[…] we receive all this news with astonishing calm, even with an admirable form of stoicism. If a radical mutation were really at issue, we would all have already modified the bases of our existence from top to bottom. We would have begun to change our food, our habitats, our means of transportation, our cultural technologies, in short, our mode of production. (Latour, 2017, p. 8)

Introduction

Global warming, mass extinction of species, and extensive pollution together constitute a human inflicted environmental disaster that humankind cannot solve by continuing to act and think as the majority has done so far. There are many reasons for insufficient action; fabricated scepticism, greed, inability to fathom the encompassing consequences of climate change and extensive pollution, hopes of technological fixes, sheer convenience or just inattention. – And underlying it all, the failure to adequately address the mindsets ingrained in the practices leading to this dire situation. There is an immense need for profound inner transformation of humans; our perspectives, thinking, and ways of being in the world to enable change at the scale necessary (Wamsler et al., 2021; Woiwode et al., 2021). For instance, Christopher Ives and co-authors suggest:
[…] the sustainability crisis is in large part an emergent property of the state of our inner worlds. If we consider only external solutions to 'out there' problems (such as biodiversity loss, climate change, resource exploitation), we will fail to identify some of the most powerful and effective solutions that begin 'in here'. It might be said that the scale of the sustainability crisis extends all the way from planetary systems to the heart and soul of every human being. In this way, we consider the inner life as both an underexplored means to change, and an end in itself. (Ives, Freeth & Fischer, 2020, p. 211)

While concurring with this notion of the connection between inner and outer dimensions, we do not mean to imply that the disaster that numerous people and so many other living beings are already living through (or dying of) is an individualised problem. Rightly, it is structural, that is, caused by laws and regulations, the economic, political, and educational systems, but also by the beliefs and expectations many of the affluent part of the human population have been socialised into, which now structure everybody's lives (Paulsen, et. al. 2022). Consequently, for fundamental changes to occur to environmentally harmful ways of living (before being pressed to do so by devastating, undeniable disaster), the shared

understandings that inform prevalent human practices must be transformed. The goal of this transformation we could call “ecoliteracy” in the broadest sense of the term (Orr, 1992). Referring not only to the possession of factual knowledge or skills and competencies, but more broadly to a kind of ecologized Bildung concerned with sustainability and environment, entailing a deep (practical and intellectual) understanding and affirmation of the living world as a whole. Thus, we will define ecoliteracy as a goal, capacity, and willingness to make society life-friendly (including eco- and climate-friendly) in cooperation with the living world (Nørreklit and Paulsen, 2023). This includes, we suggest, at least five important dimensions:

1. Understanding entanglements between humankind and the living world
2. Appreciating the living world and living beings
3. Imagining a future life-friendly society
4. Making life-friendly solutions in partnership with the living world
5. Developing life-friendly communities

In what follows, we will focus on the third dimension concerning imagination, for reasons which will become clear. That said, the other dimensions will also be relevant. Further, ecoliteracy ought not to be understood as a purely intellectual enterprise but has to do with changing practice – how we live, including how certain understandings, norms, imaginations, and skills are embedded as core structures of practice (Cutter-Mackenzie & Smith, 2003). For that reason, we will turn to a practical theoretical perspective on the issue of change.

From the perspective of practice theory, change may occur in any of the three elements “material”, “competencies”, and “meaning” which according to Elisabeth Shove, Mika Pantzar and Matt Watson (2012, pp.21-25) together constitutes a practice. Here we want to propose a framework for encouraging change (resulting in the fostering of ecoliteracy), in relation to all the elements, in particular the dimension of “meaning”, working with internalised and intrinsic motivation through playful, co-creative processes involving an open-ended speculative cli-fi roleplaying game (RPG). There are of course many other ways of trying to foster ecoliteracy. Yet, what we focus on in this paper is a specific cli-fi-roleplaying we have developed within our research project *Playing with Disaster*, with the aim of making research on how such a game can a) be developed, b) facilitate ecoliteracy,

and c) what aspects of ecoliteracy. In technical terms it is a tabletop roleplaying game, also known as pen and paper roleplaying. This type of RPG takes the form of sessions where participants are physically present in the same space under the supervision of a gamemaster (GM), enacting specified characters in a shared, imagined world during a process that (often) involves some measure of ludic mechanics such as scores, rules, or randomness generators (Zagal & Deterding, 2018, pp. 29-32).

The paper presents the theoretical framework for the pilot of the PWD project. First, we present the state of the art, discussing previous work on the uses of RPGs in relation to fostering ecoliteracy. Then we introduce the practice theoretical perspective grounding our approach. This is followed by a brief consideration of theories of motivation, as we seek to leverage this drive through playful and co-creative processes via the use of an open-ended RPG. Finally, we lay out the principles guiding our work with the format, followed by some reflections of the results of the first pilot-test of the game.

Roleplaying games and ecoliteracy

According to Stéphane Daniau (2016) RPGs have been used for formalized educational purposes at least since 1968, and the number of studies has been rapidly growing during the last twenty years. According to this body of research, participation in RPGs and other simulation games, among others, motivates and engages learners (e.g. Broadwell & Broadwell, 1996), allows for valuable perspective shifting and contextualization that results in a more complex and well-rounded understanding (e.g. Asal, 2005), and increases long-term memory and retention of the learned (e.g. Krain & Shadle, 2006).

With regards to the use of RPGs in relation to climate and environmental issues, the earliest study we have identified is from 2006 (Truscheit & Otte), but earlier studies are reported, especially related to natural resource management (i.e. Egri, 1999; Lankford & Watson, 2007; Mathevet et al., 2007). More research starts appearing in the early 2010s, proliferating in the mid 2010s and onward. In most cases, the RPGs are used in a formal or semiformal educational setting, and the studies conclude that participants are motivated by learning via RPGs, getting their skills enhanced, developing a better understanding of the topics and the complexities involved (e.g. Blanchard & Buchs 2015; Gordon & Thomas, 2018; Salvini et al., 2016). In one instance it is documented that grades are higher on topics

students have engaged in via the RPG (Kluver et al., 2018), and significant changes occur in attitudes toward and concern about climate issues (Rumore et al., 2016). With regards to the RPGs under scrutiny, these typically require participants to take a stakeholder perspective in a simulation of a realistic situation that entails using relevant knowledge to argue for a particular perspective and/or engage in decision-making regarding resources or policies (e.g. Belova, Eilks, & Feierabend, 2015; Paschall & Wüstenhagen, 2012; Wang, 2022). Thus, these games tend to employ a relatively narrow skill- and knowledge-based focus, offering somewhat generic roles rather than more fully developed complex characters that evolve over the course of game sessions. Consequently, it may be correct to describe many of these as simulations that involve a limited roleplay element because they do not unleash the full potential of RPGs, such as experimenting with developing characters, giving full room for more free forms of imagination, and creating unpredictable speculative stories together.

Practice theoretical foundations

Practice theory is not a unified grand theory, but rather an amalgamation of core conceptualisations from some of the most prominent thinkers of the 20th century, such as the late Ludwig Wittgenstein, Harold Garfinkel and the ethnomethodologist movement, Pierre Bourdieu, Michel Foucault and Anthony Giddens (Postill, 2010, p. 6; Reckwitz, 2002, p. 244; Schatzki, 1997, p. 844). While highly diverse in many regards, all these scholars stress the co-constitution of and interchange between structure and actor. – A position that is, perhaps, most famously formulated in Giddens' notion of structuration (Giddens, 1984). With inspiration from, among others, the mentioned theorists, several scholars within the last 15 years have argued for at turn to practice, seeking to formulate a somewhat integrated framework (see for instance Cetina, Schatzki, & Savigny, 2005; Reckwitz, 2002; Warde, 2005).

A practice can be defined as:
[…] a routinized type of behaviour which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. (Reckwitz, 2002, p. 249)

As intoned here by the notion of routinisation, an important aspect of practice theory is that it does not consider all human action to be deeply intentional or reflexive. Rather, practices are seen as routines that are embedded in the body through socialisation. They are rarely learned through formalized instruction, but become repertoires at hand via doing and participation (Wenger & Lave, 2009). A practice is a normalized way of acting, feeling and thinking in relation to situations and settings, such as commuting to work, having a meal, or dressing for a festive occasion. As social phenomena, practices are recognizable by others (often both practitioners and non-practitioners). Practices, then, are not individualised dispositions. Rather, human agents, in the words of Reckwitz, are "carriers" of practices; the movements, knowledge and expectations they have picked up in their day to day lives (Reckwitz, 2002, p. 250). This does not mean that every carrier of a certain practice enacts it similarly. Rather, there is room for much variation over the common theme – consider, for instance, the many different forms that the practice of baking bread may take.

Practices, according to Theodore Schatzki, are "arrays of activity" (2005, p. 11) that involve a coming-together of different elements. Only when connections are established between these elements does an active practice emerge (Shove, Pantzar, & Watson, 2012, pp. 29-35). How these elements are defined and described differs somewhat from scholar to scholar. Here we will draw on the work of Elisabeth Shove and co-authors (2012) due its relative simplicity. As mentioned earlier, they understand a practice as being comprised by the active relation between three elements that it cannot be reduced to (2012, pp. 22-25):

• The material i.e., bodies (including those of other animals and plants), objects, and the arrangement of features in space.
• Competencies i.e., skills, knowledge, and knowhow.
• Meaning i.e., expectations, values, understandings, and emotions.

For instance, the sorting of household waste is a practice that involves a human body organising various types of material they want to dispose of into categories based on knowledge about which of these are considered reusable, what state they must be in to be acceptable for reuse or disposal, and which should not be mixed. Various types of objects, such as waste bins, co-construct the practice, as does the space (or lack thereof) required to go through the motions. Moreover, the practice is informed by expectations about the appropriateness of sorting waste, a valuation of recycling – or a requirement to do so – and

perhaps of emotions about plastic pollution. At the centre is the waste, a phenomenon so naturalised in current society as to nearly disappear despite its abundant fabricatedness (Pongrácz & Pohjola, 2004).

From the perspective of practice theory, practices (including discursive practices) produce social order, reproducing it through individual repetitions. It follows from this that social order, just like discourse, is both rather stable but also highly malleable. In principle, it may be always contested and in the process of changing. Some practices are more constitutive and complex than others, comprised of many different practices that all contribute to shaping and reproducing the social order instigated by the anchoring practice (Swindler, 2005). For instance, the sorting of household waste is part of a hierarchy of practices, such as buying and consuming goods, local and national waste management, and EU regulations for the same. An important point for Shove and co-authors (2012, pp. 44-47) is that elements are more persistent than the practices they become part of by being linked with each other. The specific materials, competencies, or meanings that together make up a practice may, of course, disappear, or be changed radically, but many are long-lasting. Horses as a material element, for instance, are still important actors within a plethora of practices, but these practices are very different from those in which horses were a central means of transportation or of power in farming and industrial work hundred or two hundred years ago. Due to their routinisation practices are not that easy to change as long as they ”work”.

In the current situation, where there is a need for radical changes to many existing practices related to working, eating, transportation, etc., one of the problems is that the materials and competences which enable most citizens to continue with their daily routines are still “working”. While individuals and smaller groups actively change the material dimension of their everyday lives to foster new practices, for instance by becoming vegan or living in tiny houses, the relative intactness of the material and competency elements suggests that it may be necessary to work with changing the element of meaning, That is, working to change the understandings and expectations that inform consumerist practices in order to alter these. Working actively to change the meaning dimension requires discursive re- and de-classification (Shove, Pantzar, & Watson, 2012, p.), for instance with regards to what it means to live “the good life” or what “waste” is and isn’t. It also means spreading the understanding that humans are not set apart from nature but, rather, that what we call nature is often formed by human actions, and that humans are nature (and

pervaded by nature) despite our claims to being the privileged Other.

Motivation and playful co-creation

Transformation that is not strictly necessary, that is, not pressed on by outer forces, such as regulations, natural disaster, or social norms, requires some other motivation. Moreover, while social pressure, fear or shame can certainly motivate people, research agrees that these factors tend to build external motivation, which will easily falter at the first given chance (Ryan & Deci, 2000). The more internalised, or better intrinsic, the motivation, the more lasting and deeply rooted the change (Herlambang et al., 2021). Intrinsic motivation requires an already established interest in something, and while it can be encouraged by outer stimuli it cannot be induced in someone by others. External motivation, however, has the potential to become more and more internalised through constructive intervention, eventually transforming into intrinsic motivation. Several factors have been shown to facilitate such a development. An experience of social connection is seen as the most vital: *Because extrinsically motivated behaviors are not typically interesting, the primary reason people initially perform such actions is because the behaviors are prompted, modeled, or valued by significant others to whom they feel (or want to feel) attached or related. This suggests that relatedness, the need to feel belongingess and connectedness with others, is centrally important for internalization.* (Ryan & Deci, 2000, p. 73).

In addition to social connection, experience of competency and autonomy are other important factors for fostering a greater internalization of motivation (Ryan & Deci, 2000, pp. 73-74). Giving people an experience of competency is concerned with neither asking too much or too little of them, setting manageable tasks or adequate challenges, for instance via scaffolding techniques (Holton & Clarke, 2006). To ensure autonomy, people must be given co-influence on plans, processes, or outcomes and not be under negative pressure, for instance based on fear. A fruitful foundation for encouraging internalized or intrinsic motivation, thus, requires both a meaningful social setting where participants have sympathy for each other, clear frames, and that participants are given influence over proceedings. Moreover, research indicates that while intrinsic motivation increases the positive emotions felt, positive emotions further heighten intrinsic motivation in a fruitful feedback loop (Løvoll et al., 2017). We suggest that co-creative, playful activities, such as the use of open-ended RPGs, has a great potential to encompass all the above factors

(because of reasons listed below), and hence to engage persons who are not necessarily intrinsically motivated by the topic of climate and environment – nor, for that matter, by roleplaying. We see at least four reasons for using RPGs as such a medium with transformative potential.

Firstly, roleplaying is at its heart social. Its whole premise is to experience and create a shared, imagined scenario – hence our reference to co-creation. Working with a group of people who know each other, a meaningful social setting will already be established. Existing relations may sometimes inhabit people, for instance a group of teenagers not wanting to appear uncool in the eyes of the others, and for some this may constitute uncomfortable pressure (Gordon & Thomas, 2018, p. 175). On the other hand, done well, the contract of play – "These actions in which we now engage do not denote what those actions for which they stand would denote" (Bateson, 2006, p. 317) – can work to dismantle such initial misgivings because a special space is created in which it is acceptable to be silly, act, experiment, that is to play (Karoff, 2013). Roleplaying also provides a great opportunity to create strong connections between people who do not know each other beforehand. Being in the process of discovery, shared imagination, and co-creation that roleplay entails, is a wonderful and effective way to create positive social bonds between strangers.

Secondly, roleplaying provides a setting that is at once framed and open, offering both opportunity for experiencing competence and autonomy. A roleplaying session normally has some form of setting, purpose or goal, and the participants will be given roles to fill in. The GM, likewise, serves to set and maintain a frame, whether highly predefined or open to participant influence. Moreover, participants typically receive resources, such as character cards, backstories, and score sheets, that will aid them in playing their role. Or, if participants create these themselves it will still be within some given frames, such as the setting of the scenario. At the same time, participants have some freedom to define their characters through their actions in the session, even in the cases where these have been defined to some degree by others. Moreover, what happens during a given session is to a great degree decided by the participants and that which they create together. Thus, roleplaying can be regarded as a form of group improvisation that fluctuates between regulation and freedom, where the input of every participant is vital for shaping the shared fantasy (Fine, 2002).

Thirdly, playful activity, at its best, is itself highly engrossing and tends to catch up the participants into intense engagement in the shared fabulations and commotions that emerges. Hans Georg Gadamer (2004) describes this as a form of freedom from pressure through absorption:
The ease of play – which naturally does not mean that there is any real absence of effort but refers phenomenologically only to the absence of strain – is experienced subjectively as relaxation. The structure of play absorbs the player into itself, and thus frees him from the burden of taking the initiative, which constitutes the actual strain of existence. This is also seen in the spontaneous tendency to repetition that emerges in the player and in the constant self-renewal of play, which affects its form […] (Gadamer, 2004, p. 105)

Once, caught up in play, most players will work to maintain the mood for an extended amount of time just for the sake of doing it (Karoff, 2013).

Fourthly, play is all about potentiality: "what happens if we do this?", or "let's pretend that this is …". As such, play offers up a social space where people can engage both that which is and isn't (yet) through shared fantasy and make-believe. Several authors write about the utopian potential in RPGs and roleplay, and the ways in which their use enables a queering of roles and perspectives (Adams & Beauchamp, 2021; Cross, 2012; Ferreday, 2011; Kawitzky, 2020).

We turn to playful co-creation through roleplaying as a way to engage people in climate and environmental issues not only because there is a good chance it will positively activate people, strengthening their motivation for dealing with the topics. Play as aesthetic activity and mood practice is a fundamental directedness toward the world:
[…] the state of being where you are distinctly open to new meaning production and where the possibilities exist for that to happen. It is not something that comes from within the players or from the outside, but instead it is happening through our engagement with the doings of play and in our relations towards the people we are with. (Karoff, 2013, p. 83)

Being in play entails an openness toward the world and everything in it. Also, to live well with everything else that inhabits the biosphere in the era of the Anthropocene (Paulsen et al., 2022), humanity needs to go beyond the rationality of utility that modernity has ingrained in us.

Within the aesthetic play theoretical tradition, play is defined by doing something just for the sake of it without any thought for the utility it may have (Gadamer, 2004; Suits, 2005). Yet, this does not mean that nothing can grow from play. On the contrary, play may give rise to community, realization, art, or learning, even though these are biproducts of play, not the reason for it. In this case, we believe play may offer a fruitful arena for shared reflection and realization about what kind of world we want to be co-inhabitants in (Iversen, in press).

Inspirational sources and design principles

We now turn to the PWD project, which examines the following RQs: 1) To what extent can hope-focused, cli-fi role-playing games (RPGs) motivate and facilitate ecoliteracy? 2) Which specific elements of cli-fi RPGs have extraordinary potential for motivating and fostering ecoliteracy? 3) Which dimensions of ecoliteracy in particular can be cultivated and improved through cli-fi RPGs? 4) How can cli-fi RPGs be integrated into and change formal educational contexts for the better? 5) How do a variety of pupils and teachers respond to the format and topics of cli-fi RPGs? Educational Science has long established, that effective learning requires the learner to be active and should be experiential (Orr 1992; Paulsen et. al., 2022). Likewise, it is clear from Science Communication research that approaches which focus only on imparting knowledge mostly fail to affect changes in everyday practices (Fagan, 2017; Fox and Rau, 2017, Salmon et. al., 2017). Instead, it is important to involve citizens to ensure engagement. Moreover, research shows that environmental communication may cause apathy, anxiety, and feelings of powerlessness if not done right (Baden, 2019, Happer, 2013; Lucas, 2022). Lastly, young people are increasingly experiencing anger, depression, and anxiety due to the climate crisis (Hickman et. al., 2021). All this indicates that there is a need for participatory approaches that invoke hope and guide to action (Bloomsfeld and Manktelow, 2021, Oziewicz, 2022, Rumore et. al., 2016). PWD proposes that the use of cli-fi RPGs is one possible way to address these needs.

As we have pointed out above, PWD differs from existing studies of the use of RPGS for sustainability education both in terms of its aims and the type of game employed. Our aim is not to induce general knowledge, but to work with personal beliefs and world views at an existential level (Ives et. al., 2020; Woiwode et. al., 2021). Likewise, the cli-fi RPG will be an open-ended, fictionalized story about the future of planet earth and the life upon it with a focus on human and non-human characters, their development, and relations, unleashing

the full potential of the format. This is inspired by The Carrier Bag Theory of Fiction, proposed by Le Guin (1996), and her distinction between life stories and killer stories. The latter can be argued to have become dominant in narratives that young people in the west today grow up with (Oziewicz, 2022). PWD, will add to the ecoliteracy research field, by creating knowledge about the dimension of imagination, as an important aspect of ecoliteracy, as well as how cultivation of advanced imagination about eco-friendly future society can impact on other dimensions of ecoliteracy. Hereby PWD seeks to fill a knowledge gap within the existing research on the use of RPGs in relation to climate and environmental issues and add to ecoliteracy research by its study of co-creation of non-dystopic narratives of the future, and their engaging capacity in relation to youth.

PWD is inspired by eco-critical literary studies, especially Marek Oziewicz (2022). He argues that Western culture today is dominated by dystopian narratives. According to Oziewicz, we need narratives that can cultivate “hope as resistance” as well as imaginations of a positive “biocentric future”. Instead of searching for such narratives within existing literature or news, we want to co-create new narratives together with young citizens, following a post-qualitative, art- based way of inquiry (St. Pierre, 2019; Visse et. al, 2919; Østern et. al., 2021). The RPG format allows for a powerful way of working with future narratives because the story is not fixed beforehand as in, for instance, a novel. The author Ursula K. Le Guin (2018) has argued that science fiction can be regarded as thought experiments, which has a “what if” structure: let’s say this or that and see what happens. Moreover, the philosopher and educational thinker John Dewey (1986) has argued this is also essentially what characterizes thinking. Instead of acting out, we can think through imaginatively different scenarios (and then act). We argue that RPGs even more than the science fiction novel or short story have a potential to enable the exploration of such alternative “what if” scenarios collaboratively. Consequently, cli-fi RPG can be a fruitful answer to what Oziewicz argues is lacking in mainstream Western culture today. We are aware that mainstream RPG culture (e.g., D&D) is currently dominated by what Le Guin (1996) calls killer stories (such as *Lord of the Rings* or *Harry Potter*). In PDW we deviate from this by inviting to life-friendly storytelling, that does not follow the structure of the killer story. Besides Oziewicz’s (2022) work on climate literacy, the dimension of imagination is often neglected in operationalizations of ecoliteracy (McBride et. al., 2016). Yet, it is pivotal in enabling visions of a life-friendly future society, including the paths we may take to this, which in turn will enable society to move forward in sustainable directions (Oziewicz, 2022). It can even be

argued that the ecological crisis of today is a crisis of imagination (Haiven, 2014). If young people today can only imagine dystopic futures, it prevents needed hope and action.

Discussion: results from the first test of the prototype

What we have done until now in the project, is: 1) form the above intentions, 2) write a solarpunk cli-fi/bio-fi speculative fiction roleplaying game, and finally 3) test a prototype on an adult audience, playing the game trough four game sessions of about 5 hours each in the period from august 2022 to august 2023. In each session we ended with a reflective conversation (durations from 21-35 minutes) about what the participants thought about the game. The four sessions formed one single story, fictionalized as happening in 2023-24 and 2048-49, going forth and back between these two ages, potentializing reflections on relationships between the (near) present and (a more far away) future. Some participants joined two, three or even all four sessions. Others played only once. The aim here is not to analyze the effects of the game because what we have now is only the prototype, and the very first test of the game on this adult audience. In January 2024 we will test a second time with young adults, and later in 2024-2025 an adapted version will be tested on a greater sample of schools. Yet, we want to end this article by discussing some of the potentials that the game might have, by reflecting on key statements from the two first of the four reflective conversations, centered on the imagination aspect of ecoliteracy that we expect the game is most likely to add to.

One of the main themes of the first reflective conversation is *hope*. During playing, the players are encouraged to reflect from time to time on how they interpret their characters, with regards to whether their character's hope is affected positively or negatively by what is happening in the story.

Player 1: It was very exciting. Also challenging. Dealing with interpreting such a character. Being constantly pulled in and out of realities [present and future] is also very exciting. And being forced to reflect [on hope], it forces one to reflect on how to interpret the character.

Player 3: It's cool that everyone explains why they do what they do, that you get the reflections and hear others' reflections and thoughts on hope.
All agree with player 1 and 3 on this. On the one hand, one is almost forced in the game to

reflect on hope and hopelessness, but on the other hand, all the players appreciate this. Player 5 further reflects on the open-ended character of the game:
Player 5: We are presented with many exciting perspectives on the ecological existential crisis [..] When we discuss hope, everything becomes relative, something that triggers thoughts in you, also on a larger level. [..] I'm forced to think about what is up and down, good, or bad. I'm forced to think about the character's choices: how do I think [my character] realistically reacts in this situation. I put a lot of effort into that. … I constantly try to think about the situation the character is in. … I have to figure out how much I should be guided by the story I have in hand and how much I should take the lead.

There is an interesting negotiation in this statement from player 5. The player is not sure, how much freedom is allowed to alter the story and make it one's own. Actually, there is a great amount of freedom, but the players must find out by themselves, by trying to add to the story, step by step, and see what happens.

The gamemaster (one of the authors of this article) also reflect in the conversation: The thing about hope: it's very surprising that it's so unpredictable. I can't predict it in advance, even though I've created the characters. You [the players] interpret the characters and the situations: The same things happen, but some [characters] become more hopeful while others lose hope. I think it made me wiser or more curious, how complex hope and hopelessness are.

Player 6: Reflections provide a kind of wisdom.

Player 2: It's what takes it a step further than normal roleplaying. You end up reflecting not only on your character's situation but also in a broader context.

Gamemaster: It is 100 percent you [as players] who determine how you interpret your character and a situation, whether you become more hopeful or lose hope. You have to figure out what it's like with your character.

Player 5: I like that, the part where you step out behind the character and explain how the character feel and what you think about the character, that you get that layer, rather than just acting and doing something. … And trying to tell about my interpretation of my

character.

Although it is intended, it is still interesting that the game creates so many thoughts about hope. The result seems not so much to be that the participants get more hope from playing the game, but more that they become reflective and "wise" about hope. Player 2 also reflets on the value of that in relation to her own experience with young people and their hope or hopelessness:
Player 2: Working with hope itself is important in relation to young people, not just in relation to the climate. Sometimes my teenage daughter, for example, hits rock bottom, where there is no hope at all. My point is that the game clarifies that hope changes, so it may be terrible right now, and there is no hope, but it may change later, hope can arise out of tragedies as well. It may be that you fall into a crevice [reference to a scene in the game], but it may cause you to become more hopeful… When you come out on the other side. […] I also think you end up thinking about the valuation of civilization. For example, the character I had (in the future world, 2048), she was much better off in this future, which might otherwise be apocalyptic, than she had ever been, she flourished! And that can also make you think: maybe it's not so much about saving what we have, but we have to change into something else…

We find it significant that these reflections of player 2 indicate a potentially for kinds of deep inner transformation in relation to both hope and the future. Not that player 2 necessarily has become more hopeful because of the game; but the player seems to have begun – through the game – to develop a new relationship to both hope and the future, in a constructive way. Player 2 also mentions in the conversation a direct impact on her life because of the game:
Player 2: I'm about to move to an apartment soon. And ever since I read my character, I've wanted to join a community garden [which is a central part of the plot in the game]. There is such a plant community in the city I'm moving to. And when you no longer have a garden, maybe you should go in there and take a look. That thought had not crossed my mind before.

The conversation further touches on the game's educational value. Especially player 4 put some insightful thoughts to the table:
Player 4: You have to imagine something [in the game]. I think that's the really interesting

part, especially if its students playing it, it makes the student aware of their own imagination, which can otherwise be frightening. That's pretty much the issue – how do we teach students about this [climate crisis] without them all becoming scared. You could say, here you get, by virtue of the structure [of the game], both what makes people afraid, and you can also add knowledge, but there is also something in it [the game] that allows the players to discover what can free them from the frightening while at the same time realizing that there is something they have to deal with. It's something that's really good about the game. The game captures the existential without it being totally frightening and without there necessarily being a happy ending given in advance.

These thoughts about the games educational value we find interesting. Many educational researchers and educators are currently debating how to advance teaching about climate-crisis, ecological crisis and so on, without taken all hope out of the students, but on the other hand not neglecting to teach about these important issues. The reflections from the first conversation indicate, all taken together, that the game has some potential to foster a kind of existential wisdom about hope, imagination and how to relate to the future, that seems promising. It also seems to enlighten what could and should be a key component of ecoliteracy, when it comes to the dimension of 'imagination'. Of course, we cannot conclude based on one test that the game has a specific or very certain effect. As the players also make clear, this depends on the players playing the game, what they do, how they reflect, and who they are, and in what situations in life they are situated. Yet, it is our hope as we continue testing, that we see that the game as a frame for fellowship and shared imagination will facilitate some outcomes rather than others, precisely because it works as a framing for activity and thought (Entman, 2015).

In the reflective conversation following the second turn of the game, the players reflect about the relationship between imagination and reality, as well as their own role in the narrative:
Player 1: I think it can be a bit challenging because you have to improvise a lot. For example, with Ursula [a person encountered in the game], I could create some kind of relationship, but then I feel a huge responsibility if I create something, and then it takes a massive turn. But it also provides a lot of freedom on the other hand.

Its telling, we think, that the player describes the huge responsibility she feels for an

imaginary narrative, almost as if it were real. It seems to be exiting and ambivalent, how much each player should make up:
Player 5: When you're forced to think a lot about your character and improvise a lot with the character, there's a double play going on inside, where you also have to consider how much can we move the story… It's maybe confusion on a higher level. It's fun that you get to associate quite wildly.

In session two of the game, the narrative is less steered than in the first. This is probably the background for the player's reflections on being ambivalent about, how much to make up:
Player 2: Sometimes you can feel a bit stuck, waiting for some plot to happen that never really comes.
Player 3: Maybe we should have been braver in coming up with things ourselves.
Player 4: I also feel it pushes you to start thinking strange thoughts. … There's more wild imagination that can lead very far.
Player 1: We don't have the full picture. …You have to both solve a mystery and make up a lot. It's unfamiliar but super fun.

Apparently, the players are constantly negotiating with themselves during the game how much they should intervene in the story and make up things. On the one hand they put some restrictions on themselves, afraid of damaging the main narrative, on the other hand, their imaginations go "very far", during the game, in different directions, opening of for alternative stories and plots, which are not all realised. This is highly relevant, in connection with the aim of fostering ecoliteracy, especially cultivating skills in imagination:
Player 3: I think it's good that one world is so close to our own; it's not there yet, but it could be, just in a different place, and I find that really good. And I also feel that the game massages the part of reality that lies in imagination. I actually think that's quite good. … And then: the black hole in this game is the catastrophe [an event in the game that separates the two fictionalized worlds]. It's from there that all the light springs. I think there's something, in general, related to sustainability and climate and such, that this game can… it can do something… in terms of capturing the content side. I actually see some potential in that.

Thus, it seems that the game has some potential to cultivate the powers of imagination. But

also, it seems to make the players more aware of how they can relate to the future:
Player 5: I think there's a learning aspect in the sense that we can see that a lot has happened in the last 100 years, but we have difficulty projecting such a story forward. We struggle to see that a lot can happen in 20-25 years; it's amusing to imagine it or be forced to imagine it. Otherwise, I might think that our lives in 25 years are more or less the same as now.

As indicted in this statement from player five, it also might be that the game can have an effect on how one looks on the future. The story in the game goes back and forth between a near future, one year ahead, and a more far away future, about 25 years later, where much is different. This "double narratives" seems to enable for lots of thinking about now and then:
Player 1: It works well with both the present, and the future world. That you have two characters and switch between them. It's also super exciting; you could, in a way, just have a roleplaying game about the present part. There's so much. But it works well that there's a lot from both worlds.
Player 5: I'm constantly chasing the threads [between the two worlds].
Player 2: Yes.
Player 5: It creates the complication that you can use knowledge from one world in the other, which can be both convenient and inconvenient.
Player 3: I was thinking we can also experiment with which threads can go back and forth.

Finally, the players also reflect further on the hope-theme which was central in the first session. Again, it becomes clear that hope is a complex phenomenon, but also that you might lose hope in one sense, yet find at the same time a more meaningful life:
Player 3: There is both the survival part and the part about living meaningfully, and then there is the part about hoping. Even though things may be going downhill, one [some in the game] manage to live meaningful lives. … So, the question is whether it can become a meaningful or good life. For example, becoming curious. Because he [the player's character] has gone so far that he has started to become fatalistic: He thinks, if it goes, it goes, and if it doesn't, it could still be interesting, whatever happens. … Hope may have gone down, but vitality went up. And then I think what the game really shows is that it almost draws us into that butterfly paradox [referring to Zhuangzi]: when is it real and when is it not?
This quote indicates that the game has the potential to open up deep thoughts about hope,

life and meaning. Instead of simply thinking that hope is one-dimensional and that more hope is just better or even necessary, it seems that the player realizes through the game that you can have a meaningful life even if it in some regards seems hopeless. Thus, the game seems to enable a more reflective relationship to hope; hope as something relatable and doable as part of existential stance. Further, the game seems to open up for reflections about real life in an experimental mode. Even if it is "only" a game and a fiction, it may enlighten the lived life.

Concluding remarks

Above we have laid out the theoretical foundation and some of the design principles for our work with RPGs as a means to foster and motivate ecoliteracy. We have turned to RPGs in order to tap into the motivating factors of fellowship, playfulness and co-creation with the goal of altering the meaning dimension of daily consumerist practices. Hope, imagination, and engagement are central in our work because it is hard to act without hope and vision, and because knowledge alone is not enough. To thrive, people need to be able to act on their convictions and the problems that arise. Preliminary results from our pilot study, seem to indicate that roleplaying games provide a fruitful means to work with the more existential aspects of living through a climate and environmental crisis in ways that do not overwhelm participants with facts that may bring hopelessness and lead to apathy.

We are only in the pilot phase of the project and the next phase will consist in operationalising the notions of ecoliteracy and hope both for the qualitative and the later quantitative study, with respectively five and ten schools. The end goal is to theorize and create knowledge about the relation between play, imagination, hope and ecoliteracy as well as to develop an educational material for use with youth aged 15-19 both within formal education and in more informal settings such as youth clubs, libraries, and other cultural institutions.

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References

Adams, D., & Beauchamp, G. (2021). Other knowings and experiencing otherness: Children's perspectives of playing a hunting game in a nature reserve. *Australian Journal of Environmental Education*, 37(3), 224-239.

Asal, V. (2005). Playing games with international relations. *International Studies Perspectives*, 6, 359-373.

Baden, D. (2019). Solution-focused stories are more effective than catastrophic stories in motivating proenvironmental intentions. *Ecospychology*, 11(4), 254-263.

Bateson, G. (2006). A theory of play and fantasy. In K. Salen & E. Zimmerman (Eds.) *The game design reader: A rules of play anthology* (pp. 314-328). The MIT Press. (Original work published 1972).

Belova, N., Eilks, I., & Feierabend, T. (2015). The evaluation of role-playing in the context of teaching climate change. *International Journal of Science and Mathematics Education*, 13, 165-190.

Blanchard, O. & Buchs, A. (2015). Clarifying sustainable development concepts through role-play. *Security Dialogue*, 46(6), 697-712.

Bloomfield, E. F. & Manktelow, C. (2021). Climate communication and storytelling. *Climate Change*, 167, article 34.

Broadwell, M. M. & Broadwell, D. C. (1996). How to get trainees into the action. *Training*, 33(2), 52-56.

Cetina, K.K., Schatzki, T., & Savigny, E. (Eds.). (2005). *The practice turn in contemporary theory*. Routledge.

Cross, K. A. (2012). The new laboratory of dreams: Role-playing games as resistance. Women''s *Studies Quarterly*, 40(3/4), 70-88.

Cutter-Mackenzie, A., & Smith, R. (2003). Ecological literacy: The 'missing paradigm' in environmental education (part one). *Environmental Education Research*, 9(4), 497-524.

Daniau, S. (2016). The transformative potential of role-playing games: From play skills to human skills. *Simulation and Gaming*, 47(4), 423-444.

Dewey, J. (1986). *Experience and education*. Taylor & Francis Group. (Original work published 1938).

Egri, C. P. (1999). The environmental round table role-play exercise: The dynamics of multistakeholder decision-making processes. *Journal of Management Education*, 23(1), 95-112.

Entman, R. M. (2015). Framing: Til afklaring af et spredt paradigme. *MedieKultur: Journal of Media and Communication Research*, 31(58), 115–123.

Fagan, M. (2017). Who's afraid of the ecological apocalypse? Climate change and the production of the ethical subject. *British Journal of Politics and International Relations*, 19(2), 225-244.

Ferreday, D. (2011). Becoming deer: Nonhuman drag and online utopias. *Feminist Theory*, 12(2), 219-225.

Fine, G. A. (2002). *Shared fantasy: Role playing games as social worlds*. Chicago University Press.

Fox, E. & Rau, H. (2017). Disengaging citizens? Climate change communication and public receptivity. *Irish Political Studies*, 32(2), 224-246.

Gadamer, H. G. (2004). *Truth and method*. (J. Weinsheimer & D. G. Marshall, Trans.). Continuum. (Original work published 1960).

Giddens, A. (1984). *The constitution of society: Outline of the theory of structuration*. Polity Press.

Gordon, S. & Thomas, I. (2018). 'The learning sticks': Reflections on a case study of role-playing for sustainability. *Environmental Education Research*, 24(2), 172-190.

Haiven, M. (2014). *Crises of imagination, crises of power: Capitalism, creativity and the commons*. Bloomsbury Publishing.

Happer, C. (2017). Belief in change: The role of media and communication in driving action on climate change. In A. Elliott, J. Cullis, & V. Damodaran (Eds.) *Climate change and the Humanities: Historical, philosophical and interdisciplinary approaches to the contemporary environmental crisis* (pp. 177-197). Palgrave Macmillan.

Herlambang M. B., Cnossen, F., Taatgen, N. A. (2021). The effects of intrinsic motivation on mental fatigue. *PloS One*, 16(1), e0243754.

Hickman, C., Marks, E., Pihkala, P., Clayton, S., Lewandowski, R. E., Mayall, E. E., Wray, B., Mellor, C., & van Susteren, L. (2021). Climate anxiety in children and young people and their beliefs about government responses to climate change: A global survey. *The Lancet. Planetary Health*, 5(12), e863-e873.

Holton, D. & Clarke, D. (2006). Scaffolding and metacognition. *International Journal of Mathematical Education in Science and Technology*, 37(2), 127–143.

Iversen, S. M. (in press). Træd ind på legens sti: Et omrids af legens potential i modvækstbevægelsen. In M. Paulsen & J. Tække (Eds.) *Menneske, samfund og dannelse i en ny tidsalder*. Forlaget UP.

Ives, C.D., Freeth, R., & Fischer, J. (2020) Inside-out sustainability: The neglect of inner worlds. *Ambio*, 49, 208–217.

Karoff. H. S. (2013). Play practices and play moods. *International Journal of Play*, 2(2), 76-86.

Kawitzky, F. R. (2020) Magic circles: Tabletop roleplaying games as queer, utopian method. *Performance Research*, 25:8, 129-136.

Kluver, D. B., Robertson, W. M., & Agardy, R. (2018). Role playing a city's response to climate change: Engaging undergraduate geoscience students. *Journal of Geoscience Education*, 66(1), 25-35.

Krain, M. & Shadle, C. (2006). Starving for knowledge: An active learning approach to teaching about world hunger. *International Studies Perspectives*, 7, 51-66.

Lankford, B. & Watson, D. (2007). Metaphor in natural resource gaming: Insights from the river basin game. *Simulation and Gaming*, 38(3), 421-442.

Latour, B. (2017). *Facing Gaia: Eight lectures on the new climate regime*. Polity Press.

Le Guin, U. K. (1996). The carrier bag theory of fiction. *The ecocriticism reader: Landmarks in literary ecology*, 149-154.

Le Guin, U. K. (2018). *The left hand of darkness*. Gollancz.

Løvoll, H., Røysamb, E., & Vittersø, J. (2017). Experiences matter: Positive emotions facilitate intrinsic motivation. *Cogent Psychology*, 4, art. 1340083.

Lucas, C. H. (2022). Climate friction: How climate change communication produces resistance to concern. *Geographical Research*, 60(3), 371-382.

Mathevet, R., Le Page, C., Etienne, M., Lefebvre, G., Poulin, B., Gigot, G., Proréol, S., & Mauchamp, A. (2007). BUTORSTAR: A role-playing game for collective awareness of wise reedbed use. *Simulation & Gaming*, 38(2), 233-262.

McBride, B. B., Brewer, C. A., Berkowitz, A. R., & Borrie, W. T. (2013). Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here? *Ecosphere*, 4(5), 1-20.

Orr, D. W. (1992). *Ecological literacy: Education and the transition to a Postmodern world*. Suny Press.

Oziewicz, M. (2022). Planetarianism now: On Anticipatory imagination, young people's literature, and hope for the planet. In M. Paulsen et al. (Eds.) *Pedagogy in the Anthropocene: Rewilding education for a new earth*. Palgrave.

Nørreklit, L., & Paulsen, M. (2023). Life-friendly: who we are and who we want to be. *Journal of Pragmatic Constructism*, 13(1), p. 9-22.

Paschall, M. & Wüstenhagen, R. (2012). More than a game: Learning about climate change through role-play. *Journal of Management Education*, 36(4), 510-543.

Paulsen, M., Jagodzinski, J., & Hawke, S. (Eds.) (2022). *Pedagogy in the Anthropocene: Re-wilding education for a new earth*. Palgrave Macmillan.

Pongrácz, E., & Pohjola, V.J. (2004). Re-defining waste, the concept of ownership and the role of waste management. *Resources, Conservation and Recycling*, 40(2), 141-153.

Postill, J. (2010). Introduction: Theorising media and practice. In B. Brücher & J. Postill (Eds.), *Theorising media and practice* (pp. 1-32). Berghan Books.

Reckwitz, A. (2002). Toward a theory of social practices : A development in culturalist theorizing. *European Journal of Social Theory*, 5(2), 243–263.

Rumore, D., Schenk, T., & Susskind, L. (2016). Role-play simulations for climate change adaptation education and engagement. *Nature Climate Change*, 6(8), 745-750.

Ryan, R. & Deci, E. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68-78.

Salmon, R. A., Priestley, R. K., & Goven, J. (2017). The reflexive scientist: An approach to transforming public engagement. *Journal of Environmental Studies and Sciences*, 7,53-68.

Salvini, G., van Paassen, A., Ligtenberg, A., Carrero, G. C., & Bregt, A. K. (2016). A role-playing game as a tool to facilitate social learning and collective action towards climate smart agriculture: Lessons learned from Apuí, Brazil. *Environmental Science & Policy*, 63,

113-121.

Schatzki, T. (1997). Practices and actions: A Wittgensteinian critique of Bourdieu and Giddens. *Philosophy of the Social Sciences*, 27(3), 283-308.

Schatzki, T. (2005). Introduction. In K.K. Cetina, T. Schatzki, & E. Savigny (Eds.), *The practice turn in contemporary theory* (pp. 10-23). Routledge.

Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. Sage Publications.

St. Pierre, E. A. (2019). Post qualitative inquiry in an ontology of immanence. *Qualitative inquiry*, 25(1), 3-16.

Suits, B. H. (2005). *The grasshopper: Games, life and utopia. Broadview Press*. (Original work published 1978).

Swindler, A. (2005). What anchors cultural practices. In K.K. Cetina, T. Schatzki, & E. Savigny (Eds.), *The practice turn in contemporary theory* (pp. 83-101). Routledge.

Truscheit, A. & Otte, C. (2006). Sustainable games people play: Teaching sustainability skills with the aid of the role-play 'NordWestPower'. *Greener Management International*, 48, 51-56.

Visse, M., Hansen, F., & Leget, C. (2019). The unsayable in arts-based research: On the praxis of life itself. *International Journal of Qualitative Methods*, 18.

Wamsler, C., Osberg, G., Osika, W., Herndersson, H., & Mundaca, L. (2021). Linking internal and external transformation for sustainability and climate action: Towards a new research and policy agenda. *Global Environmental Change*, 71, online first.

Wang, R. (2022). Investigating the contribution of role-plays for social sustainability: Designing a role-play game for CSR Communication. *Developments in Business Simulation and Experiential Learning*, 49, 47-52.

Warde, A. (2005). Consumption and theories of practice. *Journal of Consumer Culture*, 5(2), 131–153.

Wenger, J., & Lave, E. (2009). *Situated learning: Legitimate peripheral participation*. Cambridge University Press.

Woiwode, C., Schäpke, N., Bina, O., Veciana, S., Kunze, I., Parodi, O., Schweizer-Ries, P., & Wamsler, C. (2021). Inner transformation to sustainability as a deep leverage point: Fostering new avenues for change through dialogue and reflection. *Sustainability Science*, 16, 841-858.

Zagal, J. & Deterding, S. (2018). Definitions of "role-playing games". In J. Zagal & S. Deterding (Eds.) *Role-playing games studies: A transmedia approach* (pp. 19-51). Routledge.

Østern, T. P., Jusslin, S., Nødtvedt Knudsen, K., Maapalo, P., & Bjørkøy, I. (2021). A performative paradigm for post-qualitative inquiry. In *Qualitative research* (pp.1-18). Sage Publications.