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Rethinking Transformative Education

Skills for a regenerative society

Futures Studies

Master's thesis

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This research builds understanding on how education professionals envision a regenerative society in year 2050. It defines the necessary skills set for the regenerative society and demonstrates how current concepts of global and green competences in education match up with the needs of regenerative futures. It is a futures study conducted with participatory futures methods making use of expert knowledge and abilities to envision the futures and its needs.

The motivation for the research comes from raising criticism on the Agenda 2030 sustainable development goals- on their insufficiency and not being reachable by humanity. Simultaneously they are said to lack a holistic approach that would cover post-sustainability scenarios. It has been argued that a transformative change aiming on regeneration is needed.

The theoretical framework of this study is based on the concepts of regeneration and transformative education. It builds understanding on regenerative futures, its aims, the necessary worldviews, and paths to regeneration. Secondly it discusses the role of education in transformation and the concept of transformative education. It introduces concepts and competence frameworks that have gained interest on European and global levels: the green competence framework and the global competence framework. Furthermore, the theoretical framework emphasizes on innovative educational and pedagogical strategies recently developed to promote planetary wellbeing and regeneration.

To answer the research questions, four participatory futures workshops were held. These workshops used Mental time travel and Causal Layered Analysis (CLA) as methods. The results were gathered from 31 educational professionals and experts working in various development and directing roles in the educational sector in Europe and master's and Doctoral students in the changing Education study program.

These workshops resulted in 18 individual future images that then were categorized into three future images that represent the image of a larger group of participants. This grouping was done based on what the image gave most emphasis on simplicity, technology or societal findings. These images are different possibilities within a regenerative society and are not contradictory to one another. At the core of a regenerative society are the respective values and worldview that secure regeneration to be an ongoing process. It is a society that everyone is valued and has value for regenerating wellbeing for all living forms This value base also affects on the necessary skills and competences.

The four workshops generated a total of over 200 skills, competences and changes in education needed in a regenerative society. They reflect the collective skillset envisioned as necessary for the described futures and reflect the holistic nature of a regenerative society, where transformation is constant and interactive adaptability needed.

The most often occurring skills were empathy, various collaboration and communication skills and critical thinking skills. But also, communal skills, respect and values were mentioned on several occasions and levels. Vast majority of the skills were related to personal ability (i.e., problem solving) rather than practical work (f.eg. cultivating). Also, observations on how education institutions and teachers should reposition were mentioned, pointing the necessity of reskilling and upskilling of the educational professionals.

Based on this study's findings Global and the Green competence frameworks have recognized competences that are also necessary for a regenerative society, despite of being built on a mechanistic worldview and on a humancentric approach. Hence if the underlying values and worldviews are not transformed, the skills might have limited potential for continuous transformation necessary for regeneration. Furthermore, the research results also included tens of skills that could not be classified into these categories leading to the observation that alone and without revision they are not sufficient frameworks for regeneration. The novel practices and paradigms of planetary citizenship and planetary social pedagogy as well as regenerative learning and education theory have filled many of these gaps and could together with this research's findings form a more comprehensive skills set for regeneration. Without understanding reality and nature and being able to evaluate facts based on evidence we have limited chances for taking use of the knowledge necessary for regeneration.

A regenerative society demands open discussion on the shared values, as the underlying worldview and values can hinder us from making the transformative change and look beyond it. Learning should support the hopeful vision for everyone and everything. The role of educator's should keep on transforming from passing on knowledge to recognizing the potential of individuals and help develop to a person able to produce wellbeing in the community. Education is the driving force of this regenerative society.

Key words: Regeneration, Education, Transformative education, Future images, skills, competences

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1 Introduction

“Dear friends, Humanity is waging war on nature. This is suicidal...” (Guterres 2020)

These were the provocative opening words of United Nations secretary- General António Guterres statement on the current state of the globe in Columbia university in 2020, begging for a transformative change. The destructive patterns of our current systems demand a change both in our thinking and action.

While UN calls for transformative action to reach the Agenda 2030’s life supporting goals for sustainability, there is raising criticism of the goals. They are critized of not being reachable by humanity, of the goals too strongly focusing on the Anthropocene, but also of lacking a holistic approach that would cover post-sustainability scenarios (Gibbons 2020; United Nations 2015; United Nations 2023; Voulvoulis et al. 2022). Additionally, there is heaving awareness, that reaching sustainable development goals will not be enough – it's time for a transformative change aiming on regeneration (Hawken 2021; Wahl 2017). This research builds understanding on a possible path of transformation; Regeneration through education.

Where sustaining refers to keeping and maintaining, regenerating focuses on processes and practices that renew, restore and revitalize (Jackson 2023 285). In addition to reversing the degradation of natural systems, regenerative approaches seek to design human systems that co-evolve with the natural systems in a symbiotic and resilient way (Mang & Reed 2012; Wahl 2017).

This idea of regeneration has gained growing interest among environmental activists as well as businesses in recent years. Especially the regenerative business models have been criticized of being yet another way of “greenwashing”. But as environmental activists working towards offering regenerative solutions have stated Climate crisis should not be seen as a science but a human problem. The ultimate power for the change relies on reverence, respect and compassion.(RegenerateBC n.d.)

Due to the goals of Agenda 2030 being based on a mechanistic worldview, with humans and the rest of life addressed separately, human interests are valued above the needs of other species and the environment. It is argued that the goals are also constructed on reductionist thinking, where the complexity of the phenomena is lost as parts of the systems are studied in isolation. Therefore, the ability of these stated goals to produce and

evaluate positive outcomes is limited and can be deemed insufficient. This is why there is a need to re-examine the existing assumptions and potentially altering boundaries of our thinking and actions, for more comprehensive understanding, with interdisciplinary and critical thinking. (Voulvoulis et al. 2022.)

The importance of the topic comes from the trembling structures of the Volatile, Uncertain, Complex and Ambiguous (VUCA) world we live in. The ecological crisis and the biodiversity loss are evident, and societies are faced with new challenges with the diversified population and loss of feeling of belonging. A change is desperately needed, and a slow transition is no longer sufficient (United Nations 2023). There is an urge for a true transformation in our values, attitudes and culture. Where else could this change begin, other than in education?

The transformation asks for a cultural change and recognition of culture as a way for reaching these goals (United Nations 2023). This cultural change will affect our attitudes and values, and this can be done through education. Currently a lot of emphasis has been put on transformative education, green competencies and raising responsible global citizens that are educational and pedagogical concepts that are said to affect the learners attitudes and values. But are they truly the tools and ethos for building a regenerative society? Where we give back more than what we take? Where common good is valued more than personal interest? Where we see our actions to have a holistic impact?

Based on the literature search very few studies have been conducted on the topic and even less have concentrated on the skills set needed for regeneration (see Armon 2021; Alves Santos & Penha-Lopes 2022).

This is a futures study conducted with participatory futures methods making use of expert knowledge and abilities to envision the futures and its needs. It aims on answering the following research questions:

- How education professionals envision a regenerative society in year 2050?
- What are the necessary skills set for the regenerative society? and
- How current concepts of global and green competences in education match up with the needs of regenerative futures?

2 Theoretical framework

The theoretical framework of this research is built around the concepts of regeneration and transformative education.

The first part of the theoretical framework and this chapter will build understanding on the concept of regeneration. The chapter will discuss its aims, the necessary worldviews, and paths to regeneration. This research defines regeneration as a process of bringing new or more vigorous life by designing human systems that co-evolve with the natural systems in a symbiotic and resilient way. It is a positive, ongoing transformation and a sense of interactive adaptability aiming on processes and practices that renew, restore and revitalize life in its all manifestations and endures responsibility of stewardship. (Mang & Reed 2012; Camrass 2020; Armon 2021; Jackson 2023.)

The second part of this chapter will introduce the role of education in transformation and the concept of transformative education. This transformative education can be a powerful tool for regeneration, but the aimed learning outcomes are reliant on the context stated in the curriculums, which may either work towards or hinder the change needed for regeneration. At its current we are educating the learners for the needs of our current economy to flourish not for the future of the planet (Bell 2016).

Therefore, the following sections will introduce concepts and competence frameworks that have gained interest on European and global levels: the green competence framework and the global competence framework. The global competencies are part of the OECD transformative competences and measured as part of the PISA-tests, whereas the green competence framework is part of the European green deal and actions towards carbon neutrality in 2050 (OECD 2019; European Commission Joint Research Centre 2022; GreenComp - Policy background and methodology 2023). These frameworks are aiming towards transformation and affecting the inner sustainability but have been criticized for lacking a holistic worldview. Acknowledging this, there is an increasing interest in education on the ideas of planetary citizenship and planetary social pedagogy (Laszlo, Luksha & Karabeg 2017; Moilanen & Salonen 2022; Salonen et al. 2023). Furthermore, the theoretical framework emphasizes innovative educational and pedagogical strategies recently developed to promote regeneration.

The chapter ends with a summary of the theories.

2.1 Regeneration

Regeneration is about paying our ecological debt; the goals are beyond the ones common for sustainable development and harm mitigation. The outcomes of action should be net positive in social, cultural, and ecological sense. (Camrass 2020.) Regeneration relies on understanding nature's systems functions (Armon 2021; Camrass 2023). Ecological systems have the ability to restore, adapt and regenerate when they are damaged or under risk. Dynamic ecological balancing and rebalancing occurs all the time, where interactions between the parts of the system eventually leads to a stable whole. This state of balance is also affected by environmental factors such as human action, climate change or climate crisis. (Hellström & Aittasalo 2023,61)

When this ecological system approach is adopted to all dimensions of a society, the transformation towards regeneration is possible and dynamic. It is worth noticing that regeneration should be looked at as a dynamic and continuous process that has the capacity to become more robust and resilient over time, and not as an end state that is "achieved." (Camrass 2020.) A regenerative approach enhances life in its all manifestations and endures responsibility of stewardship.

Regeneration has been also discussed from medical perspectives such as organ development(see f.eg Regenerative Medicine no date). In this research the regenerative futures are looked at from the educational and societal perspectives, while connotations related to organ development are deemed out of scope for this work.

2.1.1 Regenerative futures

Even if the concept of regenerative sustainability is relatively new, regenerative development practices have existed for more than 60 years (Gibbons 2020). Regenerative systems strive beyond mere sustainability or restoration; they aim for developments that boost the well-being of human communities and the ecosystems around them (Clegg 2012). Regenerative futures raise the need for alternative approaches that include interactive adaptability, ongoing co-evolution of a community, a pathway to transformation, and visions that are aligned with reality. With these approaches can socially and ecologically resilient communities be created. (Camrass 2020, 2023; Armon 2021.) Furthermore, regeneration is reliant on a systems approach that actively and

continually creates new systems designed to enhance the quality of life for both humans and nature (Clegg 2012).

Achieving regeneration requires considering social, economic, and environmental impacts and ensuring communities are equitable. This necessitates engaging stakeholders. Regenerative development has the potential to build social and natural capital, by fostering more resilient and thriving societies and communities through the utilization of local resources and the creation of jobs in sustainable industries.(Clegg 2012.)

Holistic perspectives of regeneration have been addressed by the Regeneration.org and its project Nexus. It is a project that is gathering and creating a list of research-based solutions and challenges connected to climate emergency and in building a regenerative planetary ecosystem. Regeneration is said to be what life has always done. These solutions are based on six basic frameworks that are overlapping and are all prerequisites for the desired change.(Nexus | Project Regeneration 2023)

These six basic frameworks are the following: *Equity* is the key driver for change, as how we treat ourselves, one another and the nature are connected. It recognizes that transformation is needed on an individual level, but also that it is necessary to care for the social system. Creating better lives will support the wellbeing of the nature. *Reduce* refers to actions that can be taken to control global greenhouse gas emissions. Use of renewable energy is not a sufficient action; consumption of energy and materials need to be reduced and new solutions need to be found. *Protect* discusses how the terrestrial carbon can be kept on earth with preservation, safeguarding and defending. *Sequester* talks about the natural carbon cycle and how by adopting regenerative agriculture practices and other protective ecosystem practices in land use, the atmospheric carbon levels can be reduced to stop acidification of the oceans. *Influence* is the action we take to promote change in legislations and policies that are favorable for the planet as a whole. *Support* refers to the organizations leading the change toward regeneration and their limited resources.(Nexus | Project Regeneration 2023.)

These solutions outline actions that can be taken at every level of agency, from individuals to governments. While the project focuses on addressing the ecological crisis, it acknowledges that societal and cultural shifts are essential components of the solution. At present, too few people are actively involved in changemaking, a situation that must be transformed. (Nexus | Project Regeneration 2023.) Additionally, implementing

regenerative practices will encounter obstacles if the foundational principles and holistic approach are not fully comprehended (Mang & Reed 2012).

2.1.2 Regenerative worldview

When we strive for regeneration, it is essential to question the current mechanical worldview on which our system is based. The issue with this worldview is that it assumes the whole is merely the sum of its parts, and that changes can be made by reducing and analyzing these parts in isolation. This approach is evident in current sustainability goals and actions, which fail to acknowledge the complexity and dynamic nature of systems. On the other hand, the ecological worldview challenges these simplified assumptions and assumes that the properties and behavior can be more than the sum of its parts and they are not deductible. This is seen in complex and living systems. However, in a regenerative society, these two worldviews should not be seen as controversial but complimentary and accumulating to a new worldview necessary for the regeneration. (Camrass 2023.)

Consequently, regeneration requires a holistic worldview, which is characterized by being able to adopt and benefit from various paradigms. It is an autopoietic living system of humans and all forms of life aiming to thrive and to flourish. For this worldview to become possible, it is necessary to make use of more ancient ways of knowing. (Gibbons 2020.) And, to develop the capacities of communities and individuals to create health, wellbeing and a thriving society. This asks for a transition from mere small-scale problem solving to the ability to see transitory stages of a whole system, where humanity's role is rethought, and action reoriented accordingly. (Gibbons 2020; González-Márquez & Toledo 2020; Camrass 2023.)

We are obliged to understand the constant evolving nature of the socio-ecological system that humans are a symbiotic part of and should work towards a regenerative relationship with. This change of worldview can only happen if we change our attitudes, mindset and values of the system. A regenerative society asks for co-responsibility of all individuals but also a political will for more solidarity. (Du Plessis & Cole 2011.)

2.1.3 Paths to regeneration

As previously described, achieving a regenerative society hinge on a shift in mindset. A regenerative society and civilization demand a fundamental withdrawal from our current lifestyles, which are dominated by a mechanistic worldview and a culture of individualism—both of which need to be rethought. (Künkel & Ragnarsdottir 2022, 6; Moilanen & Salonen 2022.)

The hope lies in individuals. Even though diversity of beliefs and values has increased, there still is a common desire for a sustainable future. On the individual level, only a few would say that their aim is to intentionally cause harm to the environment and accelerate the climate change. But as evident, the challenge lies in the discrepancy of our values and actions and the needs of our current economic model. (Salonen 2019.)

Regeneration asks for a new cultural narrative that challenges our perceptions of right and wrong, what we value, and our ultimate goals. Only through such a cultural transformation can we foster the imagination and creativity necessary to establish new moral standards and values that recognize humans as an integral, symbiotic part of the nature. (Hellström &Aittasalo 2023, 65). Furthermore, life satisfaction need not derive from consumerism; meaningful relationships and a sense of belonging can provide equally fulfilling experiences. This transition requires rigorous actions and mindset changes at all levels—from individuals to communities, societies, and policy frameworks. (Salonen 2019.)

To change these harmful habits an approach that Salonen has suggested is to focus on the positive actions rather than restricting and punishing, especially through education (Salonen 2019.) It is necessary to have an empowering narrative of hope in times that a transformation is needed, or else there is a risk of overwhelming that deters us from action (Camrass 2023). At the same time the ethos of education must shift from passing on information and knowledge into enhancing the transformation (Künkel & Ragnarsdottir 2022).

2.2 Transformative role of education

Education equips people with the knowledge and skills that not only boost productivity but also enhance their resilience against various risks by fostering informed decision-making throughout their lives (UNESCO 2017). The right for education has been stated in the United Nations Universal declaration of human rights article 26 as well as Convention of the right for children Article 28. The convention states that education should aim on:

> "Help on the development of an individual to one's full potential, develop respect for human rights and freedom, develop respect to one's cultural identity language and values as well as others. Prepare one for responsible life valuing the diversity and other cultures as well as nature."

Quality education is also stated as one of the Agenda 2030 goals. (United Nations 1948, 1989, 2015.)

The challenge lies in recognizing whose interest's education serves: is it to bolster a thriving economy and maintain societal status quos, or to benefit the broader health of the planet? Education can indeed catalyze the necessary transformation if both the pedagogy and the learning outcomes are oriented towards this shift. This call for a paradigm shift aligns with UNESCO's visions for education in 2050 and beyond. It endorses that human and planetary sustainability cannot be separated, if they are disconnected attempts for sustainability are ineffective and education should be in pivotal role in in reimagining our interconnected world. (Common World Research Collective 2021.)

2.2.1 Aims of education

Education is the process of facilitating learning or the acquisition of knowledge, skills, values, beliefs, and habits (UNESCO no date). Learning has various definitions but in general can be defined as the development of an individual (Oxford English Dictionary no date). It is based either on genuine enthusiasm and inner desire to learn, or on compulsion and external reward. Understanding what knowledge is acquired, along with why, where, when, and how it is utilized, are crucial questions that underpin the growth of both individuals and societies (UNESCO no date).

Where skill refers to a learned power of doing something competently: a developed aptitude or ability, knowledge is the fact or condition of knowing something with

familiarity gained through experience or association to the fact or condition of being aware of something. Competence is understood as the quality or state of having sufficient knowledge, judgment, skill, or strength (as for a particular duty or in a particular respect). (Oxford English Dictionary no date; UNESCO no date.)

Thus, education is transformative and recognized as a fundamental human right at all life stages, the content and pedagogy of formal education, as currently structured, are influenced by societal, economic, and political forces that can sometimes worsen problems rather than solve them (Hinchliffe 2000; Bauman 2005; Common World Research Collective 2021). Bauman has argued that in liquid modernity, where change is constant, education should not be controlled by stiff curriculums and preset learning outcomes but as a knowledge production that can be rapidly consumed. Learner should take full responsibility of the learning outcomes on highly personalized learning paths. Therefore, educators should concentrate on teaching critical thinking skills, encourage creativity and innovation, and foster adaptability and resilience. (Bauman 2005.)

To effect real change, it is crucial to understand the connections between education, societal ideals, and the prevailing Western lifestyle (Laininen 2019). Education can either be the catalyst of challenges or transformation. For example, some researchers argue that efforts toward sustainability often overlook inner sustainability—namely, worldviews, paradigms, and values (Gibbons 2020). If education and the pedagogies it employs do not influence these inner sustainability aspects, true transformation remains out of reach. This issue has been highlighted in various studies and is illustrated in the following figure (see figure 1).

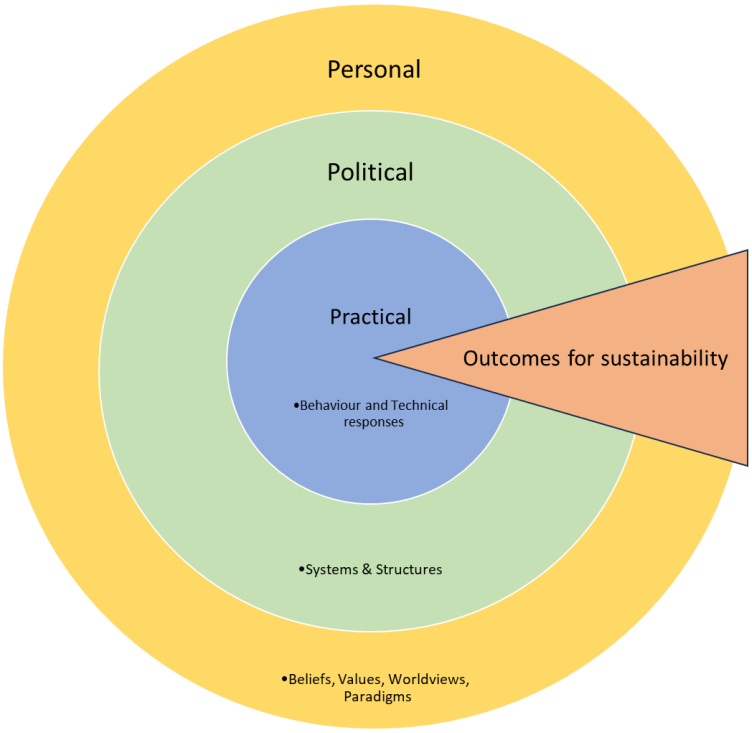

Figure 1 Three spheres of transformation

(after O'Brien & Sygna 2013)

The above figure (see figure 1) illustrates that transformation depends on our individual and collective beliefs, values, and worldviews—what can be termed as inner sustainability. These elements shape our perceptions of viable solutions and influence the formation of political and systemic structures. Since these three levels are interwoven, changes in one area can drive transformations in the others. However, interventions are most impactful when they alter our personal beliefs, values, and worldviews. (O'Brien & Sygna 2013.) Education can play a crucial role in facilitating these profound changes.

2.2.2 Transformative education and learning

The education sector has acknowledged the need for change and is addressing this by integrating new theories and tailoring learning outcomes to match. Transformative learning shifts the aim of learning from just transmitting knowledge and knowing, to enabling learners to make decisions and understand how those decisions affect future generations and the life of others (Bell 2016).

These shifts aim to influence the core beliefs, values, and worldviews through transformative educational practices, though whether these should be viewed as theories or metaphors is still a matter of debate (Hoggan 2021; Hoggan & Hoggan-Kloubert 2023).

Transformative education can be seen as a journey to inner self for personal growth and to deeper communion with the wider good (Lee et al. 2021).

According to Mezirow's transformative learning theory, individuals reflecting critically on their assumptions and the ways they interpret the world based on past experiences, can revise their views to become more coherent and functional (Mezirow 1978). However, Mezirow's framework does not specify the context or objectives toward which transformation should be directed. It views transformation primarily as a cognitive renewal at the individual level, without explicitly aiming for broader social change (Laininen 2019).

To facilitate transformative education as a catalyst for change, OECD has introduced a set of transformative competences in its Future of Education and Skills 2030 framework. These competencies are designed to empower students, helping them feel capable of shaping a better world and future. The three core competencies include creating new value, reconciling tensions and dilemmas, and taking responsibility. Equipped with these competencies, students develop skills in critical thinking and creativity, essential for generating innovative solutions. They learn to navigate the complexities and ambiguities of an interconnected world, fostering empathy and respect. Moreover, with a strong moral compass, these competencies ensure that students can reflect on their actions, collaborate effectively, and show respect for the planet. (OECD 2019.)

Transformative learning is defined as a deep, structural shift in an individual's perspective towards the world around them (Laininen 2019). Its orientation is towards action and empowering learners to become agents of change with adequate competences and values to address complex societal challenges and to find alternative paths to change through critical reflections as part of the learning process (Hoggan 2021). This is done by facilitating the acquisition of skills and competences, values and knowledge. Learning is facilitated by using inquiry and systems as an approach and use of technology in a creative way (Bell 2016). The theory has been criticized especially due to insufficient focus on the reflective stages of the learning process, which are affected by emotions, communication and limited by the meaning making based on previous assumptions (Mälkki 2010; Hoggan & Hoggan-Kloubert 2023). Nor would there be evidence on how the transformation happens (Hoggan & Hoggan-Kloubert 2023).

One approach that facilitates change through transformative learning is known as transformative futures learning. This model not only facilitates transformative learning but also demonstrates how such learning can drive overall transformation. It takes a holistic approach to individuals cognitive, motivational, and action-oriented faculties of engaging with the future. The process of learning effects changes in the structures of assumptions on which we build our understanding of our experiences. These experiences include associations, concepts, values, feelings and responses. Transformative futures learning encourages individuals to examine their habits and interpretations, moving beyond mere rational thinking. It integrates emotions, intuition, and physical sensations to enhance our capacity to comprehend and envision possible futures. The ability and capacity to envision is manifested in our action. This capacity of envisioning is a necessity in the VUCA-world. (Pouru-Mikkola & Wilenius 2021.)

2.2.3 Existing theories for sustainability in education

The concept of transformative education has been embedded into sustainability education content. It helps on people to better understand their social, technological, ecological, and political environments and be equipped to address the social and environmental challenges that lie ahead (Bell 2016). However, these educational practices have been critiqued for potentially reinforcing a separation between humans and their environments and maintaining the illusion of human superiority (Common World Research Collective 2021).

The following represents the concepts of global competences and green competences that are the frameworks which necessity in a regenerative society is one of the research questions. Lastly it introduces educational concepts that are gaining recognition within education, planetary citizenship and planetary social pedagogy. These concepts aim to integrate a more holistic understanding of humans in relation to their environment.

Green competence framework

Learning for environmental sustainability is seen necessary on European level. As part of the European green deal aiming for sustainability, European commission has recommended to activate education and training in the process leading to sustainability. This involves developing skills, promoting lifelong learning, and facilitating the upskilling and reskilling of citizens. As a result of a collaborative process involving

various stakeholders, including researchers, experts, and politicians, a framework known as GreenComp has been developed. This framework outlines the sustainability competences necessary for everyone and recommends their incorporation into educational programs to help the EU achieve carbon neutrality by 2050. (European Commission. Joint Research Centre 2022.)

The framework is structured around twelve competencies, organized into four subcategories. These competences equip learners with the knowledge, skills, and attitudes needed to address our planet and public health in an empathetic, caring, and responsible manner. The competence framework asks for thinking, planning and action. This framework and its competences are demonstrated in figure 2. (European Commission. Joint Research Centre 2022.)

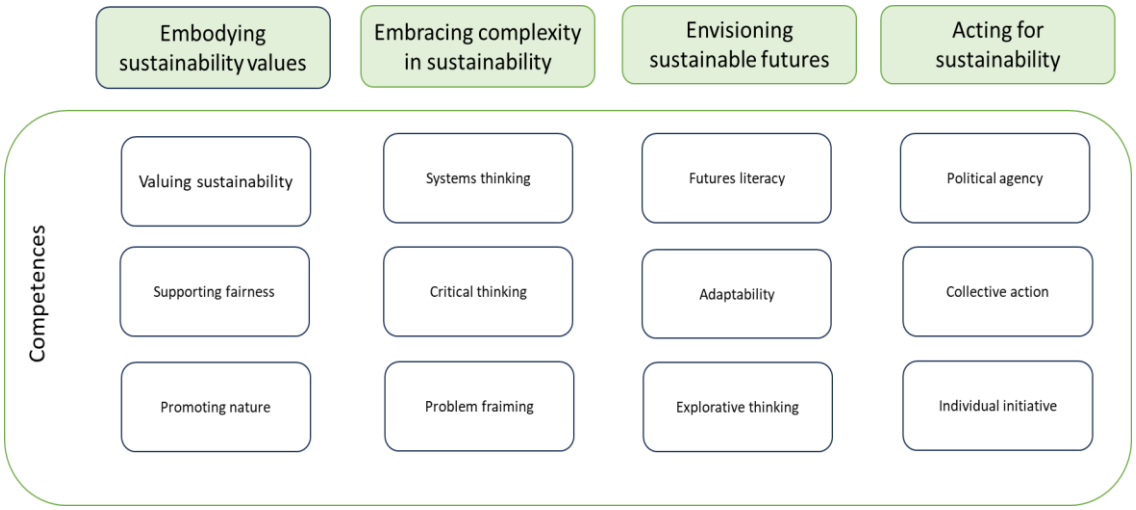

Figure 2 Competence framework of the European green competences
(adapted from European Commission Joint Research Centre 2022)

When examining the four interconnected subcategories of competencies and their objectives within the framework (see figure 2), it is evident that they address many of the previously discussed requirements for how education must evolve to facilitate transformative change.

Embodying sustainability values asks for a transition from the human centric worldview to see ourselves as part of the nature and to question our current values. It also requires us to evaluate the actions from various temporal perspectives of equity and justice. *Embracing complexity* in sustainability sees that systemic and critical thinking can be empowering. It offers tools to assess information, challenge the behaviour and put things

on scale and find solutions and to show empathy. *Envisioning futures* aims on securing that learners see alternatives and use their imaginaries for better futures. These competences secure that learners identify actions necessary for sustainable futures, but also have the necessary adaptability in times of uncertainty. *Acting for sustainability* gives the learners an active role in shaping the future. Learners are encouraged to work towards sustainable futures in a proactive way either by own action or by demanding action from the ones in power. (European Commission. Joint Research Centre 2022.)

Integrating the European Green Competence Framework within educational systems and integrating the outlined knowledge, skills, and competencies would contribute to maintaining our planet's wellbeing. However, since this framework is simply a recommendation and the EU lacks the authority to dictate national or local curriculums, the extent and timing of its implementation remains to be seen.

Global competencies and global citizenship

Another cross disciplinary concept that gives education a transformative role is the global citizenship and global competences. Raising global citizens is mentioned as one of the subgoals of the UN Agenda 2030 sustainable development goals 4.7.

OECD’s Global competencies for an inclusive world, determine Global competences as the individual’s ability to be open and respectful towards other cultures and at the same time understand one’s role as a global citizen whose actions have an impact Global competences are built from knowledge and skills that will affect learners' attitude and values following the principles of the transformative education as described in the following figure 3 (see figure 3). (OECD 2018.)

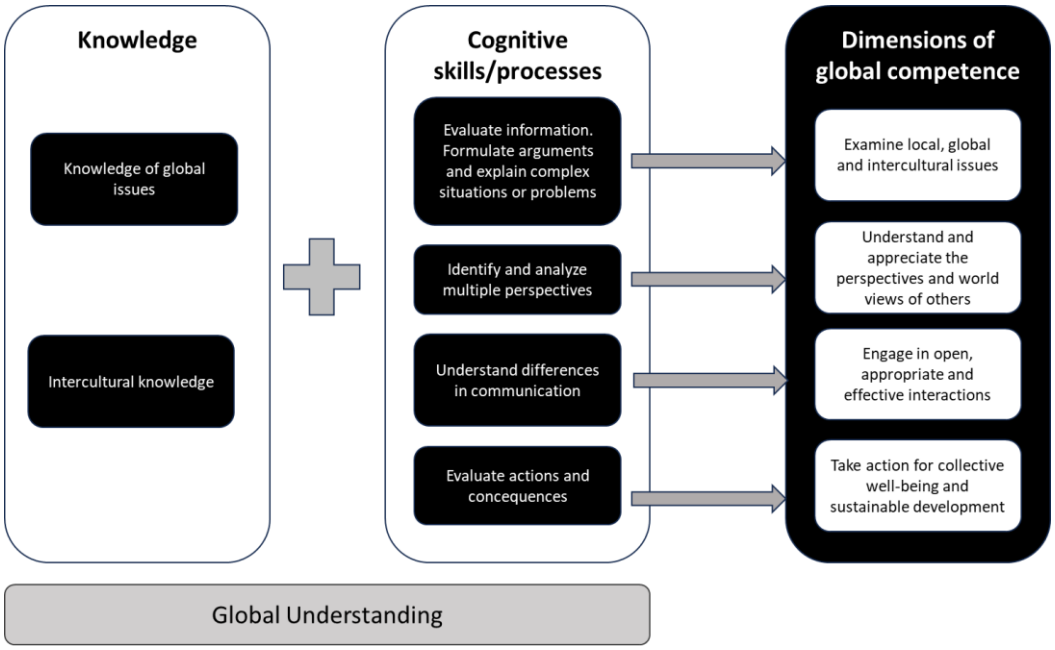

Figure 3 OECD Global competences framework

The framework presentments the global competences and the relation between the knowledge and cognitive skills to the dimensions of global competences (After OECD 2018).

The knowledge base of global competencies is in global issues but also on knowing about cultural differences and similarities as well as of relations between cultures. The skills included are aimed on building understanding of the world and giving tools for action. This means both critical literacy and respectful communication skills, adaptation and perspective taking skills but also skills to evaluate one's actions. With the knowledge base and skills, one's attitudes and values should evolve into an open and respectful way to a person with a global mindset. (OECD 2018.)

Global competencies are partly linked to the agenda 2030 goals and UNESCO's skills for global citizenship (Vaccari & Gardinier 2019). The similarity with the global citizenship and the global competencies is that they both aim on living harmoniously in diverse societies and embracing skills to interact respectfully and successfully with people from a diverse cultural background and enhancing the intercultural understanding. However, the OECD's global competencies are said to emphasize the needs of skills based on the economic benefit where UNESCO emphasizes the attitudes and values needed for the feeling of belonging to a global community. (OECD 2018, 2019; Vaccari & Gardinier, 2019.) These concepts are partly overlapping with the previously mentioned European green competencies frameworks and global competences is integrated in the OECD's transformative competences. (United Nations 2015; OECD 2019.)

Even if well adopted into education, these concepts have also faced growing critic that the model has worked against its purpose and led to segregation of the global South and North (Bosio 2021). Revision has also been asked to better meet with the needs of the VUCA-world. Rather than focusing on knowledge Global citizenship education should emphasis on skills needed to navigate in the turbulent world. These skills would include critical-thinking, problem-solving and adaptability skills and commitment to social justice and sustainability. With these skills learners would be able to adapt and be more resilient in the constantly changing world. (Stein 2021.)

Some of these needs have been addressed in the previously discussed green competence framework, but none of these frameworks have tackled the challenge of aiming towards a holistic worldview. As the Common World Research Collective has claimed the paradigm needs to change from learning about the world to learning to become with the world around us (Common World Research Collective 2021).

Planetary citizens and planetary social- pedagogy

Concepts in education that have implemented this paradigm change are the approach of planetary social pedagogy and planetary citizenship. Planetary citizenship responds to the realization that a culture of coexistence, where the values and attitudes toward its own life and life in general are aligned is needed for survival (Bosio 2021).

These new paradigms in education are said to be necessary as the politically and economically lead change is not sufficient to reach the sustainability goals nor lead to regenerative societies. Salonen at al. see that the key to sustainability is a fundamental change in the thinking of individual, which can be reached through education. This worldview recognizes the world as a complex system where the ecological and societal dimensions are intertwined and in interaction. (Salonen et al. 2023.)

They in many aspects overlap with each other and the concept of global citizenship but are more strongly bound to the ecological sustainability. They are a response to growing dissatisfaction, especially in the global south, on the concept of global citizenship which has worked against its principals leading to division rather than unification of the globe. Rather than shaping the globe the emphasis is on planet earth itself. (Bosio 2021.)

Planetary citizenship is said to be the new paradigm in education that can potentially work towards the regenerative society. This paradigm combines the lifelong and lifewide

concepts with life sciences and complexity sciences. Planetary citizens have the skills needed for the planet to thrive and with empathy-oriented education are willing to take the action needed. In an ideal situation the society would be built on collective wisdom. (Laszlo, Luksha & Karabeg, 2017.) By taking use of ancient ways of knowing and indigenous knowledge, it can overcome the challenges of Western lifestyles (Bosio 2021).

The idea of planetary social pedagogy differs from social pedagogy by uniting spatial, temporal, and ethical dimensions in a socio-ecological worldview. This worldview recognizes the interconnectedness of human societies to the natural environments that all function in the same biosphere. It lays its foundation on the principles of systems thinking and living systems and transformative learning theories. (Salonen et al*.,* 2023.)

With planetary social-pedagogy learning process learners investigate and understand the reality, its interconnectedness and gain deep holistic understanding of the reality on individual, societal and Earth levels but also act towards the health and integrity of all. This deep learning process is necessary for a transformative change on individual and in ideals values and culture. When a learner has been planetary educated, their ethical perspectives are broadened to evaluate the impact of action and consumerism on a planetarian level also including the non-living aspects. (Moilanen & Salonen 2022; Salonen et al. 2023.)

2.2.4 Education for regeneration

Regeneration calls for a change in education; what we give the emphasis on but also where we recognize the learning to happen. The focus of education should shift towards cultivating a mindset that recognizes systematic and holistic responsibilities towards all forms of life.

Achieving these goals requires individuals to develop a holistic, complex, and systemic understanding, which are crucial for this transformative change. Current educational system is said to fall short in enhancing learners' systems thinking abilities (Voulvoulis et al. 2022). Moreover, the focus on knowledge acquisition does not sufficiently empower learners to act (Laszlo, Luksha & Karabeg 2017). Enhancing skills in systems thinking can empower individuals to tackle challenges and make informed decisions, thereby influencing their life outcomes (Voulvoulis et al. 2022).

It is crucial to bear in mind that certain aspects of learning are beyond the control of educational systems and curricula, referred to lifewide learning. The concept referring to the fact that learning happens in a variety of environments; not only in formal education leading to qualifications nor in nonformal education such as courses in a community college but also in informal environments such as in families. These learning outcomes and skills learned can either work or hinder from working towards the desired goals. To reach a regenerative society, we need to truly recognize and take use of not only lifelong but lifewide education. (Jackson 2023, 284-290)

Therefore, the transition to be a successful a cultural transformation is necessary, one that embraces regenerative values and an ecological way of life (Jackson 2023, 284). But also gives us the skills needed for regenerative processes: such as "1. Co-creation and co-design 2. Participatory governance 3. Holistic thinking and systems approach 4. Continuous learning and improvement 5. Innovation and experimentation 6. Collaboration and partnership 7. Empowerment and capacity building 8. Cultural and behavioural change." (Alves, Santos & Penha-Lopes 2022)

Regenerative education

Regenerative education theory and regenerative learning Ecologies (RLE) are an upcoming strand of theory and practice aiming on educating towards a positive impact both on humanity and natural environment. Its education practices support regeneration by activating action through awareness. (Wessels & Grünwald 2023.) These action-oriented and participatory methods in regenerative learning are effective in overcoming the issue of moralization that frequently arises in sustainability education (see. Salonen 2019). It is possible that these approaches could tackle the previously mentioned challenges of transformative education discussed by Mälkki and Hoggan and Hoggan-Kloubert. (see. Mälkki 2010; Hoggan & Hoggan-Kloubert 2023).

Van der Berg bases his educational praxis on the idea of viewing it as "dynamic constellations of learning-based change that facilitate the development of regenerative capacity"—the ability to lead collective action toward increasingly regenerative future states. This goal can be realized if the praxis influences both the outer action level and the inner dimensions of knowing, anticipating, caring, and being. Bridging these two levels makes it possible to achieve the necessary transformation in both actions and values (Van Den Berg et al. 2022).

For this transformation, education must pose and pedagogy must provide opportunities for learners to develop care for themselves, others, the planet, and future generations. It should deliver sufficient knowledge of facts and figures, as well as an understanding of cognitive processes. Additionally, learners should acquire the skills needed for a regenerative lifestyle and the anticipatory skills essential for shaping desirable futures (van den Berg et al. 2022). According to Wessels and Grunewald transformation asks for a shared consciousness that can be transferred to collective and creative action and then into new reflections and insights. This process to work demands that the learner dares to engage and commit with head, heart and hands to the process. (Wessels & Grünwald 2023.) These collaborative learning strategies can address significant contemporary challenges such as a sense of disconnection from the world and feelings of lacking dignity and belonging (van den Berg et al. 2022).

Wessels and Grunewald have introduced four paradoxes of a regenerative education experience: *The paradox of structure:* Even though the current educational systems with the stiff curriculums may limit our ability for action and interpreting the knowledge, also regenerative learning asks for boundaries or else the process will lead to chaos *The paradox of shared agency,* asks for a change in the mindset and roles, to be able to align with the others regardless of their role or status. This can be achieved with sufficient self-awareness, empathy and willingness to cocreate. *The paradox of educational space* discusses how a safe learning environment is a necessity, but the safety refers to providing safety and support to be able to expand one's ability and have courage to meet the real world. *The paradox of transformation*, reminds of holistic learning and transformative education being educational practices under debate. (Wessels & Grünwald 2023.)

The learning methodology employed in these RLE's, is described as transformative, transgressive, transdisciplinary, and transboundary. This means that instead of following a traditional subject-based curriculum, the learning approach focuses on examining phenomena holistically. It encourages collaboration, ideally among multicultural groups, to enhance diverse perspectives and foster inclusivity. (van den Berg et al. 2022.)

Regenerative skills and learning

Armon has discussed the regenerative collaboration in higher education and skills needed for this process. Rather than having an orientation towards knowledge, higher education should aim on collective wisdom, action towards regeneration, and have a life centred

orientation. Armon builds the model on four principals of a regenerative process: *Mutualistic symbiosis* referring to the importance of a lifelong collaboration and mutualism with the nature, *Regenerative self-renewal* stating the importance of the competencies needed for regeneration, *Inclusive decision making* emphasizing in involvement of all stakeholders in creating regenerative systems and on *transformative learning experiences* necessary for learners to develop knowledge, skills and attitudes needed for regeneration. (Armon 2021.)

The skills Armon has pointed out include “permaculture, plant and tree care, wild lands restoration, "green" construction methods, wildlife rehabilitation, natural stormwater management, community development skills taught and various approaches to non-violent and inclusive conflict resolution. Practical regenerative skills also include the ability to engage in quiet contemplation in nature to explore what it means to be present to the life community in an observational or intuitive capacity.” (Armon 2021.)

Even if Armon’s model mention’s the transformative learning experiences necessary for the process of regeneration the skill set is strongly ecologically oriented and still supporting the humancentric role over nature. Undoubtably, these green skills are necessary for the regeneration but as has been argued earlier, there should be a set of meta skills and attitudes that are necessary for the learner to be willing to use these practical skills for regeneration (Laininen 2019). Which may be achieved by the methodologies presented by van den Berg et al and Wessel & Grünwald (see van den Berg et al. 2022, Wessels & Grünwald 2023).

2.3 Summary of the theories

Based on the previous theories and definitions, this research defines a regenerative society as one, where actions have a positive impact on wellbeing of all living forms. The society is built on a holistic worldview and functions on a will to act towards a wider good societally, ecologically, and culturally. Society has adapted a way of living where all living forms of life are equally important, and everything is connected. There is an active, positive, conscious and continuous process towards regeneration in all its actions.

Regenerative society can only be achieved by a change in our mindset. This mindset demands a systematic and holistic responsibility to all forms of life on Earth. This can be reached by enhancing knowledge and capacity to lead transformation of individuals,

institutions, societies and nations. Education can be the leverage point of the transformation if the learning methods and outcomes are aligned with the necessary transformation.

The literature review has well revealed that education and learning are strongly led by political and economic forces but also our values and worldviews can support or hinder us from learning. If we aim for a regenerative society, current views need to be challenged and questioned and various worldviews taken into consideration. Therefore, when looking at the skills and competences for a regenerative society, the research methods chosen need to be able to question our beliefs to reach transformation.

3 Methods

The empirical part of this research investigates the future regenerative society and the necessary skills and competences from the education sectors perspective with participatory futures methods. This chapter will present the applied methods and the collecting of the data, describe the data sample and the method of analysis. It will also present how the data has been managed and the use of AI in the research process.

3.1 Data Collection methods

This qualitative research was conducted using participatory futures methods, taking use of expert knowledge during futures workshops specifically designed to address the research questions of this study.

Given that a regenerative society does not yet exist, the concept was explored through mental time travel to help participants envision such a future in form of future images. The literature review indicated that achieving regeneration requires systemic changes, as well as shifts in our worldviews and values. Consequently, to fully expose the regenerative society and the necessary skills and competences for it, the research methods employed needed to facilitate exploration of alternative futures and uncover deeper, often overlooked skills. This justifies the use of Causal Layered Analysis. This method is particularly suited to revealing underlying layers that shape our social and personal realities, thereby justifying its selection for this research.

The following subchapters will give an overview to these methods and also to their possible limitations.

3.1.1 Futures workshops

Future workshops are a frequently and widely used future study method. They have an orientation towards future, asks for participants to collaborate and allow creation ideas or learning. They have been described as “deliberative meetings where a group of people analyse a focal issue, perhaps debate and hopefully comprise solutions, proposals or visions.” (Nygrén 2019.) They can also be defined as intensive setting for knowledge gathering and for creation. They were originally designed by Jungk and Müllert to activate local Citizens to act towards a desirable future. (Jungk & Müllert 1987.)

Future workshops may aim for empowering participants or influencing decision makers capacity for decision making. Depending on the aim and emphasis of the workshop the target audience varies. As very little is determined as what is considered as a futures workshop, there is no single practice for their organization, but they are tailored to the need. (Nygrén 2019.)

As the future workshop outcome is dependent on the participants and their involvement in the process the planning stages of the workshops are crucial. Including identification of suitable participants: whom to invite to secure a comprehensive understanding on the topic but also understanding on personal qualities that may affect the dynamics and outcomes of the study. The number of participants should be limited to 12/workshop to secure that all participants have sufficient chances to have their say and participating in the workshop. It is necessary to consider how the workshop will be facilitated in a friendly and relaxed manner. (Jungk & Müllert 1987; Nygrén 2019.)

3.1.2 Mental Time Travel

Mental time traveling refers to the human's ability to mentally project in time backwards or forwards and in this case pre-live the regenerative society. It is based on humans' episodic memory and anticipatory abilities. (Suddendorf & Corballis 2007.)

Mental time travel has been defined as a futures method of guiding participants in the workshop to imagine the futures as a series of motion pictures in a movie like manner. It uses one's personal imagination as the engine of the fantasy trip. This research used mental time travel to produce images of the futures, understood as different possibilities of a futures regenerative society in year 2050. Mental time travel guides individuals or groups to envision new futures, allowing them to imagine or desire things, processes, or events without the constraints of expectations, beliefs, or judgments. Deep relaxation techniques enable participants to visualize themselves, their feelings, and the creation of their own mental images of the future. (Cuhls 2017.) Unsticking the mind is a necessity when aiming on visualizing and creating something different (McGonigal 2020). The method has been seldomly used in futures workshops as a mind opener. This is partly due for it to be relatively new futures method, but to the recognized risk that if there is opposition towards its use among participants the whole experiment is at stake. (Cuhls 2017.)

3.1.3 Causal Layered Analysis

Causal Layered analysis (CLA) is a qualitative analysis method developed by Inayatullah and belongs to the family of critical futures methods. Inayatullah has described it as a tool to undefine the future (Vallis & Inayatullah 2016; Inayatullah 1998). As CLA is both a theory of knowledge and methodology it can be used to dig into internal and external stories of persons and organizations, which are relevant on how we see the present and the possible futures (Vallis & Inayatullah 2016).The CLA- method can be used in future workshops or in analysing a phenomenon based on various forms of data e.g., books, pictures and in this case the formed future images. At its best it is used in multicultural and multidisciplinary groups for making the invisible levels visible. (Inayatullah 1998.)

It is a method that does not by itself produce future images and it is not for predicting or comparison. But as a core feature is the identification of visible (external material world) and non-visible (inner psychological world) layers or levels that are then deconstructed and reconstructed to form the coherent whole of the analysis, leading to a clearer overview of the object of analysis. (Inayatullah 1998.)

The four levels originally comprised of: 1. the litany level (the “visible” or conventional level), 2. the social causes level, 3. the structure and discourse level, and 4. the metaphor and myth level. It is thus a tool that can be used for powerful scenarios work where not only the “visible” or “conventional” aspects are taken into consideration. (Inayatullah 2014)

The method enables us to look at the images and building space to find alternative futures through a reconstructing process (Inayatullah 1998). This is done by critically deconstructing the phenomena and by recognizing the levels underlying litany, the visible level of the phenomena. Below the visible surface are the social causes which stand for the social, policy, economical and some cultural aspects of the phenomena. Beneath is the discourse/worldview level that reveals the values and culture that lead to the phenomena and on the bottom are the myth/metaphor that are seldomly evidence-based but contribute to the phenomena and how we see it. These levels are all present and important in understanding the systems and phenomenon. (Inayatullah 1998.)

This deconstructing process can be used for creating preferable futures, to challenge the current reality or for creating alternative future that different worldviews are integrated

in (Vallis & Inayatullah 2016). According to Inayatullah, with vertical and horizontal analysis we can recognize the underlying causalities. (Inayatullah 1998.) In this research CLA was used first to deconstruct and then reconstruct the future images generated by the mental time travel, and then to recognize the necessary skills and competences of a regenerative society.

3.2 Sampling Strategy and Participant Recruitment

The data was collected in four two hours workshops of which two were held in Finnish and two in English. They took place in February-March 2024. Three of the workshops were held online. They all followed the structure described in chapter 3.3 and used the same presentation and Miro-board as the basis (see chapter 3.3 and figure 4).

The results were gathered from educational professionals and experts working in various development and directing roles in the educational sector in Europe and master's and doctoral students in the changing Education study program. Participants were invited to the workshops via email using personal professional contacts within Europe. All together the invitation was sent to 55 persons of which 34 responded positively and 31 participated in the workshops. All participants participated in this research on a voluntary basis. The invitation letter is in the appendix 1.

The participants were chosen from my personal professional networks reaching to persons working in various roles within the field of education in Europe having ability and knowledge to discuss the topic from various educational perspectives in English. This can be seen as a limitation of the research's validity, as the sample was not evaluated based on its representativeness. Nor that it would have been a random sample, but in the other hand followed the recommendation on future workshops by (Nygrén 2019).

The following table (table1) describes the participants of the workshop, the number of participants in the workshops, the countries the participants represented, the years of expertise they had in education, the type of organizations they represented, the level of education they work with and the field of expertise within education.

The majority of the participants were Finnish and represented Local public bodies such as cities and had more than 10 years of experience within the educational field. Within the education their expertise varied and can be described with the following categories: Co-operation with working life, development of education on National/ EU-level,

development of learning environments and teaching, Evaluation and quality management in education, Internationalization in education, Pedagogical leadership, Subject specialists, Theoretical/ research in education, Wellbeing and participation in education.

Table 1 Description of the participant profiles in the workshops

Participants in workshops		**Number of participants**
Date	15.2.2024	10
	4.3.2024	6
	6.3.2024	10
	8.3.2024	5
Years of expertise in education		
	0-5 years	8
	5-10 years	2
	10-15 years	7
	15-20 years	7
	20+ years	7
Type of organization		
	Governmental Organization	2
	Local Public Body (e.g., City)	25
	Social impact company	1
	Student	1
	University	2
Education level of expertise (multiple answers possible)		
	Early childhood education	13
	Basic education	6
	Secondary education	5
	Vocational education	4
	Adult education	13
	Reskilling and upskilling	18
	Non formal education	9
Field of expertise in education (multiple answers possible)		
	Co-operation with working life	1
	Development of education on National/ EU-level	4
	Development of learning environments and teaching	5
	Evaluation and quality management in education	2
	Internationalization in education	2
	Pedagogical leadership	2
	Subject specialists	8
	Theoretical/ research in education	4
	Wellbeing and participation in education	3
Countries represented	Austria, Denmark, Finland Spain, Sweden, Turkey	

3.3 Implementation of Futures workshops

The overall design of the workshops was based on the guidelines and suggestions of Junk and Müllert trying to minimize the known challenges:

There was an intention for a warm welcome and building a safe and pleasant atmosphere, encourage the participants to have fun a enjoy the experience. The methodologies used were explained and participants encouraged to try them without prejudices and give up previous presumptions and beliefs even when found difficult. In cases that the participants did not know each other they were given a chance to get introduced. The group discussions were facilitated to secure the use of the methods and participation of all group members. The role of the facilitator was to ease the workshop but not enrich nor to contribute to the groups work. (Jungk & Müllert 1987; Vidal 2006.)

The two-hour workshops followed the following structure. The materials used in the workshops are in the appendix 2. Background data of the participants was collected in the beginning of the workshop at the same time participants gave their consent to use the findings in this research. Participants were informed that their background information will not be linked to their answers and point of views nor seen as perspectives of their organisations at any stage of this research.

The participants were informed on my background in education and food sciences but also that I position myself to be visionary futurist that aim on provoking and question current ways of thinking for a better future and as an activist to raise awareness on societal topics.

After the welcoming and introductory round the workshop participants were given a approx. 20 min presentation on the research questions and aims of the research. This included the definition and the principals of regeneration and regenerative society based on the literature review, as well as a concise introduction to the research methods. The participants were encouraged to ask any questions if necessary. The first explorative part of the workshop was used to open space for alternative futures by using mental time travel as a method. The participants were asked to create a future image of a regenerative society in year 2050 with a guided mental exercise. This process was supported by the Remembering the future method (McGonigal 2020). Prior to the start participants were

asked to make sure that all unnecessary electronic devices are switched off and are comfortable and asked to close their eyes and breathe deeply.

The participants were asked to choose a place they wished to revisit. Then they were guided to envision the regenerative society with the help of a premade script, pauses were given after every question. Each participant was asked to write down or express in other form their Image of the future on the shared Miro-Board on the four levels of the CLA. The CLA-template had supporting questions to guide the participants that were adapted from the UN global pulse templates for CLA (see Table 2). (see UN Global Pulse n.d.) These images of futures where then shared by the participants orally.

A second explorative part of the workshop to was used to into the skills and competences necessary for the future images. The recognition of skills and abilities needed, started by listing them on sticky notes and as a second step they were placed on the CLA-layers, with adapted support questions (see Table 2). The group discussion then deepened the understanding and encourage the participants recognize the skills needed on all the four levels. The process was facilitated, when necessary, by asking supporting questions or clarifying the different layers.

As the workshop did not aim for a consensus on the skills and abilities need, but on scanning them, there was no summarizing task for the participants. The final discussion focused on the thoughts that the workshops had raised and on currently recognized skills and the ones necessary for regeneration.Feedback on the workshop was gathered on the Miro-board and as part of the discussion.

Table 2 Supporting questions for the CLA

The table questions were adapted from UN Global Pulse templates (see. UN Global Pulse n.d.)

CLA	Image of a regenerative society	Skills and competence need of the regenerative society
Litany	What is happening? The official and generally accepted description of the topic or issue, backed by data. Think of events, trends or issues generally accepted. What are you reading on the news? What are the events, trends or issues accepted by almost everybody? Use short and clear sentences. Think of newspaper headlines.	Start thinking about this future and reflect on what are the obvious and visible skills need? How can our place act towards generosity to the community and to the nature? How can all the people of our place thrive? How can we enhance and respect the health of the whole planet? How can we enhance and respect the wellbeing of all?
Systems	Why is this happening? Social, economic, political structures and policies underlying and maintaining the issue. Think of what or who is creating this situation. What are the social, economic or political reasons behind this issue? What are the actors responsible for these events and conditions? Think about how these structures, policies and actors are affected by this issue in the future.	Why are they the skills and competences needed? What are the actors responsible for these skills and competences? What are the relationships among various actors? What are the skills and competences needed to operate in this environment?
Worldview	What is true? Deeper cultural assumptions and perspectives that enable structures and justify behaviors. We are entering into a deeper layer of our analysis. Worldview can be cultural, social, or language values. What is the underlying philosophy? What are the dominant values? What is valorized or dismissed? These can be positive or negative.	What is the underlying philosophy behind these skills? What are the dominant values? What is valorized or dismissed? What are the skills needed for these values?
Metaphors and myths	What are the collective symbols? Social narratives and imagery, acting at the level of collective consciousness, usually expressed through art, stories and symbols This is the deepest layer located further in the future These premises are usually more difficult to describe with simple words. What myth, story, figure of speech, song lyric, image or saying conveys the complexity of what happens in this future? Think of using visuals to help you explain this layer.	What myth, story, figure of speech, song lyric, image or saying conveys the complexity of what happens in this future? What are the skills and competences due to this complexity?

Miro-boards for collecting data

The data collection and discussions used Miro-boards to facilitate the process. This setup allowed participants to work first independently without being influenced by others thinking. Assistance was provided for those unfamiliar with Miro. The Miro boards were organized into five frames to guide the workshop's flow: To collect information on the places they mentally travelled, to deconstruct and reconstruct their future image, to define the skills and competences needed for a regenerative society, to analyse and recognize the skills on the four levels of CLA and lastly to give feedback. Figure 4 demonstrates the layout of the Miro-Board. (see figure 4) The images used were adapted from the UN global strategic foresight pulse CLA templates (UN Global Pulse n.d.) and the supporting questions were tailored for this research, as shown in the previous table 2 (see table 2).

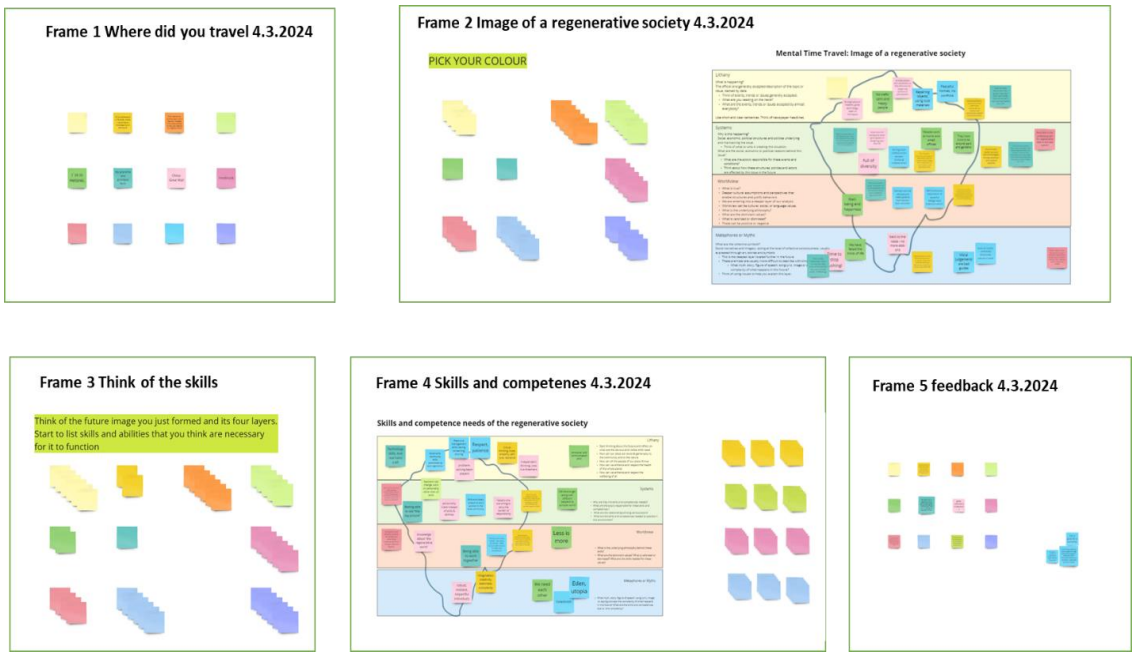

Figure 4 Example of the Miro-Board used in the future workshops

3.3.1 Adjustment made to the workshops

The first workshop was used as a pilot, it was carried out in Finnish and online with a group of participants that all knew each other. Due to schedule changes (strike) the workshop time was limited and was held online for 1h 15 min, Therefore all participants were asked to get familiar with the prepared materials in advance. The limited time led to limited common discussion and forming a mutual understanding but allowed everyone to form their own understanding without being influenced by others participating in the workshop.

Based on the feedback and the gathered data the workshop structure was adjusted as follows:

Rather than colour coding the sticky notes based on the layers of the CLA each participant should be given their own colour to work with to be able to identify the formed future images. This change also helped on supporting the participants during the process but also to follow more clearly the line of thought allows the results to be presented in a more consistent way.

The workshops also led to discussions when should the answers be shared and when it is better to think individually. Which led to the final layout of first working independently then deepening the understanding with discussions.

3.3.2 Data management

This research has been conducted according to the principles of the Finnish National Board on Research Integrity It has not caused significant risks, damage or harm to research participants, communities or other subjects of research. Participants were informed on their rights already when invited to the workshop and their consent to use the results for this thesis was asked in the beginning of the session. (Kohonen, Kuula-Luumi & Spoof 2019) The data has been collected and handled according to the University of Turku guidelines.

All participants were made aware of the aims of the research and use of their perspectives as research results. The background information was collected on a google forms, however as the forms asked only the necessary information to describe the research sample and personal data collection was limited to name so it did not form a register as understood by the GDPR legislation.

The research findings were collected on the Miro-board anonymously, the process was described in the previous section (see chapter 3.3.1). The results are personal and educated opinions and statements on the topic and were not linked to the background information at any stage.

The various Miro-board frames were closed after the workshops, to make sure that the data stays untouched. A copy of the Miro-board consisting of the findings of this research

was made to allow clustering and analysing the various workshops data. After the pre-clustering the data was downloaded as an excel file for further analysis.

3.4 Method of analysis

The research results were analysed qualitatively, using content analysis as a method. The method enables the reduction of phenomena into defined categories. It is a subjective yet a systematic method for interpretation of the data, which allows to compare the findings to previous findings on the topic presented in the theoretical framework. (Harwood & Garry 2003; Gheyle & Jacobs 2017.) The procedure included extracting the material into an excel file, reviewing and organizing the material into categories, coding it with colours, combining, comparing and breaking down codes based on the literature. This led to forming categories and subcategories and giving examples of categories.

With the future images the analysis process led to categorizing the future images into 3 future images of a regenerative society, depending on what they gave most emphasis on: technology, simplicity or societal change. These categories were constructed based on the findings as there is limited literature that could have guided the process.

In the other hand the skills and competences identified by the participants during the workshops were analysed based on theoretical framework. To aid the content analysis, a summarizing framework was developed (see figure 5): This framework is based on the existing structure of green competences, (see figure 2), these competences were adjusted to merge the elements of the overlapping global competences framework (see figure 3). Since the green and global competence frameworks are primarily oriented towards sustainability, and this research aimed to identify the skills necessary for regeneration, the findings were categorized under new headings: Embodying Regenerative Values at All Levels, Embracing Regeneration, Envisioning Regenerative Futures, and Acting for Regeneration.

This framework was first used for comparing the findings of this research to the skills and competences mentioned in the global- and green competences framework. To understand better these skills for regeneration, the previously unclassified findings were compared to previously recognized skills for regeneration. This led to the recognition of skills that have not been mentioned in this research's theoretical framework. During the analysis process the novel skills recognized were categorized and these categories titled.

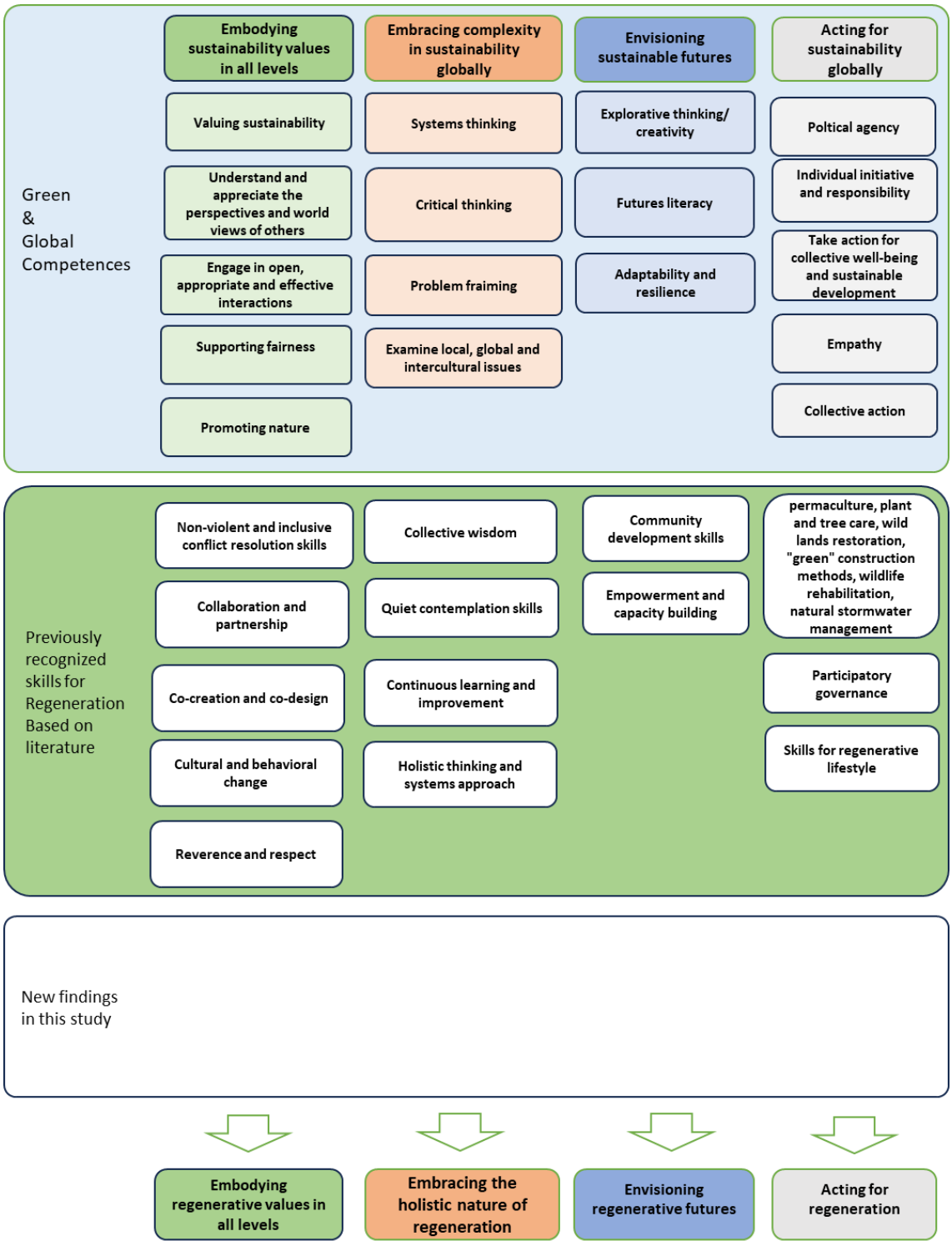

Figure 5 Framework for categorizing and comparing the workshop findings on skills and competences for a regenerative society

The framework is based on the green and global competences and on previously recognized skills for regeneration in the literature. (Based and adapted from OECD 2018; European Commission. Joint Research Centre 2022; Armon 2021; Alves 2022; Laszlo et al. 2017; van den Berg et al 2022)

3.4.1 Use of AI

This thesis process has included use of Artificial intelligence tools to support the research.

CHAT GPT Was used at preliminary stages of the study to gain a general and overall understanding on regeneration. This information has solely been used as a base to structure the thinking into a mind map. ChatGPT was also used in the finalization stages of the thesis to help on the readability and clarity of the text by modifying the sentence structures with the rewrite command.

CHAT PDF was used to facilitate the scanning the materials used in the literature review. The discussions with Chat pdf helped on finding relevant articles and perspectives to the topic.

Microsoft Co-pilot has been used by the participants to produce the future image in the workshops.

4 Results

The following chapter presents the result of this research. It is structured based on the three research questions.

First answering to the research question of how education professionals envision a regenerative society. It gives an overview of the research's findings, following sub-chapters that presents three future images that represent the findings of a larger group of participants and are possibilities within a regenerative society. The visualizations of these three societies were created with Microsoft co-pilot by participants in the workshops and are part of the research results. The sub chapter titles are mentioned myths and metaphors of the participants regenerative society.

Secondly this chapter focuses on the findings on skills and competences needed in a regenerative society, by giving a summary on the results. The third research question on the role of green and global competences in regeneration is addressed in this chapter with a figure that lists the knowledge, skills and competencies identified in the workshops, which are part of these existing frameworks. It demonstrates the necessity of these skills also in a regenerative society. Lastly it demonstrates the transition from the competences from sustainability to regeneration.

4.1 How education professionals envision a regenerative society

The mental time travel aimed to generate each participant's unique image of the future of a regenerative society. Using coloured sticky notes on the Miro board, eighteen distinct future images were identified. However, the data from the first workshop couldn't be structured into images encompassing the four levels of CLA because participants were not instructed to use specifically coloured sticky notes. In following workshops, some participants did not organize their future images as directed, making documentation inconsistent. These eighteen images, all embodying the principles of a regenerative society as discussed in the workshops, are detailed in the table 3 in the appendix 3 (see Appendix 3, table 3). This table also includes materials that are not uniformly structured.

All the eighteen images include the principles of a regenerative society as explained it in the workshop. They all were formed based on the same narrative told while mentally time traveling:

> It is year 2050, the population of the planet has reached 9.8 billion and we have adapted a regenerative way of functioning.
>
> The society has adapted a way of living where all living forms of life are equally important, and everything is connected. Our actions have a positive impact on wellbeing of all living forms. The society is built on a holistic worldview and functions on a will to act towards a wider good societally, ecologically and culturally. There is an active, positive, conscious and continuous process towards regeneration…

The participants have described the regenerative society with adjectives: pure, clean and bright and harmonious. It was seen as an “Awakening to the fact that this is the only world and continuing on this path will lead to inevitable destruction”, “It is believed that plants, animals, people form a symbiotic whole, that is, if you harm a single part in this symbiosis, others will also suffer. Human is no longer the "supreme of creation."”, as a place where “Each of us is equal, precious + love for everything present and visible”. Functioning on a “value base that respects life in all its forms and all ideas: finding commonalities and also drawing on the past, from which strength, values, perspective on why this should be done”.

In the following there are examples of these images, that varied both in their orientation (technology, societal change, simplicity), in their expression and in depth.

> Being on the right track finally, finding ways to have a regenerative society. But not yet there. More collaboration is required from both authorities in government and citizens to make more efficient regenerative decisions. Education sector needs to accelerate their policy reforms to cope with the fast-forward pace of technology. Leadership has been decentralized however, actors are not well-prepared to act in their leading roles. The origin of these changes has been global north, and they can't be transmitted to all contexts as they are. Perhaps cultural, social differences should be considered while adapting these changes

In general, the regenerative society was described with the words as being one where there is no rush calm and empathy driven. The song Imagine by John Lennon was mentioned in all workshops.

> No traffic: calm and happy people. People work at home and small offices
> They have time to be around park and gardens. Well-being and happiness
> We have faced the limits of life

After investigating all the images separately, the images were categorized into three future images that represent the image of a larger group of participants. This grouping was done based on what the image gave most emphasis on simplicity, technological or societal

findings. Four of the future images produced described and discussed the regenerative society and the role of technology in it. Five of the produced images were pointing on the societal change and its role in the regenerative process and nine on simplicity. These images are different possibilities within a regenerative society and are not contradictory to one another.

4.1.1 Technological focus “Back to the roots - no more add-ons”

Figure 6 An image of the future representing the role of technology in a regenerative society

Figure was created by a participant in the workshop on 6.3.2024 with Microsoft co-pilot

The metaphor of “Back to the roots- No more add on” presents the changing role of technology from the current Technology is universally used in regenerative society, but for a purpose. The figure 6 presents how AI envisioned this society. It supports the

regenerative process, allowing everyone to participate, communicate and support the nature:

> Strange picture: modern, great technology, clean vs "re"natureAI helps people with disabilities so that there are no longer any barriers to participation

> People are in a park and talking to each other. Some are using a holographic machine to talk in digital realm. Nano technology is very advanced. All cars are electric, no fossil fuels.

> I saw the fields where the crops grows. I was a lot more technology there on the farm now than back when I was a kid

Various applications are supporting the regeneration:

> Smart surveillance: In the central square of the village there is a smart surveillance camera with a solar panel that monitors traffic and the environment. This helps maintain safety and use natural resources sustainably.

> Social apps: Villagers use a local app that facilitates collaborative sharing. You can report surplus food, borrow tools from a neighbour or organize joint events.

> Digital Garden Guide: The village garden has a smart irrigation system based on weather forecasts and soil moisture. Villagers can monitor the condition of the garden using the mobile app.

> Online store for local food: There is an online store in the village where you can order products from local producers. Digitalization enables easy ordering and home delivery, while supporting local farmers.

> Repairing objects, using local materials, Peaceful homes, no conflicts, Strong local collaboration weaker nonlocal collaboration Humans are not rational and need systems that harness their emotions. Self-conscious separation of systems design and habitual values. Moral judgements are bad guides. Loss of myths: unlimited resources, nature is wise.

On systemic level, technology is an integrated part of the whole, that helps to maintain the biodiversity and take us of renewable energy. It was seen as part of the solution that also affects on how people spend time and the speed of life but also allowing us to communicate with and understand all living forms.

> I think the world here is both slower and faster. The technology has helped a lot of parts in the world to slow down but it also does a lot of work a lot faster and that gives us more time to do more. The environmental part of the food growing is much more regulated than today. The farms are also more important to the country

> The state of the nature has got better, return to the Eden has started. There has been holistic and systemic changes to protect the nature. Communality has its place. People have time and machines are not in control but a functioning part of humans
>
> Multichannel communication, vibration, music, sound color

The regenerative society is “full of diversity.” “Nature leads the decision making, restoration is reality. Wellbeing is a value, getting old is ok, there are less illnesses.”. But the values also effect on what technological developments are taking place. “Preserving biodiversity is the first priority of technological development.”

4.1.2 Societal focus “Empathy is the key for a liveable world, circulation is eternal.”

Figure 7 An image of the future representing a regenerative society full of diversity, where everyone learns

Figure was created by a participant in the workshop 6.3.2024 using Microsoft co-Pilot.

These future images focused on the societal change of the regenerative society. The figure 7 presents this society as AI visualize it. The society was seen as a peaceful, fair, and friendly place that has tackled corruption and racism and is built on trust. Where

communities are autonomous but helpful and there are opportunities for everyone to learn and work. This was seen as an ongoing process.

> Overall equative, peaceful society with close connection to nature, and autonomous people and communities.
>
> Equality in the world, also in the global South, no corruption, trust exists, people have work, travelling by bike or walking, no traffic jams or pollution, good education for all
>
> Penang, A peaceful paradise with no haze or noises from the cars, Friendly people spending time together and growing their own food. No litter around. Equality. In the news you read from the ways of coping with the heat well and sharing and changing the resources. As a white person I won't encounter shouting "orang putih" or harassment

The regenerative society asks for effective decisions that are done on communal, local, national and global levels. Democracies are functioning and reaching for systemic change to support the regenerative process valuing empathy and sustainable values. As people care for each other, sharing and caring is natural, these happen in partnerships rather than rigid structures. “Education is the underlying tool for regenerative skills in the new system where “everyone learns from the first day to contribute to the society”. It was also mentioned that it is a post capitalistic society, where economic growth is measured with wellbeing.

> More collaboration is required from both authorities in government and citizens to make more efficient regenerative decisions. Education sector needs to accelerate their policy reforms to cope with the fast-forward pace of technology. Leadership has been decentralized however, actors are not well-prepared to act in their leading roles
>
> There is no more racism in the country and the different groups work well together. The resources are shared and the democratic structure is strong and working internationally, too. Local and global democracies have development so that there is possible to achieve the systemic goals.
>
> All citizens including kids and youth take active part in the decision making (active citizenship, participatory). The division between public, private and NGO is much more fluid and everybody is working together un partnerships to find creative and sustainable solutions Democracy has been reinvented with a lot of trust and divided responsibilities. We learn our entire life and students as school contribute to society from the first day they are in school. All parts of society take part in educating and learning.

The worldviews may vary across the globe, but all support trust and equity and it is built on empathy. Greed has been replaced with generosity. It is supported by an indigenous

worldview where we are aware of our prejudice but are still able to operate for the benefit of mother earth.

> Worldview closer to indigenous worldviews, where nature and humans are not separate, and everyone is considered equal in their worth and rights, although people are aware of how internalized prejudice is still part of them and the need for acknowledging this, the main philosophy being of equity, accountability, caring and flourishing.

> Nature is protected, people value different worldviews, anti-racism applied, people value still their families but trust among everyone is strong, safety is important for everyone, honesty as well

The supporting myths and metaphors represent the value of caring and empathy for nature and one another, which are seen as precondition for a liveable planet. These myths are present in everyday i.e.., movies but also on what we understand with luxury.

> The heroes are those who does most good for the society, for nature, and for others - and they are rewarded accordingly

> Representations of the value and connection to nature, of the role and value of caring, diversity as inherent to human and overall life

4.1.3 Simplicity and community focus “Return to the innocence.”

Figure 8 An image representing a regenerative society where it’s calm and people are happy and caring

Figure was created by a participant in the workshop using Microsoft co-Pilot.

Simplicity and Community orientation was the informing factor of these images described as the metaphor “return to the innocence”. Figure 8 presents this communality as AI sees it. Little has changed and the change has been for better and a greener environment. Its calm and people are happy and caring. Communication and life are easier. Resources are used in a sustainable manner and things are being locally produced and repaired. People spend time and enjoy outdoors, its role in wellbeing has been recognized.

Communities are an essential part of the system, and they are formed intentionally. The relationship between well-being and material values has changed, material wealth is no longer pursued, but nature and people are at the centre. Simplicity is appreciated. there is more free time, because of technology and that work is done locally.

> We are looking for operating methods that balance consumption and the use of natural resources. Values the community, biodiversity and the use of technology to increase well-being. There has been a shift from individuals to the well-being of the community

Diversity is a norm, “People are interested of each other and take into consideration the well-being of different living forms as part of our common world and care about all lifeforms” The society values communities which are built based on wellbeing and sees them as an essential part of the wellbeing. However, it is recognized that humans are not rational, so systems are needed as a harness. Digitalization has not disappeared, but it is no longer in lead.

The society has overcome the myth that humans are superiors to other lifeforms. Life is understood from a holistic perspective. Life should be valued and cared for.

4.2 Skills and competences in a regenerative society

The four workshops generated a total of over 200 sticky notes detailing the skills, competences and changes in education needed in a regenerative society. Since these were compiled after participants shared their personal future image, the listed skills and competences are not tied to any single future image. Instead, they reflect the collective skillset envisioned as necessary for the described futures.

All data from these sticky notes were then transferred to an Excel file for detailed analysis. Each of the four levels of CLA was examined separately and entries in Finnish were translated into English. If sticky notes contained multiple skills or competences, these were divided into separate cells. In total, 47 skills were identified at the litany level, 47 at the system level, 41 at the worldview level, and 110 at the myths and metaphors level.

The most often occurring skills were empathy, various collaboration and communication skills and critical thinking skills. But also, communal skills, respect and values were mentioned on several occasions and levels.

Vast majority of the skills were related to personal ability (i.e., problem solving) rather than practical work (f.eg. cultivating). Also, observations on how education institutions and teachers should reposition were mentioned, pointing the necessity of reskilling and upskilling of the educational professionals.

These findings are presented in the appendix 4 (see Appendix 4, Table 4) showing the variety of these findings based on the level they appeared on the CLA framework and on column if they are representing knowledge, skills, competences or changes needed in education and educational professionals. This classification was based on the previous definition of the terms skills and competences, but classifying terms such as respect, hope and belief, and values could have been done differently.

4.2.1 Green and global competences in a regenerative society

To answer the research question on the role of green and global competences in a regenerative society, the skills and competences listed were studied in detail, spotting the skills and competences that have been mentioned to be part of these existing frameworks (see OECD 2019; European Commission. Joint Research Centre 2022). The following figure (see figure 9) lists the knowledge, skills and competencies identified in the workshops, that are part of these existing frameworks. It demonstrates the necessity of these skills also in a regenerative society.

As the figure 9 shows, the competences and skills presented in these frameworks are widely needed in a regenerative society. Especially the skills related to embodying values such as understanding and appreciating the perspectives and worldviews of others and skills related to engaging in open an appropriate and effective interaction. The only competence that was not mentioned was political agency which is one of the green competences. However, the research findings included tens of skills that have not been mentioned in these two frameworks aiming on sustainability.

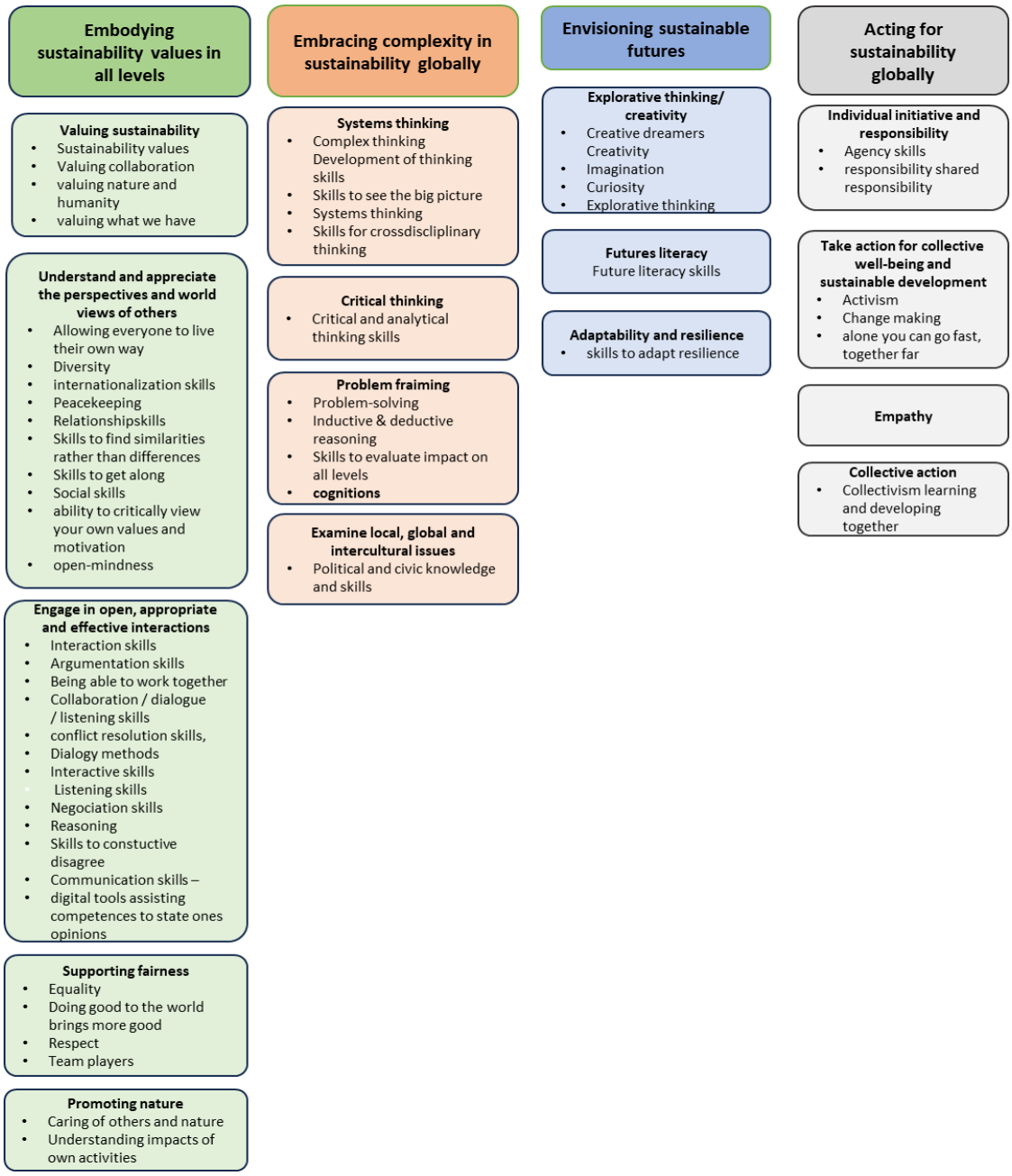

Figure 9 Global and green competences in a regenerative society

(Framework adapted from OECD 2018; European Commission. Joint Research Centre 2022)

4.2.2 Transition from skills for sustainability to regeneration

To understand the transition from the skills aiming to sustainability presented in chapter 4.2.1 to skills for regeneration based on this research's findings the additional skills and competences not listed under global and green competences were clustered in the following figure (see figure 10). It points out the similarities to the previously acknowledged regenerative skills as well the novel findings of this research. The skills and competences listed with bullet points under the categories are the skills defined and deemed necessary by the participants of the workshops' addition to the previously mentioned skills for sustainability.

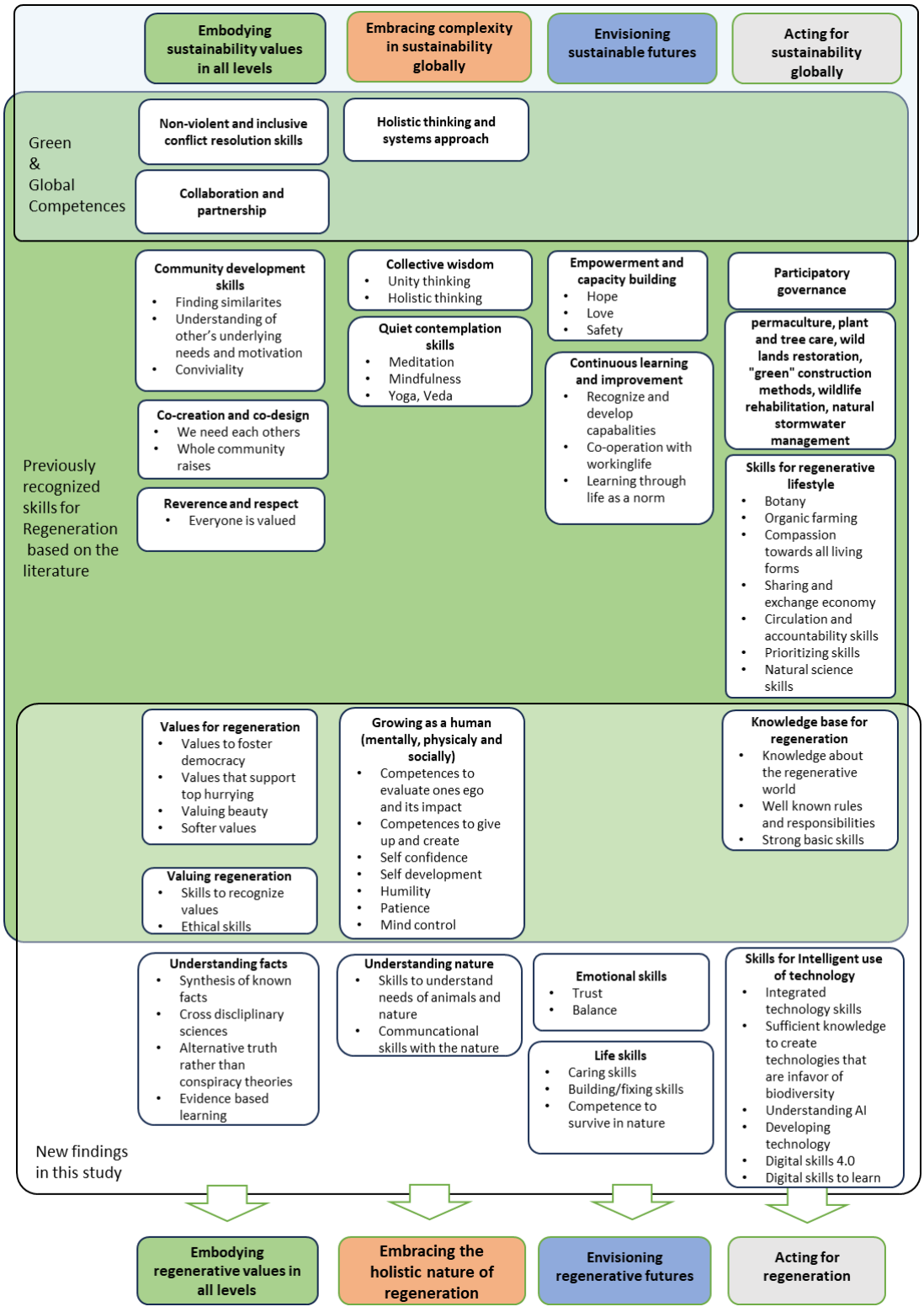

Figure 10 Workshop findings on necessary skills and competences for a regenerative society

The findings are allocated in the summarizing framework designed for this research (Framework based and adapted from Laszlo 2017; OECD 2018; Armon 2021; Alves 2022; van der Berg 2022; European Commission. Joint Research Centre 2022)

5 Discussion

This chapter will discuss the findings based on the three research questions and reflect the findings to the introduced theories in chapter 2. It will also point out possible limitations and risks of bias of this research.

5.1 How do education professionals envision future regenerative society?

Creating future images of regenerative society in year 2050, offered a chance for empowerment by envisioning a mostly hopeful image of future. The use of mental time travel was seen difficult by a few participants, partly due to their personality partly as they felt it is too Utopian to ever achieve. For some the feeling was, that the future image was odd, good and bad at the same time. This can be a manifestation of the challenge that, achieving this regenerative society asks for a fundamental change in our current values and worldviews and culture which can be daunting and hinder us from making the change (Camrass 2023).

The future images of this research represent the holistic cultural transformation necessary for regeneration. The images were based on the same narrative told in each of the workshops which was based on the literature review and the formed definition of a regenerative society of this research. This can explain why the findings are coherent with the regenerative literature and its functioning principles. Therefore, it is understandable that the images support the findings of the project regeneration as the images do discuss the role of social justice, valuing diversity and feeling of belonging. Even though they do not discuss in detail i.e., the changes in constructed world or the landscape. (Nexus | Project Regeneration 2023) The constructed world has been mentioned with electric vehicle, solar panels, and the landscape with adjectives of green and full of biodiversity. This can be due to the field of expertise the participants represented.

Somewhat surprising is, that even if the participants were told that the population of the planet has reached 9.8 billion, none of the participants described the location they travelled crowded, one participant even imagined that big cities no longer exist. As participants were allowed to choose the location they wanted to revisit, it is possible that they intentionally travelled to locations that are peaceful (f.eg. Koli-National Park, or Ylläs). But even Paris had turned into a safe and calm surrounding. Calmness can be a

consequence of the electrification of traffic and less need for commuting, also if local production and wellbeing are valued over global consumerism, there is less need for transportation. But could an explanation be, that by letting go of the current performing society with constant rush and giving value to relationships and respect for others and nature, the negative feelings related to crowds also disappears?

The value of meaningful relationships rather than consumption has been discussed by Salonen et al (Salonen et al. 2023). In these images the respectful interaction, feeling of belonging to the community and of being connected, did not only apply to other humans but also to the nature and was the source of wellbeing. Communication however could still be supported with technology for example holograms.

The role of integrated technology has not previously been discussed in regenerative literature as in these images. The integrated technology monitoring the balance and interaction with the nature, could possibly be necessary to reach and maintain regeneration. Human ability to evaluate the impact and causalities could be reinforced with AI and sensors interacting with the nature. Technology could be the link to support humans to give nature the role to be in power.

The societal and systemic change was described with terms such as equity, nature leading the decision making, economic growth is measured by wellbeing, which is in line with previous literature. But the fundamental change on societal level presented in the images evokes curiosity. How has the world overcome corruption and racism? What has been the drastic change that has forced the smaller communities to form? What is the force that has given the ultimatum to these actions or is it only the strong moral compass that has been embedded into all minds? And if we succeeded in transforming our values and culture, how?

As the images were formed based on CLA as the research method it lets deconstruct and reconstruct these future images and makes it possible to investigate the deeper layers of the phenomena (Inayatullah 1998). Especially the concept of diversity is interesting. What is the diversity of the regenerative society? If regeneration asks for a holistic worldview and shared values, the diversity cannot be cultural diversity as understood at current. Rather it must refer value and care for life; allowing everyone be valued as they are, by securing the feeling of belonging by participation in the community but within the

boundaries and balance that the ecosystem asks. Therefore, diversity in the regenerative society can not only refer to the humans but to biodiversity broadly.

The limitation of these images is, that they were produced in a short time and could have evolved if there would have been more time for discussions, a deeper understanding on the concept of regeneration or the group of participants would have been more heterogenic in their educational background and other life experience. A backcasting scenario study based on the three images could provide more consistent ideas on the path of change.

Lastly it is also interesting to look at the three visualizations (see chapter 4.1.1-4.1.3 and figures 6-8) of a regenerative society produced by the participants with the help of AI, as no limitations on expression were given in the future workshop. As these figures are findings and results of this and not conclusions of this research, they cannot consider as being false. But it is questionable how well they demonstrate a society full of diversity, where technology is used only for a purpose or pass on the values of the society? They do raise the question of what the risks and limitations are if we allow AI to envision the futures for us and do not use our own imagination.

5.2 What are the skills and competences needed and to be fostered in futures regenerative society?

This research findings on the skills and competence needs reflect the holistic nature of a regenerative society, where transformation is constant and interactive adaptability needed.

The formed framework (see figure 5) allowed to recognize the currently acknowledged skills and competences that are valid in a regenerative society, skills that have previously been seen necessary for regeneration, as well as the novel skills and competences needed in a regenerative society, but also pointed out possible blind spots in this research. Reflecting back to the chosen approach to analyse the research findings with content analysis and categorizing them, there is the risk of losing the understanding on the complexity and interrelation of the skills. Therefore, it is necessary to look at the findings as a whole and bear in mind the complex and systemic nature of the regenerative society.

At the core of a regenerative society are the respective values and worldview that secures that the regeneration is an ongoing process. Embodying regenerative values is about

passing on and taking us of values related to community, diversity, nature, empathy and valuing what we have. These values were strongly present in the findings of this research and have previously been recognized in the global competence and green competence frameworks and in the concept of planetary citizenship (OECD 2018; European Commission. Joint Research Centre 2022; Moilanen & Salonen 2022). Thus, based on this research, the value and knowledge base for regeneration cannot be taken for granted but needs to be passed as knowledge about the regenerative world, its well-known rules and responsibilities and on the value basis of the regeneration. Emphasis should also be given on skills to recognize values and ethics. With this value base it is possible show reverence and respect.

Embodying these values, a set of communal skills are a requisite, as discussed earlier in regenerative literature and in the concept of planetary citizenship (Laszlo, Luksha & Karabeg 2017; Nexus | Project Regeneration 2023). As the future images presented focus can be in local communities and its wellbeing. This explains why it is vital to support the feeling of being valued and give value on the community and collaboration with suitable skills such as recognizing similarities rather than differences and understand the motivation of others as part of these communal skills.

Even if the future images discussed the wellbeing as a value and aim of the society, surprising little skills related to physical wellbeing on a personal level were mentioned, while psychological wellbeing skills were recognized in forms of mindfulness, critical thinking, managing stress, and communicational skills as well as emotional skills of safety, hope and love and skills that support the wellbeing of the community.

In green competences and global competences there is strong emphasis on collaboration and communication skills that are also necessary for regeneration: argumentation, dialogical, listening and peace-making skills are needed to be learned. These skills do however need to be revised, as Laszlo et al. have pointed in their studies on planetary citizenship, interactions skills with nature would be needed for the process of regeneration (Laszlo, Luksha & Karabeg 2017). If we genuinely want to give nature the lead, we need both skills to promote but also to understand nature. Based on the finding these collaboration and communications skills do need to therefore be revised and recognize also the skills needed to interpret and communicate with the nature.

Little weight in the findings was given to skills necessary understanding ecosystems and the underlying core sciences such as ecology, biology and physics. This research points, that regeneration asks for skills to understand facts and reality and to learn based on evidence. There needs to be skills to build and interpret the synthesis of known facts and understand alternative realities which asks for cross-disciplinary sciences. It is possible that the skills related to understanding nature and understanding truth build their knowledge base on these sciences but can also be explained by the research sample consisting of generalist.

Embracing regeneration is about understanding the holistic nature of the society. As the future images previously described the regenerative society is calm and peaceful, pointing to the need to transform our way of living and our attitudes.

Regeneration is also about growing as a human. We need to learn to observe, account and develop as humans. It will ask for personal growth based on self-knowledge on one's capabilities, and ability to evaluate one's ego and its impact. Self-development should happen towards humility, patience, and mind control. Therefore, mind management skills and competences such as to mediate, to control stress, to manage time are beneficial. Some of these skills have previously been referred to as quiet contemplation of nature, ancient ways of knowing and mindfulness (Armon 2021). These skills can be interlinked with being able to understand nature.

As the regenerative society is under constant transition, it is evident that explorative thinking, curiosity, creativity, and imagination need to be cherished. They should be used wisely combined with other thinking skills in collaboration for collective wisdom as suggested by Laszlo et al. Regenerative society asks for a set of thinking skills including critical thinking, complex thinking, systems thinking and cross disciplinary thinking to see the big picture holistically and from a unity thinking perspective. The skills to problems framing and solving are a necessity, combined with skills to evaluate impact, inductive and deductive reasoning as well as understanding cognitions. With this set of skills learners would be equipped to solve the challenges creatively and show empathy on a broader planetarian perspective, that takes into account also the living and nonliving nature. (Laszlo, Luksha & Karabeg 2017; Künkel & Ragnarsdottir 2022.)

As regeneration was defined to be an ongoing process it is necessary to have skills for envisioning possibilities. Where green competences put emphasis on futures literacy and

adaptability, regeneration asks for open mindedness and mind control to limit stress, pressure and for sustaining hope. Emotional skills for balance, hope, love, trust and safety can support the transition to a regenerative future. Thus, Van der Berg's regenerative learning ecologies could possibly offer a pedagogical solution that could enhance these emotional skills to flourish (van den Berg et al. 2022). This research pointed also novel group of life skills. Categorizing these skills under envisioning can be questionable. Justification for this is, having the skills to care and to survive help on envisioning and on recognizing places for improvement; be tools to maintain the hope trust and balance essential for the ongoing regenerative process.

As the literature has pointed and the findings of this research support, a regenerative society needs to take use of life wide and lifelong learning that offers possibilities for work-based learning and recognizes the outcomes of communal learning (Jackson 2023). This might challenge the current formal education system and raises the question what will the Education Hub's be like, that will pass on the necessary value base, community skills and that teach collaboration sharing, giving value to the community rather than on individual needs. Simultaneously enabling that learning is based on individual abilities and with a balance between self-directed learning and community learning. How will these hub's secure the participation of all securing the feeling of belonging to all?

The cornerstone for acting for a regenerative society is in a regenerative lifestyle: Resource managemental skills such as sharing, repairing, conserving and caring are essential skills for everyone, but also skills such as organic farming, botany and natural science skills were mentioned. The need of these skills can be explained with the "return to the innocence" future image. Also, previous literature has talked on practical skills for regeneration to show compassion and empathy towards all forms of life. On the contrary this research did not recognize skills such as permaculture or stormwater management necessary (see Armon 2021). This can be a blind spot of this research or as the role of technology was discussed in the future images and novel technological skills seen necessary it is possible that they will lead to solving these issues. The technological possibilities open and will ask for new skills, learners should have sufficient knowledge to use technology for learning, take use of technology but also to create innovative technology for enhancing wellbeing.

Regeneration builds on strong actor ship from individuals, but for the good of the nature, community and society, these skills have been previously recognized in the global and green competence frameworks. It is necessary to teach about regeneration and its philosophy besides on passing on the responsibilities and rules that are acquired for the society to function.

Current education has been criticized of its focus on knowledge acquisition rather than empowering learner to act (Laszlo, Luksha & Karabeg 2017). Reflecting back to the findings of this research the focus of learning in a regenerative society is on personal abilities and skills that enable one to take action and responsibility as the learning is targeted in the inner levels values attitudes and worldviews and therefore supports these previous findings.

What at first appeared contradictory was, why should the regenerative society work on personality on personalized learning if the focus should move away from individualism to holistic wellbeing of the community and the planet? The answer may be as regeneration.org has pointed in equity, as how we treat ourselves, one another and the nature are connected (Nexus | Project Regeneration 2023). If learning doesn't offer tools for giving value to oneself or feeling of belonging and be needed what would be the driving force to work towards a wider good? By creating better and meaningful lives we will support the wellbeing of the individuals, community and nature.

The limitation of these research results is that they represent the perspectives from education only. They well demonstrate the high expertise of the participants and their knowledge on current educational trends and concepts implemented on European level. The findings are well in line with previous yet limited studies on the topic. Regenerative society relies on meta skills. If the sample would have been diversified and included participants from various industries or sectors and globally the findings could possibly have led to more varied answers.

5.3 How do these skills and competences differ from the current global competences and green competences?

The role of Green and Global competences in a regenerative society was evaluated based on the framework design for this purpose. It showed and the previous chapter described that many of these skills are relevant also in a regenerative society, but alone are not sufficient for regeneration. This chapter will discuss the aspects of these findings that have not yet been discussed.

Systemic and critical thinking skills cannot be overvalued in a regenerative society. Their necessity has been discussed broadly both in the transformative education, planetary social pedagogy as well as in the concept of green competences. Without these skills it is unlikely that individuals nor the society would have sufficient skills to evaluate impact that is a perquisite for the production of wellbeing.

Communicational and interactions skills are the essence for the regenerative society to function, these skills are also well presented in these two frameworks. Therefore, it is understandable that these skills were the core of the findings of this research. The harmonious life described in the future images is based on respectful and meaningful interaction in the diverse community, possibly supported with technology. The society will ask for collaboration and co-operation to support the regenerative process.

The global competences include the intercultural skills, understood as skills to be able to know about, understand and respect various worldviews. It makes sense to consider what this means in a society full of diversity, that at the same time requires a holistic worldview and a strong value base in order to function. Does intercultural refer to human cultures or humans and natures cultures? Or can the various cultures be the differences in the life choices that are given emphasis on, like in the future images of return to the innocence and technology driven society? This leads to think should the definition for intercultural competences be rethought to: know about, respect and find similarities rather than differences?

The only skill that is mentioned in the current frameworks but not in this research's finding is political agency. This was not expected, as the especially the future image emphasizing on the societal change talked on the strong democracy and on inclusive decision making. A possible explanation is that the findings do include political and civic

knowledge and skills which can include agency such as systems thinking. It is however possible, that the political system needs to change, which might lead to more communal and participatory decision making, as well as nature leading the decision making, ending political agency as understood now.

It is interesting that it was seen necessary to have the skills to allow everyone to live in their own way. Is it truly possible in regenerative society where balance with the nature is at its core? Or are there so strong societal norms and a moral compass in individuals that there are no risks for causing harm to the nature nor to the community? But if this would the case why there is a recognized risk for conflicts? Peace-making and conflict resolution skills have been recognized in previous literature as well as in the findings of this research (see. Armon 2021). Is the soul of conflicts in a regenerative society in the cultural differences, values and worldview of humans or in something different?

6 Conclusions

A regenerative society offers a hopeful vision for future. Achieving a regenerative society demands open discussion on the shared values, as the underlying worldview and values can hinder us from making the transformative change and look beyond it. It is a society where everyone is valued and has value for regenerating wellbeing for all living forms.

A regenerative society has a strong value base which also affects the necessary skills and competences. It is a society that fosters diversity, wellbeing of all living forms and participatory democracy. The essence is in humility, it functions on softer values than the current system, giving value on beauty, calmness and empathy. To be functionable regenerative society asks us to have the skills and to be ready to recognize and evaluate our values and their impact on holistic wellbeing. This will require ethical, philosophical and systemic skills.

Education is the driving force of this regenerative society. Learning should support the hopeful vision for everyone and everything. At core are the values, personal abilities and personal growth that support balance. The essence for the regenerative society to function are various communal and interactions skills. Learners should be equipped with sufficient knowledge and skills for maintaining trust and hope and be able to support enhancing wellbeing in the community. Educational aims should be fitted locally and based on one's personality, making sure that everyone sees themselves a valuable part of the society. The role of educator's should therefore keep on transforming from passing on knowledge to recognizing the potential of individuals and help develop to a person able to produce wellbeing in the community.

The constant regenerative process asks for lifelong and wide learning. These will ask for novel approaches on the co-operation with the education providers and homes. Learning through life should be the new norm and not be limited to designated buildings. As both the skills needed and the societal structures will be community based, schools and families should work in a close cooperation and the communality and collaborations being taught jointly. Only then can the necessary values be passed and support the transformation and regeneration.

Based on this research's findings Global and the Green competence frameworks have recognized competences that are also necessary for a regenerative society, despite of

being built on a mechanistic worldview and on a humancentric approach. Hence if the underlying values and worldviews are not transformed, the skills might have limited potential for continuous transformation necessary for regeneration. Furthermore, the research results also included tens of skills that could not be classified into these categories leading to the observation that alone and without revision they are not sufficient frameworks for regeneration. However, the novel practices and paradigms of planetary citizenship and planetary social pedagogy, as well as regenerative learning and education theory, have filled many of these gaps and could together with this research's findings form a more comprehensive skills set for regeneration. But without understanding the complexity of reality and nature and transforming our culture and values, we have limited chances for taking use of the knowledge necessary for regeneration.

This research shows perspectives solely from educational professionals' perspective and the findings are therefore limited. Conducting similar research in a cross disciplinary setting with participants from various industries and sciences could deepen the understanding on the skills needs of regenerative society. Additionally, a backcasting scenario research on how education could function as a leverage point for the necessary transformation for regeneration, could lead to novel educational practises.

However, this research and the conducted workshops pointed out that there is desires and a will for explorative future discussions in the education field. Professionals recognized needs for openly discuss the values we base our curriculums and pedagogies on. Regeneration is a narrative of hope we can work towards in education.

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Appendices

Appendix 1 Information sheet for the participants

Dear Sir/Madam,

As part of my Master's thesis in Futures studies in the University of Turku, I am conducting a workshop using participatory futures methods aiming on gaining understanding on the following study questions:

How do education professionals envision future regenerative society?

What are the skills and abilities needed and to be fostered in future regenerative society?

How do these skills and abilities differ from the current "future skills"?

Your insights on education and skills would be highly valuable to my research.

Workshop details:

Duration: The workshop will take approximately 2 hours

Structure: The facilitated workshops will be carried out in two steps.

The first step asks for the participants to create a futures image of a regenerative society with mental time travel.

The second step uses Causal layered analysis to identify the skills needed in the previously formed futures images.

Note: the study is exploratory and there are no right or wrong answers. The workshop discussions are either in English or Finnish.

Data protection:

Anonymity: All data (locations, names, expertise) will be anonymized and treated confidentially and used solely to this research purposes.

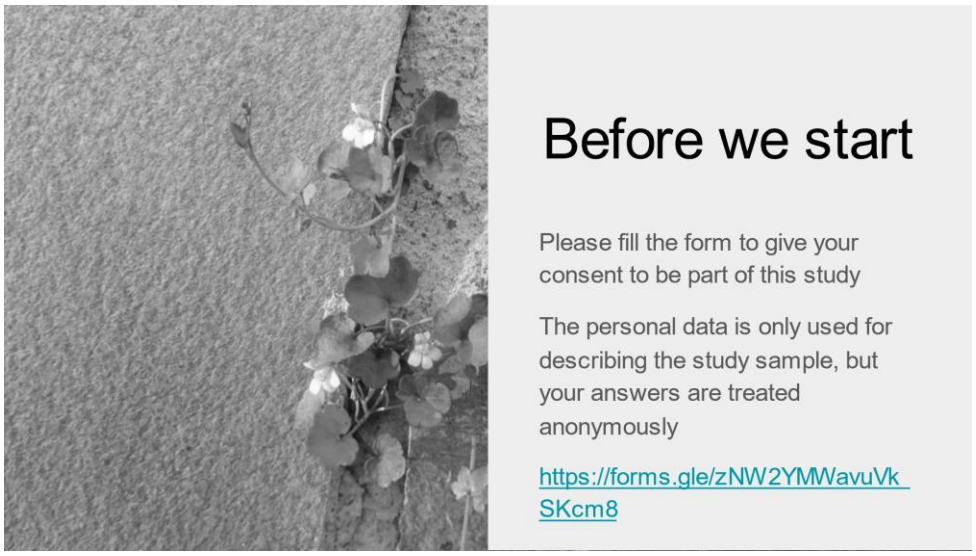
Consent: Your consent will be sought for recording the workshop for research purposes.

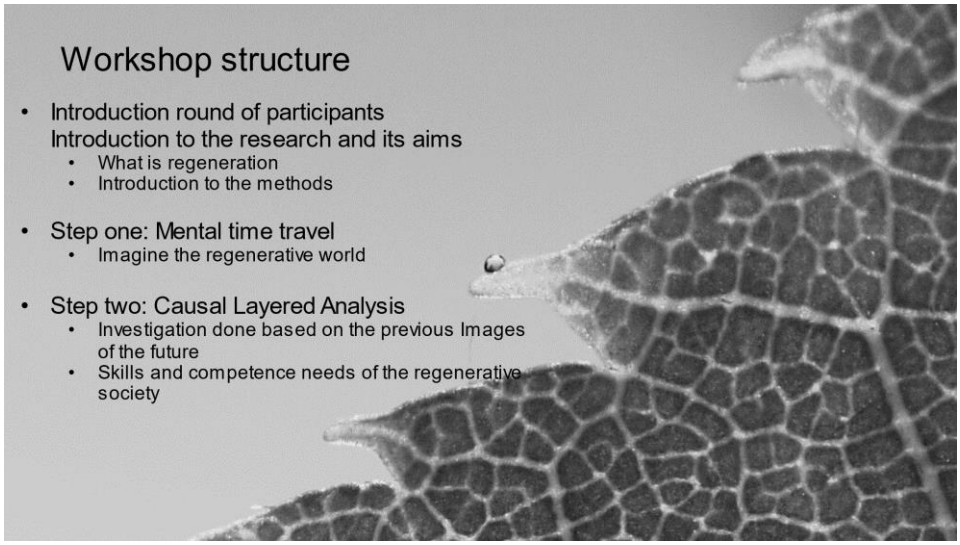
Contact: If you have further questions or would like to discuss anything in advance, I am at your disposal. You can reach me via email at eerika.kantonen@gmail.com

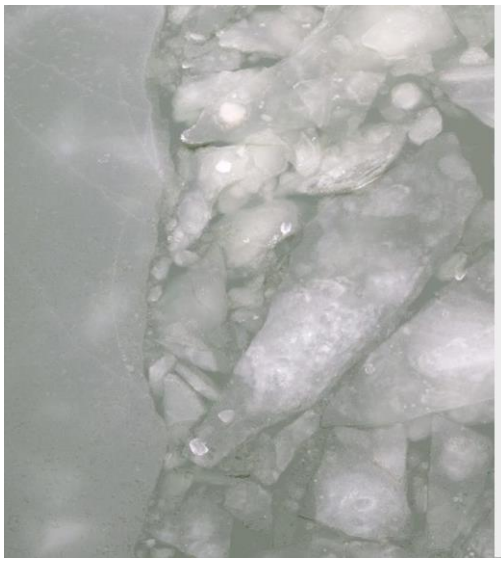
Thank you for your interest. I would greatly appreciate benefiting from your expertise!

Best regards, Eerika Kantonen

Appendix 2 Workshop materials







Study Questions

How do education professionals envision future regenerative society?

What are the skills and abilities needed and to be fostered in future regenerative society?

How do these skills and abilities differ from the current "future skills"?

What is a regeneration?

Stages of development, from conventional to the regenerative economy. Source: Brown et al. (2018) according to Fullerton (2015).

Etymology of the word regeneration is from Latin meaning "reborn, reproduced, restored,"

Regeneration is a positive, ongoing transformation and a sense of interactive adaptability. It is a continuous process that has the capacity to strengthen over time (Camrass 2020)

Regeneration evokes hopeful themes of renewal, revival, rebirth and restoration. Regeneration involves more than doing no harm, it is an active, positive and continuous process (Camrass 2023)

Regeneration asks for a new complementary and accumulating an holistic worldview (Gibbons 2020) where also humans role is rethought (Gibbons 2020, Goncalves 2021, Camrass 2023)

The positive impact can be on all levels economical, ecological, societal and cultural

The ultimate power to change the world does not reside in technologies. It relies on reverence, respect, and compassion for ourselves, for all people, and for all life." (Hawken 2023)

Opening space for alternative futures with mental time travel

Mental time traveling refers to the humans ability to mentally project in time backwards or forwards and in this case also the regenerative society. It is based on humans episodic memory and anticipatory abilities (Suddendorf & Corballis 2007)

Mental time travel is a futures method of guiding participants in the workshop to imagine the futures as a series of motion pictures in a movie like manner.
It uses your personal imagination as the engine of the fantasy trip.

Mental time travel guides you to envision new futures, allowing to imagine or desire things, processes, or events without the constraints of expectations, beliefs or judgments.

Causal Layered Analysis

A futures studies method developed by Inayatullah
Does not by itself produce scenarios or future images but opens space for seeing alternatives
A four-level sensemaking approach to analyse a particular topic or issue in the future.

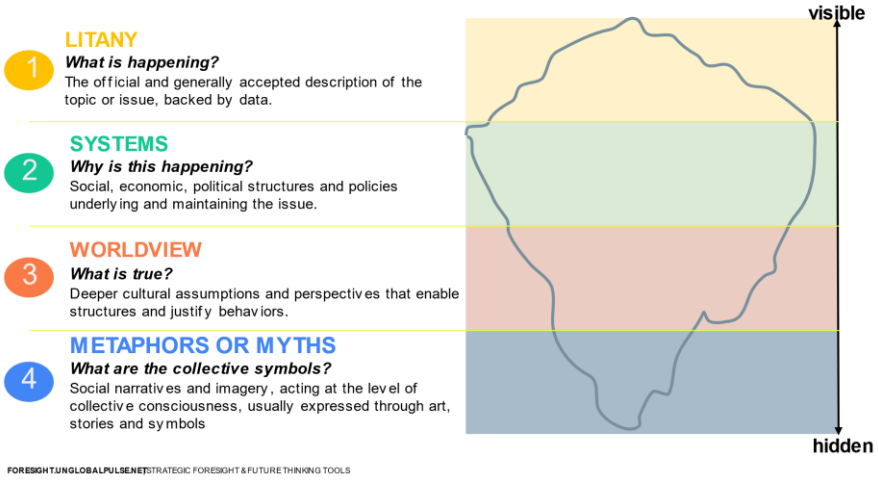
the surface understanding of an issue (**itany**), the official and generally accepted description of the topic or issue

the causes creating and sustaining the situation (**systems**) social, economic and political structures, actors and policies underlying and maintaining an issue.

the different perspectives shaping it (**worldview**) deeper cultural assumptions and perspectives that enable structures and justify behaviors

the underlying stories that might feed it (**metaphors or myths**) corresponds to the social narratives and imagery, acting at the level of collective consciousness, the underlying stories that might feed it

CAUSAL LAYERED ANALYSIS



FORESIGHTJUNGLOBALPULSE.NET STRATEGIC FORESIGHT & FUTURE THINKING TOOLS

It is year 2050, the population of the planet has reached 9.8 billions and we have adapted a regenerative way of functioning;

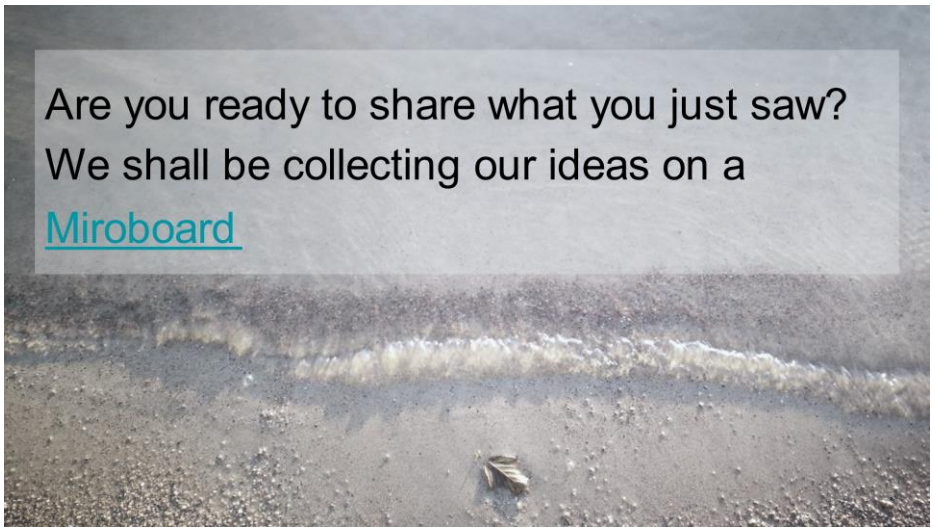
The society has adapted a way of living where all living forms of life are equally important, and everything is connected. Our actions have a positive impact on wellbeing of all living forms. The society is built on a holistic worldview and functions on a will to act towards a wider good societally, ecologically and culturally. There*is an active, positive, conscious and continuous process towards regeneration..*

Pack your Bags it is time for a mental time travel:

But before we can you need to pack

And choose the destination you wish to revisit

Are we ready? Close your eyes and let's start the journey



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Appendix 3 Future images produced by the participants

Table 3 Future images of the participants

Reusult were gathered in the four future workshops and are presented on the four levels of CLA.

	Litany	Systems	Worldview	Myths and metaphors
1	Strange picture: modern, great technology, clean vs "re"natureAI helps people with disabilities so that there are no longer any barriers to participation	more rules for society but more participation in designing your own life	full of diversity	back to the roots - no more add-ons
2	Repairing objects, using local materials, Peaceful homes, no conflicts	Strong local collaboration weaker nonlocal collaboration	Humans are not rational and need systems that harness their emotions. Self-conscious separation of systems design and habitual values	Moral judgements are bad guides. Loss of myths: unlimited resources, nature is wise
3	No traffic: calm and happy people	People work at home and small offices, They have time to be around park and gardens.	Well-being and happiness	We have faced the limits of life
4	Overall equative, peaceful society with close connection to nature, and autonomous people and communities.	Shared tools, public services and technologies, strong education and medical systems. Post-capitalist economy, participatory democratic political and economic system with components of municipalism and internationalism.	Worldview closer to indigenous worldviews, where nature and humans are not separate, and everyone is considered equal in their worth and rights, although people are aware of how internalized prejudice is still part of them and the need for acknowledging this, the main philosophy being of equity, accountability, caring and flourishing.	Representations of the value and connection to nature, of the role and value of caring, diversity as inherent to human and overall life

5	I saw the fields where the crops grows. I was a lot more technology there on the farm now than back when I was a kid	I think the world here is both slower and faster. The technology has helped a lot of parts in the world to slow down but it also does a lot of work a lot faster and that gives us more time to do more. The environmental part of the food growing is much more regulated than today. The farms are also more important to the country than now because of	This is very hard, I think. The AI has of course exploded and the world is much more divided in "good and bad"	This is really interesting, I think. For me this i like some of the worlds i Star good and bad world. TrekBoth gg
6		Education is the underlying tool for regenerative skills in the new system		People’s need to show-off has diminished or shifted to regenerative things: luxury products are not "cool", viewing what is luxury has shifted
7	Paris has become a true biodiverse city - and it’s safe for kids to move around for free. The schools and the city are melting into one- and everybody are friendly. The transportation system is 100% electrified and for free as well as cars allowed in the city. People do not look into screens all the time, they use technology more wisely and look at each other and smile, when they are on the streets, at work or transporting themselves.	All citizens including kids and youth take active part in the decision making (active citizenship, participatory). The division between public, private and NGO is much more fluid, and everybody is working together un partnerships to find creative and sustainable solutions Democracy has been reinvented with a lot of trust and divided responsibilities. We learn our entire life and students as school contribute to society from the first day they are in school. All parts of society take part in educating and learning.	Trust, openness, collaboration, recycling rather than consumption, holistic and cyclic thinking rather than linear, creativity is highly valued, kindness. Connectedness to nature is key - we are not separate but one big system (belief), Greed (what I can take out of the system) is exchanged with generosity (what I can give to the system).	The heroes are those who does most good for the society, for nature, and for others - and they are rewarded accordingly.

8	Being on the right track finally, finding ways to have a regenerative society. But not yet there	More collaboration is required from both authorities in government and citizens to make more efficient regenerative decisions. Education sector needs to accelerate their policy reforms to cope with the fast-forward pace of technology. Leadership has been decentralized however; actors are not well-prepared to act in their leading roles	The origin of these changes has been global north, and they can't be transmitted to all contexts as they are. Perhaps cultural, social differences should be considered while adapting these changes	"Persepolis" connected to our past
9	It looks quite similar to nowadays or even better, which is a relief. We have finally stopped the climate change and the loss of biodiversity.	More renewable energy, no fossil fuels, less metsätaloustoimenpiteitä, restoration of different habitats. Less stress		
10	Penang, A peaceful paradise with no haze or noises from the cars, Friendly people spending time together and growing their own food. No litter around. Equality. In the news you read from the ways of coping with the heat well and sharing and changing the resources. As a white person I won't encounter shouting "orang putih" or harassment	There is no more racism in the country and the different groups work well together. The resources are shared, and the democratic structure is strong and working internationally, too. Local and global democracies have development so that there is possible to achieve the systemic goals	We are dependent both form each other and especially from the mother earth. Philosophy is very down to earth and reaches the spiritual values, too. We accept that there are limits what we know, and it is accomplished with what we feel. We are a philosophy of empathy.	Empathy is the key for a livable world, circulation is eternal

11	Equality in the world, also in the global South, no corruption, trust exists, people have work, travelling by bike or walking, no traffic jams or pollution, good education for all	Corruption problem has been solved, the political system is stable, people have organized better, different types of communities flourish because people care about everyone	Nature is protected, people value different worldviews, anti-racism applied, people value still their families but trust among everyone is strong, safety is important for everyone, honesty as well	Old myths of different native groups are valued and stand for continuity, coexistence with the nature and those are visible in art and, songs and the media. Human as a spiritual being is emphasized also in new myths. Movies emphasize human's humanity (inhimilisyys) and are discussing about important topics.
12	communication and interaction, also working is somehow easier and less complicated, requires less multitasking	development of more sustainable mobile devices, applications and programs	the knowledge on the welfare of the brain when it comes to multitasking has increased so enormously that there was a need to change the way we work to save the working life	
13	The natural resources are utilized in a sustainable way both environmentally and socially	The political system has changed and there doesn't exist international or national corruption People are more equal.	People are interested of each other and take into consideration the well-being of different living forms as part of our common world and care about all lifeforms	You can see everywhere round symbols which include pictures of trees, apes, small insects and people, all living together, nobody above the others
14	Walking around the market, buying local food	The importance of communality has been emphasised. People return to a simple life.	People need a community. In society, it is important to restore concentration and give up multitasking. Digitality has been subordinated to being a slave, not a master.	Humans are social animasl. Simple is beautiful. Return to innocence. The value and meaning of life must be respected
15	Gardening in a sunhat looking out at the sea. Neighbors behind low fences in similar activities talking to each other.	Communality, Self-sufficiency, Sharing economy, simplicity,	sociability, caring for others, organic. Humans have returned closer to nature and a simpler life, Solar power, joy of life.”	humans have returned closer to nature and a simpler life, Solar power, joy of life.”

16	We are by a clean lake and talk about health and wellbeing and how it has improved during the past 20 years	People care more about their wellbeing, there has been medical breakthroughs	Holistic wellbeing	Understanding human activity from holistic perspective and as a part of the nature. Self reliant energy production solar panels
17	Spending time outdoors in community wellbeing areas, swimming is not approved due to dirty water, swimming pools do exist. Wellbeing is enhanced with the time spent outdoors and it is well appreciated	communality is appreciated, it was built intentionally. Meaning of work and free time are mixed as they both aim for wellbeing	it is a norm to be "different, wellbeing is behind the communality. It is easy to transfer oneself to the artificial world	Song Imagine
18	Looking at the National view, positive news of the state of the nature. I am wearing sunglasses that have an integrateg camera, I am eating an eater egg cacao has not dissapeared and choclate does not make me fat	The state of the nature has got better, return to the eden has started. There have been holistic and systemic changes to protect the nature. Communality has its place. People have time and machines are not in control but a functioning part of humans	Nature leads the decision making, restoration is reality. Wellbeing is a value, getting old is ok, there are less illnessess.	
Unidentified				
	Sunny, warm and clean	Simply value simplicity more / the system encourages simplicity	accepted climate change and truths about what causes it and a genuine desire to live better, respect, reproduce and preserve nature and a relationship with nature that takes into account people, houses and technologies	
	Pure	a richer cultural sense of community where nature is taken care of every day;	Unhurriedness, fellow creatures and nature	Mother Earth Nature's "faith" replaces belief in technology

	Greener	Outwardly, not many changes, time has stood still	Awakening to the fact that this is the only world and continuing on this path will lead to inevitable destruction	A value base that respects life in all its forms and all ideas: finding commonalities and also drawing on the past, from which strength, values, perspective on why this should be done.
	Shiny and beautiful	The relationship between well-being and material values has changed, material wealth is no longer pursued, but nature and people are at the centre	Each of us is equal, precious + love for everything present and visible	The story of Narcissos ditched
	Nature is green and there are more plants	people have started to seek lower economic growth, and national product is also measured by well-being	respect for one another	Together we are more
	brighter and looser, people see each other, care about each other	Attitudes towards consumption and recycling have changed, nature and sustainability are at the core	We are looking for operating methods that balance consumption and the use of natural resources. Values the community, biodiversity and the use of technology to increase well-being. There has been a shift from individuals to the well-being of the community	Myth: continuous economic growth increases well-being
	Nature is more diverse and healthier	Science has advanced to the point where renewable energy and materials are widely and cheaply available	Man is part of nature and nature is part of man - balance	OUM
	big cities no longer exist	Communities take care of each other	Preserving biodiversity is the first priority of technological development	The starting point has been communities, borders have created an image between people, even though we are one entity. Myth: man is separate from

				others and from the rest of the environment.
	Snowy and peaceful	Connection among all living things	People do not see themselves as detached, a change in individualistic values. All are part of a holistic whole,	Man, and nature are one
	Harmonious	Society is led with empathy and more sustainable values	All living things are manifestations of the same / appreciation and respect	It is believed that plants, animals, people form a symbiotic whole, that is, if you harm a single part in this symbiosis, others will also suffer. Man is no longer the "supreme of creation."
	People are in a park and talking to each other. Some are using a holographic machine to talk in digital realm. Nano technology is very advanced. All cars are electric, no fossil fuels.	The importance of ecology has been taken into account in everything. Nature is in its natural state	trust in others, in the world, in the good	The Big Bang myth, vibration
		Multichannel communication, vibration, music, sound color	less is more	
		Technology serves to maintain biodiversity	understanding nature and its renewal	
		A more minimalist world, less need and need		
		Technology is an integrated part of the whole		

Appendix 4 Recognized knowledge, skills, competences and changes needed in a regenerative society

Table 4 Recognized knowledge, skills, competences, and changes needed in a regenerative society

	Knowledge	Skills	Comptences	Changes and observations
Lithany	Biology, selfknowledge, Suffient knowledge to create technologies that are infavor of biodiversity	Collaboration, Communication skills, Creativity, Critical thinking Digital skills 4.0, Emotional skills, Independent thinking, Listening skills, Problem-solving, reasoning, renessance of metaskills, renewable energies, Resource management skills: saving, conserving, sharing, skills to evaluate impact, Skills to understanding nature, Social skills. Strong basic skills, Technology skills, Wellbeing skills	Development of systemic thinking, empathy, GreenComp skills: values, understanding of complexity, visions and action, Hope and trust/belief, Open-mindness, Respect, Seeing connections between nature and humanity, Valuing nature and humanity	Innovations are tested in schools, Moving without technology, porosity and loosness to allow meeting. Skills are closely related to one's position in the local community, Values that support stop hurrying
Systems		Collaboration / dialogue / listening skills, Communication skills - digital tools assisting, community skills, Critical and analytical thinking skills, Development of thinking skills, Dialogy methods, evaluating impact on all levels, finding similarities, Integrated technology skills, Interactive skills, More internationalization skills, Natural science skills, Organizing skills are important to get the country's system to work, Philosophical / ethical thinking skills, Reciprocity, Skills to adapt, Skills to constuctive disagree, Skills to get	Adaptability, Agency, Agency / activism / change making, Competence to survive in nature, Competences to evaluate ones ego and its impact, Competences to give up and create, Conviviality, Digitalisation in measuring wellbeing, Learning and developing together, Medical sciences integrated to technology, Meditation, Responsibility Science and research are crossdiscliplinary, Sharing and Exchange economy,	Appreticeships training possibilities are secured between companies and municipalities, Development based on personal abilities, Educational settings, Everyone can participate based on abilities, Families teach communality and collaboration skills, Families, schools and communities in closer co-operation, Individualised learning, Personality traits instead of skills & abilities, Structures for dialogues, Teacher’s role change, work on personality rather than on

		along, Skills to see the big picture, Systems thinking, Well-being skills	Understanding impacts of own activities, valuing what we have	skills, The whole education system, incl. early childhood and both formal and nonformal learning
Knowledge		Skills	Comptences	Changes and observations
Worldview	Cognitions and selfknowledge, Evidence based teaching, Knowledge about "the regenerative world", Posthumanistic, Science, Synhtesis of known truths.	Being able to work together, Communality, Complexity thinking, Deconstruction, Eliminating waste, (leaned), Inductive & deductive reasoning, Intelligent use of technology (hacking, creating), Less is more, Observation, Relationship skills, Sharing and renting culture, Trust	Compassion and empathy towards the people and other living creatures and non-living locally and beyond, Curiosity, Doing good to the world brings more good, Everyone is valued, Feeling safe, Filantropy, selfishness is diminished, Strong community values, Sustainability values including environmental, social, cultural and economic aspects, Valuing collaboration	Shared understanding as basic education functions, Balance between self-direction and community direction, Compulsory education both in buildings and in VR, Continuous learning, Everyone has something to give, Holistic, Learning those skills required is not traditional learning from school etc, it's will to change the world together, To have a united equal universe We are all equal. No one needs special rights. People value different kinds of opinions, can feel free. Philosophy needs to improve with the same pace that technology is moving forward
Myths and metaphores	Complexity, Alternative truth rather than conspiracy theories Cross-discliplinary sciences, Equality, Humility, Intersectional and holistic perspective,	Ethical skills, Interaction skills, Visualisation, Accountability skills, Allowing everyone to live i their own way, Botany, Care, Caring of others and nature, Carpe diem, Communication, Communicational skills with the nature, Community skills, Complex thinking, Conflict resolution skills, critical and analytical thinking, Developing	Self-love, Ability to critically view your own values and motivations, Balance, Circulation, Collectivism, Communality learning, Competences to state one's opinions, Creative dreamers, Explorative thinking, Fostering democratic values, futures literacy, Equality, peer- learning	A famous speech of a politician that connects the nation and make the nation to be united. Songs singing about equality and encouraging for difficult choices people to make. apprenticeships training is valued. Art plays an important role in the scene. Song and myth should be

	Knowing yourself, Political and civic knowledge and skills, Science/evidence-based education, Well known rules and responsibilities	capabilities, Developing technology, digital skills to learn, diversity, growing as a human (mentally physicaly, socially, holistic thinking, life skills (caring skills, building/fixing skills, Imagination, meditation/ joga, Veda, mind control (to manage stress, desperation, to be changed to survivalism and positive thinking, mindfulness, Money comes and goes, don't collect a fortune, rather live the moment, Negociation skills, Open mindness, Organic farming, Patience, Peacekeeping, Real hand craft, Recognition of capabilities, Recognition of values, Schools should teach mind management skills and mediation, Self-control skills, Sharing economy skills, Skills to crossdiscliplinary thinking, Skills to find similarities rather than differences, Skills to restore, Skills to survive in the nature, Skills to understand needs of animals and nature, Suffisient skills to take use of technology, unity thinking, wellbeing skills	on society level, Hope, Love, Prioritizing, Resilience, Safety, Self-confidence, Self- development, Shared responsibility, Shared values, Softer values, Structures and values of soceity need to change to support the change, Team players,	created. ability to critically view your own values and motivations. Safety, whole community raises, Alone you can go fast, togehter far. Two wolffs, a good and a bad one, the one that is fed wins.