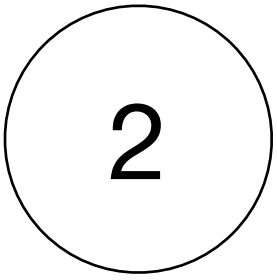
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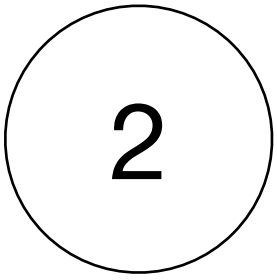
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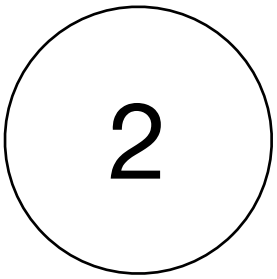
Explain the **uses prescribed** by a recent artifact or system you have designed (e.g. a speed bump prescribes slowing down).

Explain some **choices** you had to make in the design process of a recent artifact or system you have designed.

Explain some **challenges** you experiences in the design process of a recent artifact or system you have designed.

Explain how you **prototyped** or otherwise expressed your design in the design process of a recent artifact or system you have designed.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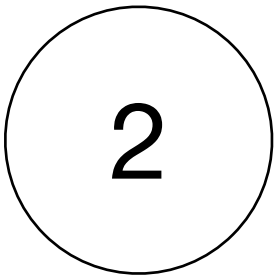
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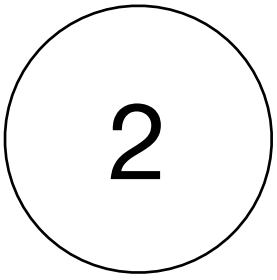
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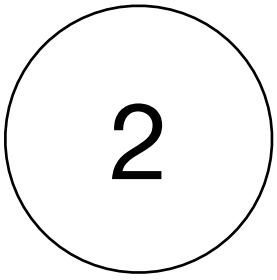
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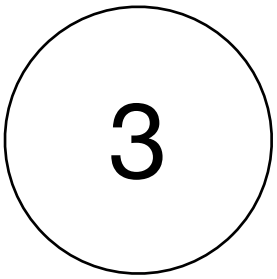
Reflect on why a recent artifact or system you have designed **exists**.

Reflect on what your **personal intentions** were with a recent artifact or system you have designed.

Reflect on how your **personal values affected** a recent artifact or system you have designed (or the design process thereof).

Reflect on the **ethical consequences** of a recent artifact or system you have designed.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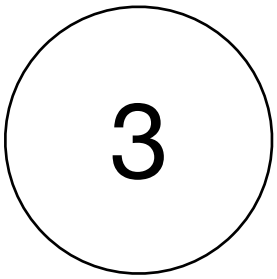
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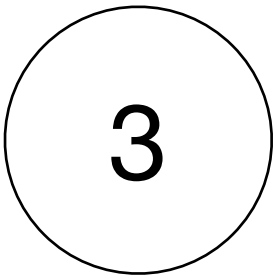
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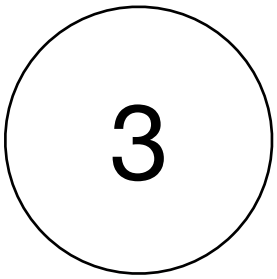
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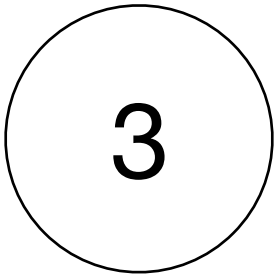
Reflect on how the **design context affected** a recent artifact or system you have designed (or the design process thereof).

Reflect on how your **personal experiences affected** a recent artifact or system you have designed (or the design process thereof).

Reflect on how **you were affected** by the design process of a recent artifact or system you have designed.

Reflect on what **values might be mediated** by a recent artifact or system you have designed.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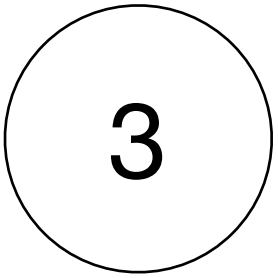
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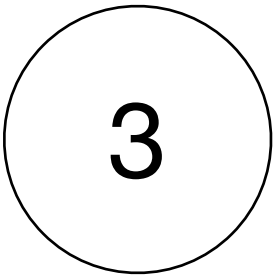
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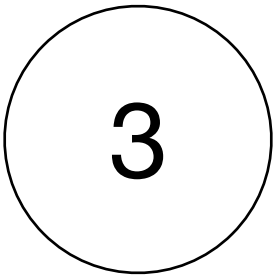
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