



# De-schooling

## the Education System

Valentina Auer  
Masters | MASD 2020

Sustainable Education through a playful approach

‘De-schooling the Education System – sustainable education through a playful approach’ follows and builds up on previous research from the sustainable design presents, futures and studio modules. This workbook aims to summarize and conclude earlier design research, answers new research questions about education and delivers an overview of design outputs and measures of success.

Focusing on the British and Austrian (primary and secondary) education system, based on the experiences and familiarity from the researcher, this work opens a critical discussion about the equality, quality, and value of public schools as well as a critical observation of the Sustainable Development Goals (SDGs) and ‘STEAM’ education models. Through primary and secondary research throughout the MA Sustainable Design course it was possible to gain a broad knowledge and insight into the field of education. During the course, and with the impact of COVID-19, the subject got more importance and relevance and showed how impactful a qualitative learning environment and method is for the future society. The research touched various disciplines, including ‘unschooling’, ‘pedagogy of the oppressed’, individuality and different intelligences, alternative pedagogy methods, ‘decolonization of the curriculum’ and ‘decolonization of design’, racism at school, communal learning, and the importance of learning through playing. Furthermore, the design outputs will be critically reviewed according to the ‘key values of education’ defined by the researcher.



Fig. 1. Portrait

# Valentina Auer

## Designer Statement

Valentina has a first degree in Design and Product management with special focus on interior design. Her passion is to make people's everyday life better, more sustainable, and smarter. Therefore, she focused on biomimicry, emotional durable design and systems thinking through her studies and career.

During the MA in Sustainable Design her focus changed from more practice-based design to critical design research. Most of her current work has focused on how to make education for children more sustainable. The subject touched many areas within public schools, alternative pedagogy methods and home education as well as the impact of COVID-19 on the education system. Through primary and secondary research Valentina created a network of people who influenced and accompanied her design research outputs. Together with a student at the school of education in Austria she develops a game that focuses on equality, critical thinking, systems thinking, self-directed learning, individuality and creativity and can be used in a schooled and unschooled environment. She is trying to build a bridge between the unschooling and schooling and to address the real value of learning and education, to make it an equal system that fits with the 21st century.

She defines herself as a social designer with focus on systems thinking and design thinking. Her work aims to critique the equality and sustainability of the education system and creates discourse and dialogues. Valentina's output is focusing on using games, illustrations and pedagogy as links between the theoretical context and design approach.

Valentina was born and raised in Austria, she likes to challenge herself with new knowledge and enjoys designing with and for children of all ages.

# Statement of Intent

## Introduction

As one of the 17 UN sustainable development goals, education is an impactful and very complex topic to face. Since children are going to be the next generation who have to embrace and live in a circular system shifting away from a linear one, their knowledge and understanding of sustainability must be focused on.

Even though many researcher and educator have criticized and reformed the education system it is still not sustainable and valuable enough for a society facing problems of the 21st century. The project seeks to find practical and playful approaches through design to create a bottom up and not top down shift in the system. It is not about WHAT children get mediated, but HOW educators are communicating knowledge.

## Output

The work about 'de-schooling' education is based on theoretical research, including interviews and talks about decolonization, unchooling and schooling. The context concludes with the following outputs:

- A workbook with a summary of the research (theoretical context, importance and motivation) and the design outputs
- A prototype of "Musu.Bi" - an educational game about experiencing different learning methods and focusing on individual interests for schooled and unschooled environments.
- "De-schooling education" website to communicate the project
- Participation at the end of year show from the School of Architecture and Design
- Workshop at the Summer School for the University of Brighton in July 2020
- Drop Out New Minds 2020 Talk with an Art student from Edinburgh and Drop Out Co-founder about the project in combination with mapping and critical thinking.
- An offer from the Global Grad Show 2020 to apply with the project and be part of the exhibition
- A PhD application for the AHO Systems Design course in Oslo focusing on the implementation of systems design in education for younger generations and designers.
- Critical review of already existing games and the produced design outputs

# Research Question

The overall research question of this design research project is:

***How can design help to make the education system in the UK and other countries more sustainable, adaptable and resilient?***

Issues of particular concern include: decolonizing the curriculum, equality, critical thinking, empowering parents, bringing education to the most vulnerable and putting the learner first.

Taking up from previous project the main research questions for this particular module are:

***What is the value of schools in the 21st century in the UK and countries with a similar education system?***

***How are the design outputs from previous modules fitting with the critical context and adding value to the education system and society?***

## Target Audience

Since this project includes theoretical design research and practical design outputs, there are two different categories of target audiences to define. First, the target audience for the theoretical context are fellow designers, educators, artists and innovators who are working within an educational and social change context. The various design outputs are targeted for children, educators, parents, critical thinkers such as designer, artists and innovators.

## Engagement with design research

The project in general is done through design research as it focuses on primary and secondary research and methodologies. Literature studies and interviews about education and the interaction of design in this topic are building the theoretical context. The outputs are engaging into design research as they are reflecting on the theoretical context and outputs that have been defined. The project is based on sustainable design, critical and discursive design, systems design and to some extent transformative design as it tries to create a transformation within the education system.

## Engagement with design research

This module aims to engage with the education system through design by looking at various aspects of schooling and unschooling and combining those two worlds to lead a path towards a more connected and sustainable society. This was achieved by research into unschooling and schooling through primary and secondary research. Furthermore, the research has defined gaps and opportunities for design to intervene and create tools that change the way children get taught nowadays. Especially the game “Musu.Bi” as a final design output is addressing a niche in the education system and analysis of the field shows that there is an urgent necessity for this idea.

The research is focusing on Play and learning; unschooling (home education), schooling; Impacts of Covid-19; Inequalities, Racism, Decolonizing the curriculum and design; Collaboration and communication; Games design and what impact design can have in the system. All these categories are influencing the design outputs.

# Key Comparators

Due to the variety and importance of education the project has many different comparators from individual fields. Alternative pedagogy, decolonization, racism and equality, politics and the impact of COVID-19 have influenced the context. For the design output game designers, playful learning and gamification as well as advocates for the 21st century skills will be comparing with the project.

The input about playing and learning from **Stuart Brown**, *The institute of play* and *Quest schools* have inspired to create an educational game as core research output. Several games from different designers and educators have been analysed, compared and reviewed and will be mentioned as key comparators later.

**Eve L. Ewing**, a female black activist; *Black lives matter at school*, a collaboration amongst black teacher in the US; *The black curriculum*, the UK equivalent to the model from the US and the Australian design institution *Relative Creative* focusing on decolonization of design have coined the importance of equality within schools and the education system and are key comparators in the discussion about racism and fairness. Through attending online summits and presentations, an organization from the US (**OpenIDEO**) and one from the UK (*Tortoise*) became key comparators as well. They are critiquing and influencing the education system in a similar way; especially the *learning reimagined* report by OpenIDEO is very similar to the work that Valentina is doing. With asking critical questions about the system and giving speculative design opportunities targeted for educators for the future after Covid-19 they are trying to change the system already.

Particularly for this module another comparator is **Kathrine Riley** who sees schools as a place of belonging and therefore explains the meaning of school, among others, very well. Throughout previous modules the research has mostly been inspired by alternative education advocates like **Paulo Freire**, **Ivan D. Illich**, **John Holt**, **Stephen Sterling** and **Howard Gardner**.

**Helen E. Lees** is working with a similar approach of researching about home education and how it can impact the traditional education system.

## Measures of success

- Critical engagement with the current education system and questioning its effectiveness and value
- Attention from experts who are either working in education and/or design
- Positive and critical feedback from collaborations and testing of the design
- Identifying future possibilities to shift the system towards an equal and sustainable system
- Opening discourse about the capabilities and knowledge a future society needs
- Showing the importance of learning in- and outside of school and offers possibilities to access the communal knowledge
- Acknowledging the decolonization of design and the curriculum and reflect the important outcomes of the research in future work and design proposals

# Contents

Designer Statement

6 Statement of Intent

14 Introduction  
Research Output

26 Theory & Methods  
Design Thinking  
Collaboration  
Interviews, Talks and Playtesting  
Literature Research

36 Context & Motivation  
Why Education?  
Focus  
Unschooling and Schooling  
What are Schools for?  
School is political  
Teaching for the Future  
Discourse  
Design Approach  
Values of Education

56 Design Outcomes  
A game to de-school the system  
Musu.Bi - Learning to Explore  
De-schooling Education Website  
Summer School  
New Minds 2020  
Global Grad Show 2020  
PhD Application

116 Conclusion & Futuring  
Research Questions  
Conclusion  
Personal Conclusion  
What's next?

124 Bibliography & Appendix

# Introduction

A project about how to make the public school system more valuable for children to create a sustainable future society through a game that is focused on sustainable education.

Thinking about sustainability and why our society isn't acting more respectful towards natural environment and social relations, the core of this issue could be possibly found in education. As one of the 17 UN sustainable development goals, education is an impactful and very political topic to face. Since children are going to be the next generation who have to embrace and live in a circular system shifting away from a linear one, their knowledge and understanding of sustainability must be focused on.

Looking into unschooling, decolonization and the real value of school the research leads to design proposals for possible solutions. The term 'de-schooling' will be used to define the approach of the designer following Ivan D. Illich's "De-schooling society" philosophy. The designer seeks to develop a game that can build a bridge between the spirit of home educated children and a schooled environment. The focus is on equality, the 21st century skills (highlighting communication, collaboration, creativity and critical thinking), individuality and self-directed learning.

The workbook is defining the value of education using the following key words:

*INCLUSIVENESS/EQUALITY, PLAY AND ENJOYMENT, COLLABORATION, COMMUNICATION, CREATIVITY, CRITICAL THINKING, INDIVIDUALITY, SYSTEMS THINKING, SELF-DIRECTED LEARNING, COMMUNITY*

Design research outputs are going to be critically reviewed using the defined values above about how the researcher has used these in the development of the designs but also how the designs reflect and encourage those to other people.

# Research Output

**“The biggest advantage and ‘super power’ of design is to gain knowledge, take the necessary information and then make something that actually makes people’s life better.”**

*Dori Tunstall, Respecting our Relations, 2019.*

## Workbook

The following workbook gives an overview of the whole project taking up from previous modules. It aims to show the connection between research and design, how the researcher included the findings in her design outputs and engaged with the defined conclusions about de-schooling education.



## Musu.Bi – learning to explore

Building up on the theoretical context from former modules of the course, the research motivates to create a tool or device that can be used to implement a de-schooling spirit into the education system. Since the focus is set on equality, playful learning, individuality, collaboration and creativity it was the best to conclude with the development of a game that engages with these values. In collaboration with the Miss Elena Hirsch, a student at the University of Education Stefan Zweig (Pädagogische Hochschule Stefan Zweig) in Salzburg, Austria, the board game “Musu.Bi – learning to explore” has been developed. Input from experts and peers and playtesting with the target group have improved the ideas and visions of the two students with different backgrounds as well. The game is the main design output of the sustainable design master project. Not only the final result, but also the journey of development from the designer and researcher herself is influenced and motivated by the theoretical background. Main goal of the game is to find all the missing parts of Musu.Bi the robot, who has been destroyed due to a storm, through exercises that helps them to become an expert in a topic of the child’s choice. Children are exploring a foreign planet to find missing parts and only through collaboration they can find them all. Each child has chosen an individual topic of interest and will get tasks and challenges that brings them further with their research. Targeted for children aged 10-12 years in a schooled or home educated environment, this game helps to include the real values of education in the 21st century. The workbook will discuss the game in more detail with research background, creative execution, playtesting, and final design proposals later on.

See page 65

## End of Year exhibition and project website

In addition to the studio workbook and for the online “End of Year Show” from the school of Architecture and Design at Brighton University, the website “de-schooling education” has been developed. The purpose is to mediate the research and its outputs in a clear and attractive format to reach a broad audience. The online portfolio of the project gets updated constantly with every new research input and design output. The end of year show has proofed that this project and the homepage are very successful and trigger a lot of discourse in academic and creative environments. Through this the researcher has been contacted by several people about her project, amongst others by Drop Out – New Minds 2020 and the administrator of the Global Grad Show 2020 in Dubai.

While the information on the online exhibition website from the University is more like an introduction of the project, the project website offers a lot of detailed information for anybody who is interested.

The website can be found via this link <https://lauerva29.wixsite.com/deschoolingeducation>

See page 105

## New Minds 2020

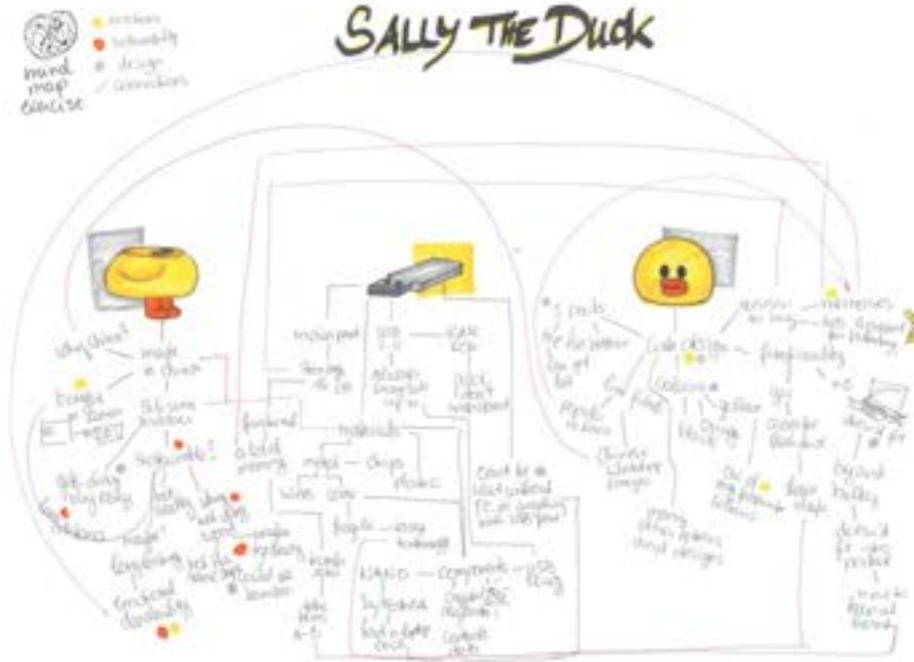
Through the online exhibition the project got discovered by a British platform called “Drop out” which focuses on approaching and solving problems through creativity. They are recruiting the brightest and best design and arts graduates from all over the UK to participate in their annual “New Minds” project which aims to connect students and their projects to create a big network of innovative creatives. They reached out to Valentina and encouraged her to apply for this year’s discussions. Together with Sofia Hallström, a fine arts student from the University of Edinburgh and Ollie Nicholas, co-founder of Drop Out they had an inspiring, provoking and motivating discussion about mapping, education and the future of creative studies within Corona.

The talk has been recorded and can be found at:

<https://dropoutmag.com/featuring/new-minds-2020-valentina-auer-sofia-hallstrom/>

See page 111

## Design Task - Example



Object: USB Flash Drive

 University of Brighton

Design for a Circular System | Task Summer School 2020

## Summer School Workshop

Conducted by the University of Brighton and recruited as a student ambassador, Valentina got the opportunity to be part of the summer school in July 2020. Through this research project and previous experience the researcher got hired as a *super ambassador* of the school of architecture and design which included the creation of summer school materials and a specific workshop for product design. Due to the impact of Covid-19 the summer school was online, and presentations had to be previously prepared and recorded. The workshop introduced the participants into the product design process, focusing on design thinking, complexity and wicked problems within design and mapping. Their task was to create mind-map of a product of choice to engage with the object and observe how something simple can turn out to be very complex. Within this map connections of the whole system surrounding the object have been made and categories should be defined about what influences a designer can have. The participants got several research materials provided (Ted Talks and research papers) and they had two days to accomplish the task. This workshop has shown the potential interest into design of young people and their engagement with creativity and complexity.

See page 107

## Global Grad Show 2020

*The Global Grad Show* is an annual exhibition of design and technology students occurring in Dubai, United Arab Emirates. 100 students of design and science courses from all over the world get the chance to exhibit their project to a broad and social innovation focused audience, including a prize of 10.000 Dollar for the best project amongst those. Valentina got contacted by one of the administrators of the Global Grad show with the purpose of encouraging and motivating her to apply for the exhibition as her project seems very promising and important for social change innovations. They caught her attention through the online end of year show from the school of Architecture and Design.

[See page 113](#)

## PhD application

As this project would be interesting and promising to develop further, the decision to apply for a PhD was made. The AHO in Oslo offered a fully funded PhD position within their 'Systems Oriented Design' course. Since the researcher is critiquing and observing the education system, the call for this position seemed to fit with the vision to develop the project and ideas further. The proposal included discourse about the education system in general but with focus on the education of interior design and design in general. The application is part of the research process and output because it focused on the importance of systems and systems thinking within design.

[See page 115](#)

# Theory & Methods

The following research of this Master module project follows the outputs and findings of the previous “De-schooling education” project from the Studio module. Furthermore, earlier research, such as “Sustainability in education for sustainability” and “De-schooling school” built a base for this module output as well. Research questions have been newly defined, but the core idea and motivation will be taken on from previous work. The workbook describes how the learning outcomes and design research influenced the design process and future work and pictures the growth of the researcher within the project. Context and motivation will be discussed in the following chapter.

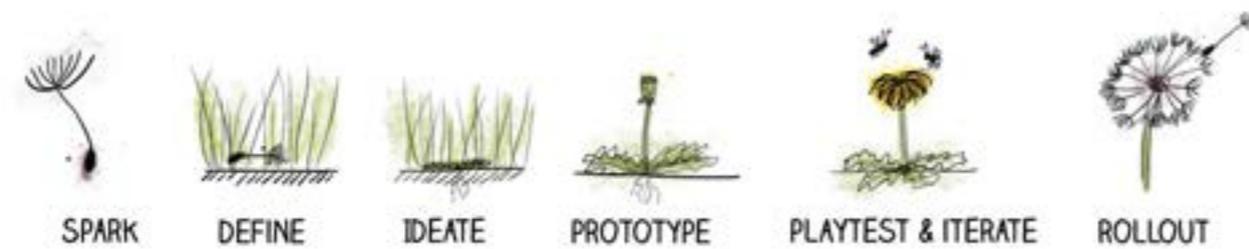


Fig. 4: Design Thinking

## Design Thinking Process

The goal for the Master course was not only about design research and a theoretical piece of work but also a practical and physical output. Especially the game, but also other proposals and ideas, are following the design thinking process. This particular process of project development used in several disciplines apparently got detached from the work progress of a designer. Design thinking is human centred, collaborative, optimistic and experimental.<sup>1</sup> For a sustainable design it is necessary to bring this attempt of designing back into the practical work.<sup>2</sup> Especially for systems designer it is an important “tool” to use.<sup>3</sup>

<sup>1</sup> OpenIDEO with imaginable futures: “Learning Reimagined: Radical thinking for equitable futures.” 2020.

<sup>2</sup> Sevaldson, Birger. Redesigning Systems Thinking. Form Akademisk - forskningstidsskrift for design og designdidaktikk. 2017. DOI: 10.107577/formakademisk.1755.

<sup>3</sup> IDEO LLC.: “Design thinking for educators” 2012.



Fig. 5: Collaboration

## Collaboration

As one of the learning outcomes for this module as well as the Studio module was focused on collaboration within the project, the researcher decided to create a game together with an expert about the education system. Collaboration is one of the skills that are necessary for a sustainable society and especially for sustainable design.<sup>4,5,6,7</sup> The collaboration in this case is between two students. One is the student of sustainable design, leading the research, game design and development and the core ideas for the game. The other one is the student at the school of education in Austria, offering expertise from the view of a teacher-to-be, gathering ideas that are attractive for the schooled environment and research about what is already available and what is missing in the system. Both are very creative minds and through the influence of Valentina, the teacher-to-be got a critical view about her profession as well and is motivated to work with a different approach within the system. The collaboration will be described in detail in the chapter “Design Outcomes” where the complete process of the game development is discussed.

4 Auer, Valentina. “De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society”. Sustainable Design Studio workbook. Brighton, 2020.

5 Auer, Valentina. “Sustainability in education for sustainability”, Sustainable Design Presents workbook. Brighton, 2020

6 Rotherham Andrew J. and Willingham Daniel T.: “21st-Century Skills Not New, but a Worthy Challenge” American Educator, Spring 2010.

7 Thoughtful Learning: “What are 21st century skills? 2020.



Fig. 6: Interviews

## Interviews, Talks and Playtesting

Beside the collaboration in the game development the project led towards more communication with people inside and outside the course at University. The previous design research focused on interviews with parents and children from home educated and schooled environments. Their opinions and the conclusions after analysing the interviews led to the idea of creating “Musu.Bi”. After accomplishing the first drafts the researcher reached out to experts about systems thinking, decolonizing design and creating games for a social change within these fields. Furthermore, drafts and ideas have been presented to other teachers and game developers to get more input and critique for the development. The home educated families from previous interviews have been introduced to the outputs as well and after all this communication and collaboration it was clear that the project has a lot of value for a broad audience to offer.

The first prototype of “Musu.bi” has been playtested with children as well as it is necessary for an excellent and promising game design.<sup>8,9</sup> It is important to mention here that due to Covid-19 it was more complicated to collaborate, especially when talking about design ideas and prototypes. But thankfully to the community within the sustainable design course the researcher got a lot of contacts and took advantage of the broad expertise of their peers. The research is following the ethics application from earlier modules and is seen as design development within the same measurements and aims. As education is a topic everybody has experience with it was not that hard or complicated to find people who are willing to collaborate.

<sup>8</sup> Deej Johnson and Billy Langworthy: “The snakes & ladders of creative thinking”. London, 2019.

<sup>9</sup> Institute of Play “Q Design Pack – Games and Learning” 2020.

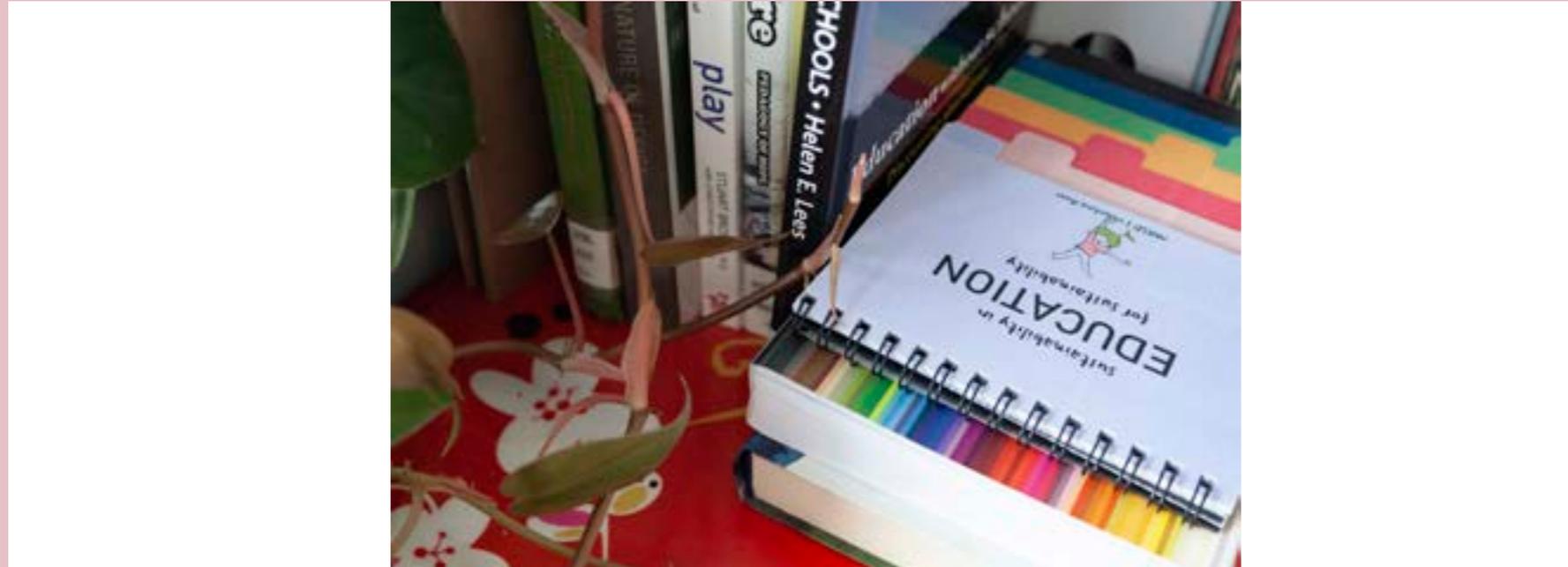


Fig. 7: Literature

## Literature Research

Along with all the research methods and knowledge gathering above, the core information has been taken from already existing literature, online live talks and discussions about the education system. Taking on from the Presents, Futures and Studio module, the list of references has expanded a lot and is still growing. Especially with the new input due to the discussions around Black Lives Matter and the Covid-19, it is a never ending learning and researching process. The theoretical context as well as the design outputs built up on the findings from literature reviews, exhibitions, talks and discussions.

# Context & Motivation

*“Good design entails research. Good design equals research. We owe it to the field to reflect on our own practices, again and again, and to investigate every component, again and again. Design requires a constant research of new idioms, a battle against presuppositions, a push of the limits, and the continual refinement of responses to fundamental questions, like ‘What can design add to the world of plenty?’ and ‘What is functionality in the here and now?’”*

*Hella Jongerius & Louise Schouwenberg, Beyond the New: a search for ideals in design, 2015.*

## Why Education?

Thinking about sustainability and why our society isn't acting more respectful towards natural environment and social relations, the researcher thought that the core of this issue could be found in education. Since children are going to be the next generation who have to embrace and live in a circular system shifting away from a linear one, their knowledge and understanding of sustainability must be focused on. Education, and especially school, is the perfect place to achieve a change.<sup>10</sup> The problem with the current education system is that it is built on a capitalist and linear model from the industrial revolution. Everybody has to learn the same, has to achieve the same grades through standardized exams and has to function like a puppet in a rotten system.<sup>12,13</sup> The future of education is not about *WHAT* children get mediated, but *HOW* educators are communicating knowledge.

Valentina is not the first one who is addressing this issue. Already in the early 20th century alternatives to the public school system evolved, like Montessori or Steiner Waldorf schools. Changing the curriculum won't change the system therefore it is time to explore this topic further and figure out how design can intervene towards change.<sup>14</sup>

This project is going to mainly focus on the equality of the education system followed by keywords such as collaboration, communication, creativity, critical thinking, systems thinking, individuality, self-directed learning and the enjoyment of learning.

<sup>10</sup> Kate Candy at Tortoise: "Tortoise Education Summit". Talk about "How do we break the link between inequality and educational outcomes?". June 23, 2020.

<sup>12</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>13</sup> Auer, Valentina. "Sustainability in education for sustainability". Sustainable Design Presents workbook. Brighton, 2020.

<sup>14</sup> Auer, Valentina. "Sustainability in education for sustainability". Sustainable Design Presents workbook. Brighton, 2020.

## Focus

As issues and flaws in the education system can be found all over the world, it is still not possible to generalize. It would be paradox, ignorant and not sustainable to talk about decolonization while trying to develop a *one-size-fits-all* design proposal. Therefore, the following research and design outputs are focused on the British and Austrian primary and lower secondary school system, as they are the ones the researcher is familiar with and both are using a national curriculum and have similar structures and grading systems.<sup>15, 16, 17</sup> Of course they are not the same and there are some differences to be noticed, for example school in Austria is compulsory for 9 years, only 8% of schools in Austria are private and the school models and subjects in the curriculum differ from the British ones.<sup>18</sup> It is not possible to take one functioning system and bring it to another country. For example the Finish school system is one of the best in the world, not only because of PISA results but because teacher are motivated, highly qualified, respected and well payed members of the society. Finland has a different approach towards education, and a different culture and life spirit. Their system would fail in another country if it would be copied somewhere else.<sup>19, 20</sup> Designing globally can be very dangerous, therefore it is better to focus on a small area and not try to create something that won't be valuable for any culture or system.<sup>21</sup>

The focus on primary and lower secondary schools, so children between 7 and 12 years, has been set because of previous research about when children develop the most skills, still are willing to learn from an authority but at the same time are able to learn self-directed and are motivated to improve themselves.<sup>22</sup>

<sup>15</sup> UK Government online: "The national curriculum". www.go.uk. United Kingdom, 2020.

<sup>16</sup> Department of Education "The national curriculum". United Kingdom, 2013.

<sup>17</sup> Bundesministerium Bildung, Wirtschaft und Forschung: „Volksschul-Lehrplan“. www.bmwbwf.gv.at. Austria, 2019.

<sup>18</sup> Internations.com: "A Comprehensive Guide About the Education System and International Schools." Education in Austria. 2020. a

<sup>19</sup> Tortoise: "Tortoise Education Summit". Talk about "Which is the best education system in the world?". June 23, 2020.

<sup>20</sup> Forum Umweltbildung: „Bildungswellen: Ein Podcast zu Bildung und Nachhaltigkeit. Folge 2: Komplexität will gelernt sein“ Podcast with Rolf Jucker. Vienna, March 27th, 2020.

<sup>21</sup> Jacobs Intitute: "Respecting our Relations: Dori Tunstall on Decolonizing Design". Medium, January 31, 2019.

<sup>22</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.



Fig. 8: Unschooling

## Unschooling and Schooling

Focusing on alternative pedagogy methods in previous projects has helped a lot with identifying the issues modern society is facing with the education system. Exploring the unknown topic of 'unschooling' and home education opened so much new discourse and need for change. Schooling and unschooling have both advantages and disadvantages but if we could combine these two models it would help towards educating a more sustainable society. Especially the approach of individuality, self-directed learning and tailored learning methods to each child are promising and necessary to include in a schooled environment.

In Austria home education isn't a very common option as school is mandatory for several years but in England the number of home educating families is steadily growing. It shows that more people are not comfortable with the education system and want to take it in their own hands how their children are gathering knowledge and skills.<sup>23, 24</sup> Whereas the importance of school, the community and safe environment and the structure within a schooled system are important for a child as well.<sup>24</sup> Both systems are lacking one main thing: equality. To take your children out of school and educate them at home in a safe and tailored environment is a privilege not every family can afford. Most parents also don't have the courage or motivation to teach their children and it involves a lot of additional costs since there is no funding from the government available.<sup>26</sup>

The inequality within the traditional education system, especially in the UK, is enormous. It starts with the various choices of different school models, private and state schools. Most of the private institutions are not affordable for middle class to low income families, and families with migration background and/or of colour will find it even harder to send their children to private schools.<sup>27, 28, 29, 30</sup> The impact of Covid-19 has highlighted that within the same classrooms there are inequalities according to the socioeconomic status of families.<sup>31, 32</sup> Only 50% of all children around the world could have access to online distance learning during the pandemic for example.<sup>33</sup> Education is not a privilege, it is a human right.

<sup>23</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>24</sup> Gray, Peter & Riley, Gina. "The Challenges and Benefits of Unschooling." According to 232 Families Who Have Chosen that Route. Journal of Unschooling and Alternative Learning. 7. 2013

<sup>25</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>26</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>27</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>28</sup> Nuffield Foundation: "Secondary school admissions system is still a work in progress". Nuffield Foundation, June 11, 2020.

<sup>29</sup> The Black Curriculum: "The Black Curriculum", 2020.

<sup>30</sup> Tortoise: "Tortoise Education Summit". Talk about "What should we teach?". June 23, 2020.

<sup>31</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>32</sup> Tortoise: "Tortoise Education Summit". Talk about "What should we teach?". June 23, 2020.

<sup>33</sup> OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

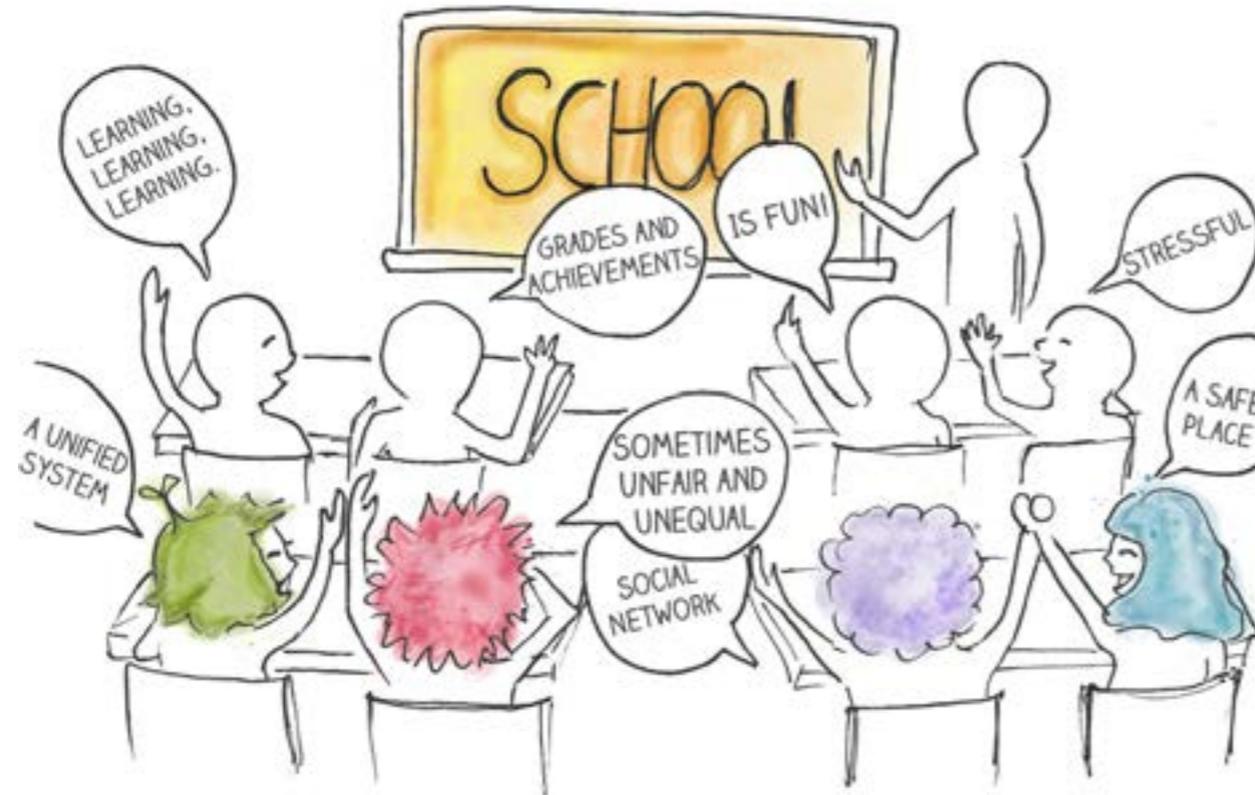


Fig. 9: School

## What are schools for?

Not everything about school, or schooling is bad. Contrariwise, it is a great idea of having a place where children learn together, get knowledge and skills communicated and where they are safe and well protected. The reality looks a bit different, and this has to do with the system itself. The education system could also be called exam system as there is not much focus on the actual development of children's knowledge and skills.<sup>34</sup> As mentioned earlier, different education and school systems seem to work better; it has nothing to do with the basic idea of schools. Especially in less developed or economically poor countries the institution of school is important for the families.

The Covid-19 pandemic with closed schools and children being stuck at home has highlighted this even more.<sup>35,36</sup> Schools are places of belonging; Kathrine Riley has coined this statement, and says that "schools can - and should be - places of wonder, excitement and joy, places that bring young people together, places where they feel a sense of welcome and inclusion." (Riley, We're a long way from sense of belonging, page 22) Trust, social interaction and community are the main indicators of success for schools in the future.<sup>37,38</sup> School has to be for and with the children and not only 'about' them. Inclusion is a very important keyword, children must feel included, heard and taken seriously. Teacher have to adapt to the needs of the children, the curriculum should be made together to really focus on the needs of both included parties, the teacher and the students.<sup>39</sup> For example in Chile in high poverty schools, a principle doesn't allow the teacher to give the children homework as it can create conflicts at their home environment.<sup>40</sup> They are looking at the social environment of the schools and adapting the system accordingly. Decolonization is a keyword in this case, but also the inclusion of the community.

The Covid-19 pandemic has forced families to 'home educate' their children, and the researcher wants to pick up a question from the openIDEO report about reimagining school after Covid-19: "What if homeschool becomes the new school?" This could be possible indeed at least for the next couple of years. Particularly for families whose children don't get equal opportunities in education caused by migration or socioeconomic backgrounds, this option could be very attractive.

<sup>34</sup> Riley, Kathryn: "We're a long way from a sense of belonging". Tes Scotland, June 7, 2019.

<sup>35</sup> Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>36</sup> OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

<sup>37</sup> Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>38</sup> OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

<sup>39</sup> OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

<sup>40</sup> Riley, Kathryn; Carmen Montecinos and Luis Ahumada: "Effective Principals Serving in High Poverty Schools in Chile: Managing Competing Realities" EDUHEM 2016, Almeria, Spain, 2016.

## School is political

Education has to be done together, we can learn a lot from each other. No matter the social background, age or profession. Teacher need to be treated with respect, even more respect than they are treated at the moment, but they also have to be trained accordingly to achieve a qualitative teaching.<sup>41</sup> The education system in most countries, also the UK and Austria, is very political. Sadly, education is often used as a political weapon without thinking about the benefits or threads for the people who are actually involved in the system.<sup>42</sup> Attending an education summit conducted by “Tortoise” and listening to a talk by John Johnson, the education minister of the UK, proofed this assumption. Sadly, if the basic mechanisms from the government do not exist, then no change in the system will happen.<sup>43</sup>

Very recently the relationship between government and schools has caught attention again due to the crucial A-levels grading algorithm based on past performance used in the UK. Students and parents are raising their voice against the government as the algorithm downgraded especially pupils from state schools and schools with high students’ numbers. Again, the inequality among the British education system has been pictured perfectly. Using statistics instead of human judgement isn’t always the best solution. The system has failed, people are protesting, hopefully the government will learn a lesson from this drastic mistake that influenced millions of A-level students across the country for their future educational path.<sup>44, 45, 46</sup>

Right now, the European governments are all preparing the system for the time after the Corona pandemic, if they will change it for good or bad will be shown soon enough. A lot of money and time has been invested in technology and buildings but not into people, into the education of teacher. We need an education system that is worth to be trained for.<sup>47</sup>

---

41 Tortoise: “Tortoise Education Summit”. Talk about “How to rethink education for rest of life?”. June 23, 2020.

42 OpenIDEO with imaginable futures: “Learning Reimagined: Radical thinking for equitable futures.” 2020.

43 Tortoise: “Tortoise Education Summit”. Talk about “How to rethink education for rest of life?”. June 23, 2020.

44 Busby, Mattha: “A-level students speak: ‘I always dreamed of going to Cambridge’”. The Guardian (London), August 15, 2020.

45 Summers, Nick: “How the UK’s algorithm-based grading fell apart”. Endadget.com, August 18, 2020.

46 BBC News: “A-levels and GCSEs: How did the exam algorithm work?”. London, August 20 2020.

47 Tortoise: “Tortoise Education Summit”. Talk about “What would a revolutionist education system look like?”. June 23, 2020.

“We are not preparing our children for the future,  
we are preparing our children to create the future.”

Yong Zhao, Tortoise Education Summit 2020



Fig. 10: Values

## Teaching for the Future

Through the studio module the values of education have been defined accordingly (see Fig. 10). Comparing them to the 21st century skills that are currently a highlighted issue in the national curriculum in England and Austria, they are quite similar and pretty much say the same thing. The 21st century skills are as followed:

Critical Thinking, creative thinking, collaboration, communication, information literacy, media literacy, technology literacy, flexible, initiative, social skills, productivity and leadership.<sup>48, 49</sup>

They have been always important, but they gain more importance as there is a lack of them being mediated in schools. Future jobs are focused on the mentioned skills above, and since we rely on the next generation of innovators, creators and workers, they have to be equipped accordingly.<sup>50</sup> One aspect that isn't mentioned in the 21st century skills and why the researcher insists to merge them with the previous defined values of education is systems thinking. Through systems thinking it is easier to understand and value complexity, and to live and act in a sustainable way we have to see the links between ecosystems and human societies. Therefore, it takes the most qualitative education to make this accessible for children from an early age on.<sup>51, 52, 53, 54</sup> Children can engage with systems thinking very well, especially through a playful way. But before that, educators have to understand it and understand how to mediate it to the younger generation.<sup>55</sup>

Today's schools systems are not designed to be compatible with these skills, teacher don't even have the skills themselves, how should they teach them to the younger generation then? It looks like a reform would be necessary but as so many reforms have already happened, nothing really has changed to improve better teaching and student-centred learning and including the 21st century skills so far.<sup>56</sup>

48 Thoughtful Learning: "What are 21st century skills?" 2020.

49 Rotherham Andrew J. and Willingham Daniel T.: "21st-Century' Skills Not New, but a Worthy Challenge" American Educator, Spring 2010.

50 Thoughtful Learning: "What are 21st century skills?" 2020.

51 Rotherham Andrew J. and Willingham Daniel T.: "21st-Century' Skills Not New, but a Worthy Challenge" American Educator, Spring 2010.

52 Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

53 Forum Umweltbildung: „Bildungswellen: Ein Podcast zu Bildung und Nachhaltigkeit. Folge 2: Komplexität will gelernt sein“ Podcast with Rolf Jucker. Vienna, March 27th, 2020.

54 OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

55 Institute of Play, "Q Design Pack – Systems Thinking", 2020.

56 OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

“We can’t solve problems by using the same kind of thinking we used when we created them.”

Albert Einstein

## Discourse

Including creativity more into the curriculum, one might think about the approach of STEAM (Science, Technology, Engineering, the Arts and Mathematics) education. Indeed, Arts has been added to the four main subjects Science, Technology, Engineering and Mathematics (STEM), but with little success. The system is under critics since many years already because implementing arts seems more like a decoration and quick fix solution, than actually focusing on the creativity of children. Also, within STEAM there are still no subjects about humanity included, such as Philosophy, Psychology, Ethic, History and Languages. STEAM is a first try of bringing arts and science closer together but once again the system isn't ready for this multimodal thinking.<sup>57, 58</sup>

The Tortoise education summit in June 2020, the Open Ideo Webinar about reimagining learning after Covid-19 and other online talks and conferences have shown that not many creative thinkers and people from outside the education system have been involved. Even though everybody has gone through education, whether home educated, lower and higher education or training in practical skills, it seems like only professionals and experts are suitable raise their concerns and thoughts about the system. Most of the ideas that were discussed during these online events sounded more like quick fix rather than long term solutions with sustainable outcomes for future generations. Innovators, like for example the chair of the Black Curriculum in the UK, raised their ideas and plans to the government and got declined for reasons that are indescribable. This is very alarming considering that black history is a fundamental topic that children must engage with growing up in a colonialist country.<sup>59, 60, 61</sup>

And apparently it takes a pandemic to let people wake up and think about the issues in the system even though they have been there since many years already. The researcher also wants to critically question the advocates for change in the education system like for example Freire, Sterling, Holt and Illich, who have all an impressive and clear point of view on the education system, but still didn't manage to convince politics and policy makers to actually implement their ideas.<sup>62</sup>

Therefore, this calls for opportunities from other disciplines to engage with the education system to offer a change beyond the political hierarchy and influence.

57 Clapp Edward P., S. Lynne Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "Complicating STEAM: A Critical Look at the Arts in the STEAM Agenda". USA, 2019.

58 Auer, Valentina. "Sustainability in education for sustainability", Sustainable Design Presents workbook. Brighton, 2020

59 Tortoise: "Tortoise Education Summit". Talk about "How do we break the link between inequality and educational outcomes?". June 23, 2020

60 OpenIDEO online webinar: "Reimagining Learning: During COVID-19 and Beyond." June 9, 2020.

61 The Black Curriculum: "The Black Curriculum". 2020.

62 Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

“There are a lot of problems in education today... but each of these concerns can be seen as an opportunity for you to design new, improved solutions for your classrooms, schools and communities.”

IDEO LLC, Design thinking for educators, page 6, 2012.

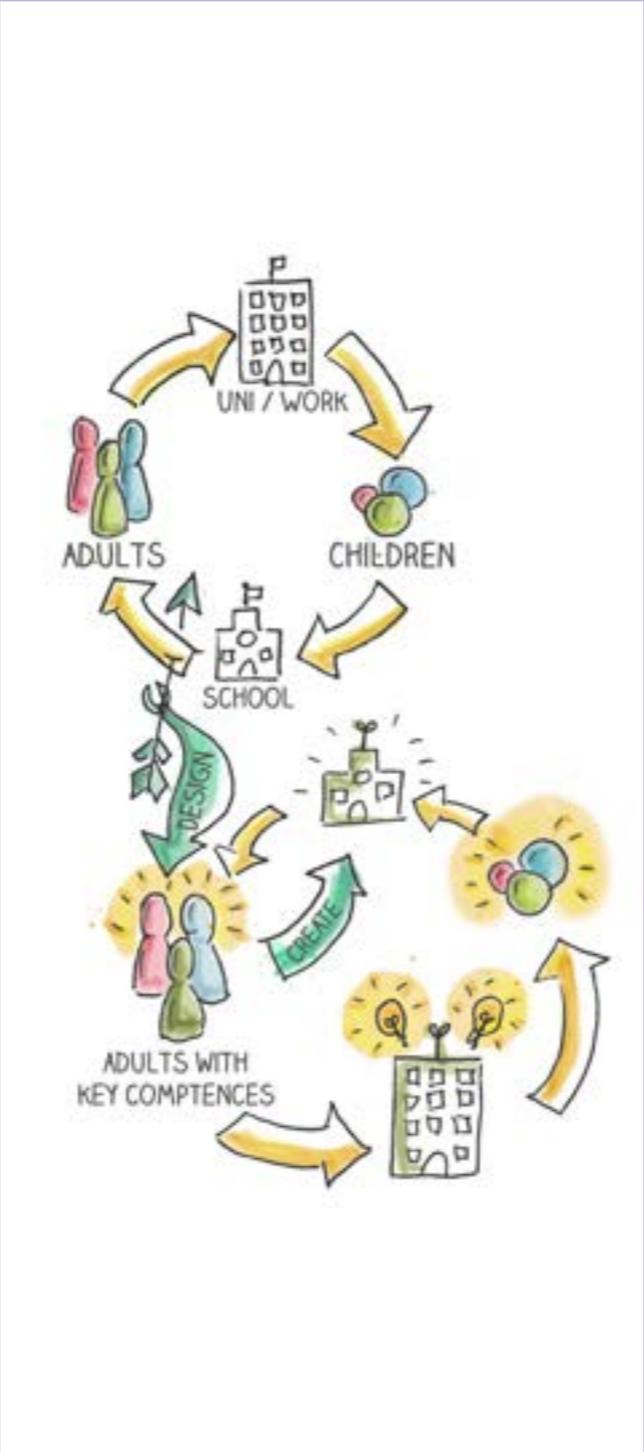


Fig. 10: Impact of Design

## Design Approach

As mentioned earlier, the super power as a designer is to engage with an issue and make something that improves people’s lives, the environment or even whole systems. As a designer who never had anything to do with education but a strong interest in improving the system, it offers opportunities to create discourse and eye-opening arguments. The designer wants the society to gain awareness, give them agency to make a change from bottom up; and through successfully implementing the ideas reaching a broad audience through online talks and exhibitions. The following graphic describes the scenario of how design can break the circle of the current education system with a more sustainable and valuable education system and society as an outcome

# Values of Education

In conclusion here is a syllabus about the terms that have been defined through the research for a qualitative education. All words in this list accompany each other and rely on each other as a whole picture. The designer and researcher is going to focus on these values for the design outputs and will critically review the outputs according to these definitions.

# Equality & Inclusiveness

Make valuable education accessible and available for everybody, despite the socioeconomic and cultural background. Qualitative education should be for free, every child should have the same chances to receive education that helps for their own development of knowledge and skills. Children have to feel that they are included in the education system, that it is designed with and for them. Agency is an important factor here.<sup>63, 64, 65, 66, 67</sup>

# Play and Enjoyment

Education and play belong together, learning through playing is the most natural and successful method. Learning shouldn't be a plague; it should be enjoyable and fun for children at every age. Therefore, the system must adapt accordingly to the age group, interests and talents of the children.<sup>68, 69, 70</sup>

# Collaboration

Between individuals, institutions and disciplines. Learning from each other and with each other is an important skill. Education has to be done together, the human species is built up on collaboration and cooperation. Through collaborative playing children are able to understand complexity and systems.<sup>71, 72</sup>

# Communication

To collaborate we must be able to communicate. Communication, no matter how, is the key to make each other understand and engage with the environment. Linguistic skills, speaking and expressing, having arguments and being able to ask critical questions is something we can get trained at.<sup>73</sup>

# Creativity

This is one of the most important skills that gets lost very easily through a schooled education system. To develop solutions for problems one has to be creative. Arts and Music are not valued enough even though the STEAM curriculum has been rolled out already. Teaching should foster the creativity of children and not oppress it. The division between arts and science has to stop and those two disciplines should merge together again.<sup>74, 75, 76, 77</sup>

63 Riley, Kathryn: "We're a long way from a sense of belonging". Tes Scotland, June 7, 2019.

64 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

65 Tortoise: "Tortoise Education Summit". June 23, 2020.

66 Clapp Edward P., S. Lynne Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "The Maker-Centered Learning Playbook for Early Childhood Education". Agency by Design, USA, 2020.

67 Forum Umweltbildung: „Bildungswellen: Ein Podcast zu Bildung und Nachhaltigkeit. Folge 5: Wir wollen spielen" Podcast with Natalie Denk. Vienna, June 19th, 2020.

68 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

69 Fräulein Flora: "Heast #001 Serious Games". Podcast, June 15, 2020.

70 Clapp Edward P., S. Lynne Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "The Maker-Centered Learning Playbook for Early Childhood Education". Agency by Design, USA, 2020.

71 Johnson, David W. and Johnson, Roger T.: "An Overview Of Cooperative Learning". Cooperative Learning.

72 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

73 Tortoise: "Tortoise Education Summit". June 23, 2020.

74 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

75 Tortoise: "Tortoise Education Summit". June 23, 2020.

76 Sevaldsen, Birger: Redesigning Systems Thinking. Form Akademisk - forskningstidsskrift for design og designdidaktikk, 2017.

77 Clapp Edward P., S. Lynne Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "The Maker-Centered Learning Playbook for Early Childhood Education". Agency by Design, USA, 2020.

# Critical Thinking

Taking agency of our own lives and not accepting everything that we get offered is a first step towards innovation. Also accepting critique as something positive, an opportunity to grow and to see that we can learn from our mistakes. We can only learn from our past and try to improve what hasn't worked so far. Children often get underestimated; they have a very critical point of view. Adults have to listen to them and help them to develop this skill even more.

# Community

Learning happens together and from each other. Involving the community is a promising way to foster communication and collaboration skills but to learn how to listen to different voices and opinions as well. Education, especially sustainable education, happens outside the classroom. This gives children awareness about their natural and social environment; it will minimize inequality and exclusion and school will have a different value and meaning for children again.<sup>78, 79, 80, 81, 82</sup>

# Individuality

Everybody has different strengths and talents. We have to acknowledge this and don't force children into a "one-size-fits-all" system that only focuses on a few learning and teaching techniques. Oppressing one's interests and intelligence leads to depression; children don't feel comfortable at school because they don't get the right treatment; constant competition and comparing is crucial.<sup>83, 84, 85</sup>

# Systems Thinking

Creating awareness of systems, that everything is linked and connected on various levels, sounds more complicated than it actually is. Children can engage with complexity a lot better than most educators are assuming. Again, here it is about the way it is mediated, the age group and the individual interests of children. Thinking in systems helps with creating solutions that are sustainable all species on this planet.<sup>86, 87, 88</sup>

# Self-Directed Learning

Interests and talents of each individual are mostly self-taught and learned through their own motivation. To include self-directed learning into pedagogy gives children agency of their own knowledge and they are able to achieve skills to keep on learning and exploring after finish school or university.<sup>89</sup>

78 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

79 Riley, Kathryn: "We're a long way from a sense of belonging". Tes Scotland, June 7, 2019.

80 Tortoise: "Tortoise Education Summit". June 23, 2020.

81 OpenIDEO online webinar: "Reimagining Learning: During COVID-19 and Beyond." June 9, 2020.

82 OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020.

83 Tortoise: "Tortoise Education Summit". June 23, 2020.

84 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

85 Auer, Valentina: "Sustainability in education for sustainability", Sustainable Design Presents workbook. Brighton, 2020

86 Institute of Play, "Q Design Pack – Systems Thinking", 2020.

87 Valentina Auer: Studien I

88 Sevaldsen, Birger: Redesigning Systems Thinking. Form Akademisk - forskningstidsskrift for design og designdidaktikk, 2017.

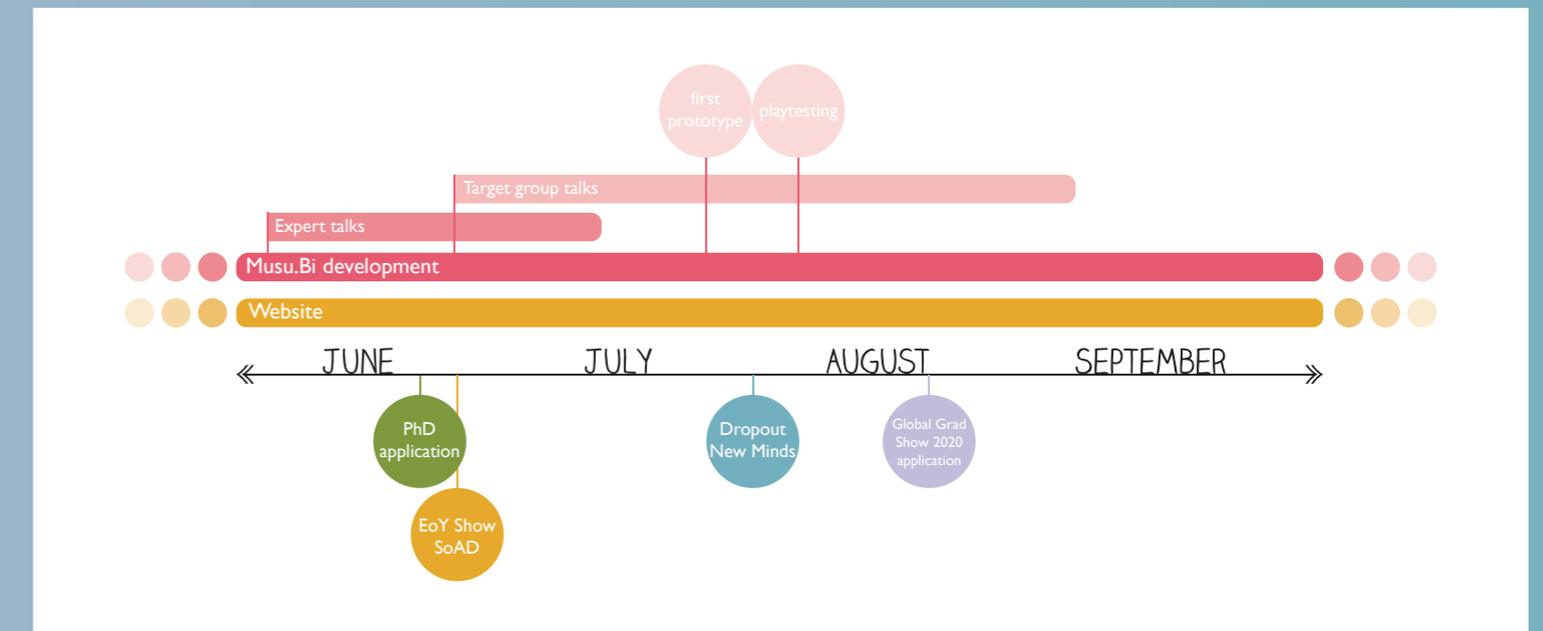
89 Auer, Valentina: "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

# Design Outcomes

## Part 1

The following part of the workbook is going to focus on the design outcomes building up on the design research. The outcomes will be discussed and described in detail to show their necessity and engagement with the research conclusions.

The timeline shows in what time frame the outcomes have been developed and realized:



## A game to de-school the system

Games in general are a great tool to create innovations, to deliver and mediate information and with each game there will be a learning outcome. Only through a playful, free and a bit crazy approach new ideas can be developed. It is allowed to make mistakes; games foster collaboration and communication. Playing and fun doesn't stop after reaching a certain age, in contrary, we enjoy playing even more. Companies like Google, Facebook and YouTube are giving Co-workers a lot of freedom, a playful environment and the feeling of well-being and community in the office. What is successful for adults, is successful for children as well, so why are we still sticking to the less enjoyable and less motivating "exam system"?<sup>90, 91, 92,</sup>

<sup>93</sup> Educational games are already very popular in the school system, but as research has shown they are not very attractive for children and adults as well.<sup>94</sup> Addressing complex and difficult issues, such as racism and inequality, through a playful and interdisciplinary way is already a successful approach. The Black curriculum for example offers courses and workshops for schools where children learn about black history through music, arts and dance. They want to combine creativity and history to make it more attractive, accessible and understandable for children aged 10 years and older.<sup>95, 96</sup>

Another example that is about racism "the school that tried to end racism", a chanel4 documentary, where a class (year 7-8) in the south of London attends an experiment about unconscious bias and inequality within the same socioeconomic environment. It was impressive to observe how children are not aware of the issues their classmates of colour have to face on a daily basis. Children don't see a difference between skin colours, which makes them 'colour-blind'. This is not as dangerous as conscious racism, but they ignore the reality of white privilege and oppression. The experiment lasted three weeks and the pupils had to do different exercises in different subjects. They started to question politics, society and the way they get educated and raised. It only takes a few hours to make a whole classroom realize that something isn't correct in the system and those students will probably keep asking critical questions in the future.<sup>97, 98</sup> This experiment pictured perfectly what this project is trying to achieve: motivating children to make a change for the future, to develop their own opinion and to find their true talent and intelligence.

Taking on from one of the design proposals for the Studio module, an educational game has been developed. It has been mentioned earlier already several times, playing, fun and enjoyment is a key value for education. Since the research focuses on schooled and unschooled education systems it is important to include them both into the development. Therefore, the decision of creating a game for children within both systems has been made. A game to experience different learning methods, various research options and the real value of education. The game is focused on equality, self-directed and motivated learning, individual interests, collaboration and communication, creativity and diversity. It is developed to de-school the education system, with special focus on the Austrian and English system. What home educated children profit from their education will be introduced in a playful way to kids at school, but this product can be used in a home educated environment as well.

**“Without play, there can be no design that inspires the user.  
Without foolishness and fun there can be no imagination.”**

*Hella Jongerius & Louise Schouwenberg, Beyond the New: a search for ideals in design, 2015.*

<sup>90</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>91</sup> Fräulein Flora: "Heast #001 Serioue Games". Podcast, June 15, 2020.

<sup>92</sup> Buland, Rainer: "Spiele in sozialen Innovationsprozessen." Ein Podcast. Podcast.

<sup>93</sup> Forum Umweltbildung: „Bildungswellen: Ein Podcast zu Bildung und Nachhaltigkeit. Folge 5: Wir wollen spielen" Podcast with Natalie Denk. Vienna, June 19th, 2020.

<sup>94</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

<sup>95</sup> The Black Curriculum: "The Black Curriculum". 2020.

<sup>96</sup> The Black Curriculum: "The Black Curriculum Syllabus". 2020.

<sup>97</sup> "The School That Tried to End Racism", Channel 4, 47 Minutes Episode 2 of 2, March 2019.

<sup>98</sup> "The School That Tried to End Racism", Channel 4, 47 Minutes Episode 1 of 2, March 2019.



Fig. 10: Game testing

In collaboration with a teacher-to-be from Austria, Miss Elena Hirsch, the researcher is trying to close a gap that has been defined by looking at various game options, the education system in general and through gathering information from experts. According to this there are no such games that are focusing on equality, individuality, self-directed learning and different learning methods and skills. The previous study about unschooling is the main influence of this output and inspired the researcher to use the term 'de-schooling' as it combines unschooling, schooling, deformation and design in one word. The spirit of unschooling, which includes self-directed learning, interdisciplinary learning and focusing on the individual talents and interest, will be introduced to children in a schooled system through a playful way.

The development of the game was mainly about finding the right way of making the game enjoyable for everybody, that it is not only a boring toolkit for educators to use. Children will learn more than they are even aware of while playing it. It was important to make it doable for the weakest, but still challenging for the best children in the classroom. And to make it accessible for everyone, for the children with internet access and a safe and educated environment at home but also for children with no technological devices in their private space and parents who are less supporting. Good design always focuses on the most vulnerable.<sup>99, 100</sup>

Challenging for the game developer was to create something that meets those needs and keeping in mind to create something that is more like a game than a tool that is not fun. Inspiring for this purpose was the research about 'connected learning' which talks about Quest schools in the US which are focusing on games and playing while teaching. Every teacher is a game developer at the same time and the children learn through a very creative and open approach. The design principles for a good game are: everyone can participate, learning happens by doing, and everything is interconnected. Furthermore, they foster the difference between in- and out-school learning. Connected learning happens when peer-support, interests and academics meet together.<sup>101</sup> Another research paper focusing on lower primary school education mentioned that children are learning by doing. They learn from life experience; already Jean Piaget's work about constructivism focused on that. The necessity of an inquiry-based classroom, where the teacher merges the interests from the children in the classroom with the curriculum is high.<sup>102</sup>

Before really starting with the first prototypes of the game, the designer and researcher decided to have a look at comparators in the field of educational games for children and adults. The following analysis of various games, mostly designed for schooled environments, will give an overview of already existing options that are focusing on the defined values of education. Some are analogue, some are digital, some are with cards and boards and some only involve the movement of the body. All in all, it's a wide spectrum of popular techniques to teach children across the world. The following figures are developed to illustrate clear and understandable review of the analysis.

<sup>99</sup> Jacobs Intitue: "Respecting our Relations: Dori Tunstall on Decolonizing Design". Medium, January 31, 2019

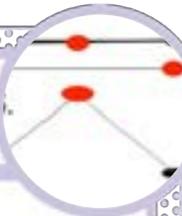
<sup>100</sup> Rivers, Bradley. Talk about teaching and playing. August 4, 2020. Recorded, not published.

<sup>101</sup> Ito, Mizuko with Kris Gutiérrez, Sonia Livingstone Bill Penuel, Jean Rhodes, Katie Salen, Juliet Schor, Julian Sefton-Green, S. Craig Watkins: "Connected Learning: An Agenda for Research and Design." Irvine, CA: Digital Media and Learning Research Hub. 2013.

<sup>102</sup> Clapp Edward P., S. Lynne Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "The Maker-Centered Learning Playbook for Early Childhood Education". Agency by Design, USA. 2020.

## THE SYSTEMS GAME

from 10 years | Kinaesthetic activity



**DESCRIPTION**  
Classroom is divided into two groups, scientists and system. System group has to follow rules within movements (set by teacher) and they all have a defined role to play. System group shows their system following the set rules to the scientists. Scientists can ask yes/no questions every 2-3 minutes, they are allowed to observe and change the system to see how it gets affected. Goal is for scientists to define the rules of the system by observing and asking the right questions. Afterwards students reflect on the exercise and think about systems they have experienced already and are in their environment. Time frame is 2x50 minutes classes

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input type="checkbox"/> matches curriculum</li> <li><input checked="" type="checkbox"/> easy to access</li> </ul>	<p>Children learn about systems, system is not a thing but it consists of different parts and links and they all depend on each other; learn to collaborate; critical thinking and observing; learn to reflect on their approach and actions</p> <p><b>INSPIRATION</b> Creative introduction into systems thinking and understanding the importance of systems; using only the body and mind as game materials; introducing a complex topic to children through an easy setup</p>

UCAR, "The Systems Game", 2020. Online: <https://scied.ucar.edu/activity/2925/print-all>

## FRONTIERS

n.n. | Online PC game



**DESCRIPTION**  
Players are experiencing the life of a refugee moving from Africa to the borders of Europe. It is a shooter game and can be violent, but players get to empathize with the challenges refugees have to face nowadays. The Austrian artist group "goldextra" developed the game to gain social and political awareness and to have more empathy for refugees coming to Europe.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input type="checkbox"/> matches curriculum</li> <li><input checked="" type="checkbox"/> easy to access</li> </ul>	<p>Empathy and value of refugees; awareness; political discourse; anti-racism; cultural integration and migration</p> <p><b>INSPIRATION</b> using a game as a way of mediating critical issues; empathy and experience as a learning technique</p>

The game is not equal accessible for everybody but it introduces inequality and racism to the players.

Goldextra, "Frontiers - You've reached Fortress Europe", 2012. Online: <http://www.frontiers-game.com/>

## DIE ÖKOLIS

from 8 years | Board game, quizz



**DESCRIPTION**  
Players have to answer multiple choice questions about environmental topics with different categories around ecology (water, food, chemistry, air, climate, etc.); pawns on the board are moving around, there is one for each player and one communal pawn. A mix of card game with trumps and board game with dices. End of the game if the communal pawn reaches the finish line on the board, winner of the game with most points (earned through answering questions correctly). The game won the prize of best environment protection game in 1991 through the government.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Gaining knowledge about ecology and environment; valuing the treasures of nature</p> <p><b>INSPIRATION</b> introducing the importance of protecting the environment through a game; collaborative and individual goals; knowledge about nature; a bit too complicated for children...</p>

not a classic educational game, more for home environment, therefore forces self-directed learning. Very complicated game mechanics!

Ravensburger, "Die Ökolis - spielend die Umwelt schützen", Otto Maier Verlag, 1993. Online: <https://boardgamegeek.com/boardgame/82777/die-okolis>

## DAS WELTSPIEL

from 12 years | Board game



**DESCRIPTION**  
The game is showing the relation of the world's population and gross domestic product (GDP). The board of the game is a world map using the Peters-projection from 1974 with proportional visualization of the continents, the pawns represent either people or GDP. One pawn is 1% of world's population / 1% of world's GDP. Players have to guess first how many population-pawns are on each continent. They will get the correct answers told afterwards and adjust the pawns according to the real numbers. Then the have to do the same with the GDP. The game shows that the GDP is not fair distributed among the population. Other topics like food, materials and nature can be discussed as well using the same game.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Knowledge about GDP and world's population; visualization of big numbers; different perspective of world map; poverty and how to encourage fairness</p> <p><b>INSPIRATION</b> Using a game to introduce this critical topic to children is very inspiring; children and adults can engage with it; board can be used as a poster afterwards and game can be played more often using alternative topics.</p>

A great game that introduces a lot of different topics to the players. Typical educational game that won't be played in leisure time.

Bildung trifft: Entwicklung, "Das Weltspiel". Online: <https://www.das-weltspiel.com>

## DARE TO BE YOU

from 10 years | Card game



**DESCRIPTION**  
Game focuses on the 17 Sustainable Development Goals (SDGs) and introduces them to children in a playful way; various playing methods depending on the children in the group; helps with learning German as a foreign language as well and can be used internationally; Cards have pictures on them and there are 12 different variations how to play the game. For example: "Find the correct card" - teacher puts cards across classroom and describes in an abstract way what a particular card is showing. Children have to find the matching card then. It is a lot about imagination and interpretation of the pictures on the cards, getting to know the other player's minds a bit better and to engage with everyday issues that are addressed in the SDGs. There are templates to print for some variations of the game included.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Interaction with SDGs; understanding the importance of sustainability; each variation has different goal</p> <p><b>INSPIRATION</b> Printing templates that give teacher freedom to play game in different ways; variations with using the same cards; can be used for homogeneous group of children; game can be accompanied with a book about the 17 SDGs described for children.</p>

Can be used for different environments and purposes

FORUM Umweltbildung "Empowerment für die 17 Globalen Nachhaltigkeitsziele", 2020. Online: <https://www.umweltbildung.at/digitalisation-materialien/hintergrundinformationen/power-empower-fuer-die-17-globalen-nachhaltigkeitsziele.html>

## CHALLENGE ACCEPTED

from 15 years | Card game & board



**DESCRIPTION**  
Game introduces the "5Ps" people, planet, prosperity, peace & partnership, which are focus of the 17 SDGs by the united nations. The players have to come up with creative and innovative solutions for problems around the 5Ps. Game mechanics work like a traditional board-card game with drawing cards, playing them and following a pawn and order on the game board. Challenge cards introduce players into the problem, skill cards have to be played to offer solutions. Players are playing in teams, team with most solved challenges in the end wins.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Interaction with SDGs and 5Ps; understanding the importance of sustainability; no fear of failure and the motivation to develop ideas and act</p> <p><b>INSPIRATION</b> Giving children agency and responsibility about good and better ideas how to solve a challenge; using the simplicity of a boardgame to address complex issues</p>

Could create unfair behaviour if children are not comfortable to interact with some team members

FORUM Umweltbildung "Challenge accepted!", 2020. Online: [https://www.umweltbildung.at/index.php?id=2692&ADMCDM\\_cooluri=1](https://www.umweltbildung.at/index.php?id=2692&ADMCDM_cooluri=1)

## MOBILITY 360°

from 10 years | Card game



**DESCRIPTION**  
The game is introducing children into city planning and sustainable mobility. The players are confronted with mobility challenges in a city and have to find the best fitting solution with the cards on their hand. It can be played in the classroom or at workshops that talk about mobility. Goal of the game is to find best solution (children decide it themselves) and make sustainable public transportation possible. Children learn about sustainability, systems thinking, collaboration and creative thinking; game is in German and English available; a junior version for younger kids is available too; QR codes on the cards implement technology and make the game more attractive, but they don't have to be included to avoid inequality amongst players who don't own a smartphone; children review their solutions critically and get the feeling of making a change in the system.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Sustainability, mobility, systems thinking, collaboration, creative and critical thinking towards solutions</p> <p><b>INSPIRATION</b> Card game with link to digital interactions; fun and engaging way of learning about mobility and city planning</p>

a junior version for younger kids is available too; QR codes on the cards implement technology and make the game more attractive.

Mobility 360° "Mobility 360° Card game", 2018. Online: <https://mobility360.at/mobility-360-kartenspiel/>

## PLANSPIEL GUTE SCHULE

for teacher | Board game & cards



**DESCRIPTION**  
This game is about creating a vision of the perfect school for teachers and educators. The game should encourage the players to separate them from the classic perspective and opinion of school and explore creative and idealistic solutions for existing problems. Three rounds equal three school years, different categories (budget, quality, community, responsibility, etc.) have to be played through. The players are using focus cards, action cards and time cards to move forward and express their ideas and plans. The game can be played individually or in teams, goal of the game is to reach together a set goal for the school. The game inspires principles and headteacher to move forward and not being afraid of change and innovation.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Innovation and change through play; new creative ideas; widen the horizon</p> <p><b>INSPIRATION</b> Leaving restrictions behind through creating something in a playful environment</p>

only available for adults, no version for children which makes obvious that students are not included in the innovation process of their school.

Friedrich Verlag, "Planspiel Gute Schule", 2019. Online: <https://www.friedrich-verlag.de/planspiel-gute-schule/info-zum-planspiel/>

## SOCRATIC SMACKDOWN

10 to 18 years | Pen and Paper game



**DESCRIPTION**  
The game aims to practice and develop discussion skills in a group of 4-6 people. Students get a topic to discuss about, they get introduced to several discussion rules and tips and are asked to use them as discussion skills. They are observed by the rest of the class, who are giving and counting points for each student in the fishbowl arena about how well they are using the discussion skills. The discussion lasts for six minutes, then the students change. Goal of the game is to earn as much points as possible.

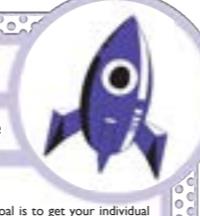
<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Communication skills, discussion skills, collaboration, critical thinking</p> <p><b>INSPIRATION</b> Easy to access the materials, it doesn't need much to prepare and children have their own agency about the discussion; critical reflexion and feedback from peers</p>

Not really a game with a storyline or an exciting goal but the competitive spirit is there.

Institute of Play "Socratic Smackdown". Online: <https://c Alliance.org/wp-content/uploads/2020/02/SocraticSmackdown.pdf>

## ABSOLUTE BLAST

10 to 14 years | Pen and Paper game



**DESCRIPTION**  
A game to introduce mathematics to children. Goal is to get your individual rocket on the paper as far from zero as possible. Each child has three different rockets, each rocket needs three boost cards (with numbers and calculations). In the end the rocket with the highest number wins. While playing the educator asks the students why they chose to use specific cards and students can reflect on their actions and thoughts. Different cards with higher and lower numbers can be used to increase the difficulty level.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Mathematics; critical reflection on actions; learning through playing</p> <p><b>INSPIRATION</b> Pen and paper game with easy rules and easy access; developed by teacher who is teaching mathematics</p>

only for learning mathematics, clearly a learning game.

Institute of Play, "Absolute Blast". Online: <https://c Alliance.org/wp-content/uploads/2020/02/Absolute-Blast.pdf>

## MINECRAFT

from 8 years | Online PC game



**DESCRIPTION**  
Minecraft is one of the most popular games around the world. It is about breaking and mining parts from a 3D world and building your own world through that. There are two modes, survival and creative mode, in which players can play. The game is often used in educational context as it fosters creativity and children can engage with different topics through "building" them in the virtual space. Since 2016 there is an educational edition available which is focusing on the 21st century skills and fits with the STEM curriculum. Topics like extinction, islands, remote learning, history, science and languages can be learned. Through gaming children enter the "flow" state, the state of the mind when one is highly concentrated and ready to learn.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Learn various topics from the curriculum through achieving tasks on Minecraft; creative engagement; computer skills; problem solving skills, reading and writing skills; autonomy and collaboration at the same time.</p> <p><b>INSPIRATION</b> Including technology in a playful way to make learning more attractive; creative approach of different topics that seem boring to be taught and learned.</p>

PC game is not available for everybody, computer and internet connection must be provided

The Conversation, "Minecraft can increase problem solving, collaboration and learning - yes, at school", November 24, 2015. Online: <https://theconversation.com/minecraft-can-increase-problem-solving-collaboration-and-learning-yes-at-school-11335>

## THE SCHOOL GAME

from 4 years | Kinaesthetic activity



**DESCRIPTION**  
Is not a commercial game, but a natural game children play before entering school. They imitate school at home with their friends or family. They play teacher and student, teach each other first steps of maths, reading and writing. It is a preparation for school without even being aware of it.

<b>EVALUATION</b>	<b>LEARNING GOALS</b>
<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> equality &amp; inclusiveness</li> <li><input checked="" type="checkbox"/> play &amp; enjoyment</li> <li><input checked="" type="checkbox"/> collaboration</li> <li><input checked="" type="checkbox"/> communication</li> <li><input checked="" type="checkbox"/> creativity</li> <li><input checked="" type="checkbox"/> critical thinking</li> <li><input checked="" type="checkbox"/> community learning</li> <li><input checked="" type="checkbox"/> systems thinking</li> <li><input checked="" type="checkbox"/> self-directed learning</li> <li><input type="checkbox"/> individuality</li> <li><input checked="" type="checkbox"/> matches curriculum</li> <li><input type="checkbox"/> easy to access</li> </ul>	<p>Reading, writing, calculation, speaking skills, social skills, confidence</p> <p><b>INSPIRATION</b> Free game that everybody can play as there are no rules; children are putting themselves in different positions and experience "school" from various perspectives; children are motivated to learn from each other and teach each other.</p>

Children without a safe and fun social environment are less likely to play this game.

The Conversation, "How playing the 'School Game' helps kids on their journey to literacy", November 24, 2015. Online: <https://theconversation.com/how-playing-the-school-game-helps-kids-on-their-journey-to-literacy-50984>



Fig. 13: Musu.Bi Box

# Musu.Bi

## Learning to Explore

*Musubi - Japanese for to tie, to bind, to link<sup>103</sup>*

The name fits with the idea of the game because it is about making connections within a topic of own interest and at the same collecting pieces of a fictional figure and put it together in the end. The Japanese word was chosen because it does not remind of any other word in English or German and it sounds like a proper name for a robot. It is easy to pronounce and to remember as well.

---

<sup>103</sup> Japanese mythology & folklore: "The musubi gods: A comparative survey of binding gods, binding magic and their origins." No date.



Fig. 14: Musu.Bi Template

## Musu.Bi

Who is the game made for?

The game is specifically made for children in schooled and unschooled environments aged between 10-12 years, but with no actual age limitation. Whilst the idea is to use it within an educational context it can be used without the context as well. Musu.Bi offers great possibilities for pupils that are motivated to learn and explore, for example as an activity during summer and winter breaks or in camps. It will give all the benefits and critical engagement with education to the user no matter how, where and when the game will be played. Furthermore, it can be used for refugees and developing countries where children don't have the chance to get any education. This perspective will be discussed later in the workbook while talking about further development of the game.

What is the game about?

It is about an expedition on a foreign planet trying to find the missing pieces of the research-robot Musu.Bi to make it possible for it to explore and preserve the planet's ecosystem.

The children get asked to find the parts of the robot, who got destroyed by a desert storm, on the different continents of the planet "Pangea" through achieving tasks. Tasks are creative and scientific research and learning exercises which the children will accomplish based on their chosen project. Bonus tasks can be done if children are motivated and have spare time to do so, this will gain them special parts to make Musu.Bi even more skilled than before the storm. The players have to collaborate to keep moving from continent to continent with the space-boat. Nobody should be left behind therefore children can and have to help each other to move faster forward.

Goal of the game is to make Musu.Bi function again and to get expert in a topic of choice with a final research output in the end. The children will experience different ways of learning and researching and can develop their own interests and learning style. They will see that education can be done in a fun and free way as well. 21st century skills are going to be addressed and developed, and the game fosters equality and self-directed learning since the tasks are easy to achieve for all kind of social environments and schooling models. "Musu.Bi" can be played from 2-30 people (suggested, can be more as well) and is designed for children aged 10-12 years old. The game continues over several weeks, depending on the education model it is used for (home educated children will take less time than children in school because they don't have a curriculum to follow).



Fig. 15: Musu.Bi Components

The game consists of the following components:

- 1 board (poster) showing a map of the planet with the grey continents
- 50 task cards (35 main tasks, 15 additional tasks)
- 1 logbook
- 1 educator's manual including additional stickers for bonus tasks
- 1 letter of Musu.Bi
- 1 Spaceboat pawn

printing templates:

- Musu.Bi robot template (for each child one)
- emergency cards (for each child 5)
- reflexion sheet (for each child one)

At the beginning the children will read the letter from Musu.Bi which tells them the situation of the robot and why it needs the children's help. Following, they will get introduced to the rules of the game which can be found in the logbook. The educator has to decide on an overall theme of the game, something that fits with the curriculum or anything else for example sustainability, Europe, underwater etc. Within this theme the players have to find a topic that interests them and they want to explore further. They will start with the first task, reading the task card and finding more information and examples of task outputs in the logbook. Once they accomplished the exercise (depending on the task this can take one hour up to a few days) they will mark their experience about it on the reflexion sheet. As soon as half of the players have accomplished the task the next one will be reviled, and they can work on that. With each task accomplished they will find parts of Musu.Bi on the continent the space boat is currently parking on. They can colour the found parts of Musu.bi on their Musu.Bi printing template handed by the educator. After a set amount of tasks the space boat is ready to travel to a new continent, but only after all players have accomplished those tasks. Children who are struggling with an exercise can use the emergency call card to ask for help from another student. Each child gets 5 of these cards, if they ask for help the supporting student gets one of the cards from the child in need.



Fig. 16. Musu.Bi Letter

This section of the workbook describes the idea and materials a bit more in detail. All materials can be found in the appendix for more observation. The design has only been developed in detail for a prototype so far. The designer is aware that it needs more development and creative work for the final design, but the first drafts give ideas about how the game could look like when it will be tested in a classroom.

Musu.Bi starts with the following letter that will be read to the game participants by the educator:

## Letter from Musu.Bi

Hello there!

I am glad you found my message. My name is Musu.Bi, I am an expedition robot from Galaxy AE29-V3. My duty is to explore unknown planets, to get to know the ecosystem there and to collect this information to share it with my fellow robot friends. Right now I am on a Planet called "Pangea", about 400 light years away from my galaxy. I found some very interesting creatures here and made observations of plants that can possibly be useful for my home planet without ruining it's ecosystem. The last months here have been very stormy and one day I got caught by a very strong desert storm on one of the continents. I got blown away and while the storm was carrying me around I lost many parts of my body. All the parts are blown off across the planet and I cannot find them all by myself since I am missing too many of them to move, see, taste and explore properly. I am sending this letter with the hope somebody will find it who is motivated and can help me to find all my pieces so I can finish my expedition here.

I will assist you on your journey across Pangea. I have prepared a map for you, all the grey parts are still undiscovered but I marked how many parts can be found on each continent. You can use my space boat to travel around, but this is a special exploration space boat. You have to be an explorer yourself to make it move.

What do you think? Are you brave enough to help me finding my bits and parts and at the same time exploring this mysterious planet?



Fig. 17: Musu.Bi Instructions

After this introduction the children will read the following instructions:

## Instructions

You have just read the letter of Musu.Bi and decided to help this expedition-robot from a foreign galaxy. To move around in the space-boat you have to accomplish tasks, but the boat can only move when all have accomplished the task on the specific continent.

Now it is your turn to start exploring and researching. Think about a topic that interests you and that you would like to know more about. It has to be within the theme of the game (chosen by your educator), but it can be anything as long as it motivates you and catches your interest.

After deciding on a topic start with task card number one. Read the exercise on the card. In the right corner you will find a number which is the page number in the logbook of the space boat. Go to the page number to get more detailed information and tips about how to accomplish the task. There is no right or wrong, do as much or less as you want to do, as long as you enjoy it. With every task you accomplish you will get a bit of Musu.Bi's parts. Finish the task and fill out the reflexion card that comes with each task. Show your outputs and the reflexion card to your educator and they will show you which part you got next. Then you can colour it on your personal Musu.Bi colour sheet and add your task output to your personal collection. After half of the players have accomplished the task the next card will be turned around. Your goal is to make Musu.Bi complete and function again, so to find all the parts across the planet. Beside that you will do a lot of research and exploring around your chosen topic, so you will have a portfolio of all archived tasks in the end and can call yourself an expert in your topic.

### BONUS TASKS

Since you cannot discover the planet alone and sometimes you might have to wait for other players in the game, you can do bonus tasks. These will give you special parts for Musu.Bi and makes the robot even more skilled and powerful. In the end all players will have different versions of Musu.Bi with different skills, but this shows how diverse and individual everybody is.

### EMERGENCY CALL

If you feel you can't accomplish a task on your own or you need help from others, use your emergency call card and ask for help. Each player has 5 of those cards, but if you help somebody you will get an extra card. So for example Mary needs help, she will ask David to help her. Mary loses one of her emergency call cards but gives hers to David. David has now 6 cards, Mary only four. If somebody needs Mary's help, she will get a card as well. So she has 5 cards again. Keep in mind, you can only travel from one continent to the other together so no one gets left behind. Don't be afraid to ask your friends to help you, and be helpful if somebody asks you for help too.



Fig. 18: Musu.Bi Task Cards

## Task Cards

The tasks that the players will have to accomplish are easy to understand and straight forward. Especially the main tasks shouldn't be too hard and don't include extra skills or fancy materials. The bonus tasks are a bit trickier; this is where the fast and very smart players can develop their skills even further and get challenged. Tasks are based on previous research from both collaborators. They include a lot of creative methods how to explore a topic and don't remind of the classic exercises from school. Especially Elena has done a lot of research about how to train skills with children and the Valentina implemented those core ideas into the tasks for this game. The task cards are open for everybody, they are attached to the poster on the wall in a pocket, assorted in the correct order.

The bonus task cards are indicated with a different colour and are attached to the board on the wall as well. They are hidden in envelopes and only the educator has the "key" to open them. Each continent has about 3-4 bonus tasks. If one player decides to do a bonus task, the card will be taken out by the educator and is now open for everybody. Children will prove the same way as with the main tasks (output and reflexion sheet) that they have done it and will be rewarded with an extra part for Musu.Bi in form of a sticker.



Fig. 19: Musubi Logbook

## Logbook

In combination with all the task cards the players will be provided with the *Logbook*. The book includes extra instructions, additional information and task examples for the children. This ensures the children are able to do the exercises without needing much guidance or help from the educator.



Fig. 20: Musu.Bi Logbook Example



Fig. 21: Musu.Bi Logbook Cover



REFLEXION TASK 1  
Pantomime

How would you rate this task?

NOTES:

## Emergency Call Cards

The emergency call cards are an important component of the game. They foster collaboration and communication as well as learning through mistakes and teaching. As the rule says, only all participants of the game can travel together in the space boat and nobody should get left behind, this tool allows children to get support from children who are faster with some tasks. It gives the game a fluent execution and nobody will get bored while waiting for each other to do the tasks to move on.

## Reflexion Sheet

The reflexion sheet is, beside the task output, evidence for the educator that the child completed the task successfully. The design of this sheet reminds of a target and the children can indicate how much or less they liked the task. In the notes section they can write why they liked the task, what they would like to improve or why they think it wasn't enjoyable. The reflexion sheet will show them in the end which learning methods they are more talented and interested in.

Fig. 22: Musu.Bi Emergency Call Cards & Reflexion Sheet



Fig. 23: Musu.Bi Board

# The Board

The board of the game, which is an A1 sized poster for the classroom, shows the map of Pangea with all the continents. They are grey at first and will get colourful through exploring them. The colours and patterns of the continents don't remind of continents from planet earth and are very colourful and creative. In the pattern the lost bits and parts of Musu. Bi are hidden to give the players some clues. Especially the bonus parts will be interesting to find. In the test version this effect was done by grey bits that covered several parts and could be taken off after going there with the space boat. For the final version the poster could be like a scratch map where the grey parts can be scratched off, or with stickers that can be taken off and reused several times again. The cards are in pockets attached to the poster. The following graphic shows how the designer imagines the final board to look like.

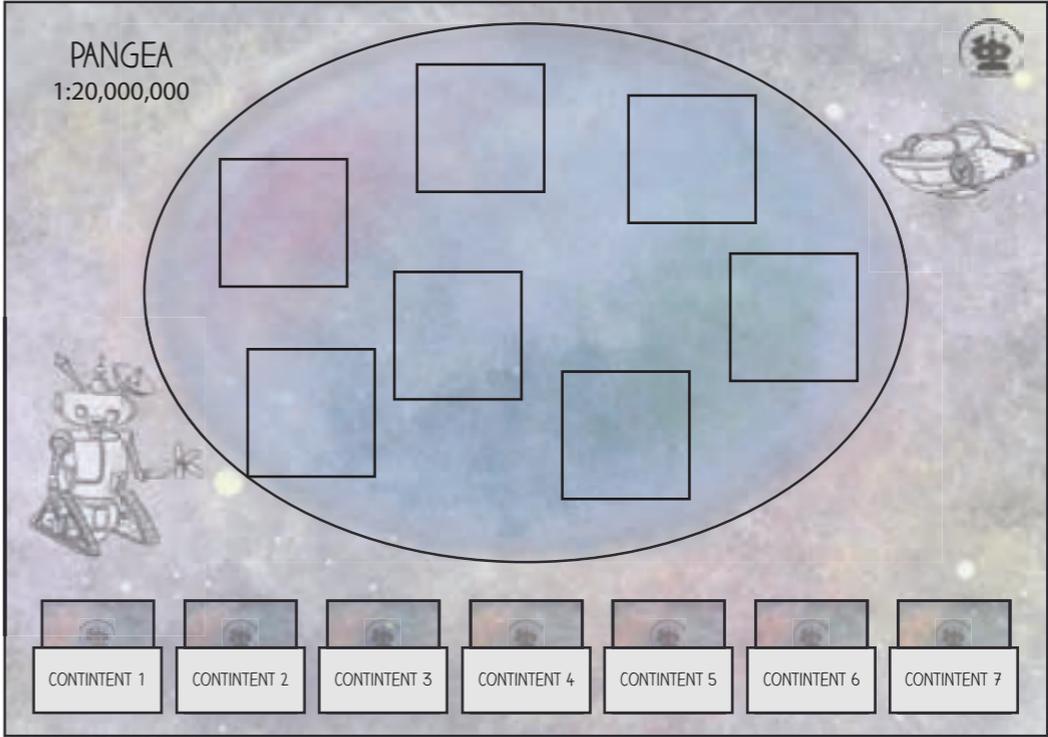


Fig. 24: Musu.Bi Board Example



Fig. 25: Musu.Bi Educator's Manual

## Educator's Manual

The educator will be provided with a full manual of how to guide through the game and help children if they are stuck with one task. It will include the same information as the children have in their logbook but with extra tips and examples. Especially the learning outcomes that the children will achieve indirectly through doing the tasks are an important component that the educator's manual is including. Furthermore, it describes the keywords for the values of education that the whole game is about to the educator like they are described in this workbook. Included in the educators' manual are the Musu.Bi printing template, the reflexion sheet template, the emergency cards template and the bonus stickers for the bonus tasks that can be attached for each individual Musu.Bi robot.

# Game Idea Generator

Based on the game development toolkit by the Institute of Play.

## Learning Goals

Children will learn how to gain and mediate knowledge through different methods. They will learn how to learn for their own needs.

Children will explore their own topic of interest and will become experts in their field.

Children will get introduced into systems thinking, collaboration, playful learning and self-directed learning. They will get independent and develop a critical mind. Children will see that school is not only about learning and learning can happen outside of school too.

## Game Idea

Children get introduced into the story of Musu.Bi. The robot lost all its parts on a foreign planet, the children have to solve tasks (individually and in groups) to collect the parts and make Musu.Bi function again.

Children choose their own topic within a general theme that the educator decides for the game (animals, plants, universe, sustainability, etc.)

Learning methods will be experienced and used through various tasks. There are main tasks and bonus tasks. After each achieved main task children get a part for their robot, the bonus tasks give an extra feature.

They will travel through different continents on the world map (board, poster on the wall) where they can explore and find parts. Travelling is only possible if every participant of the game has achieved the main tasks of the continent. Emergency cards can be used to ask for help and support from other participants.

Each child will experience every method throughout their project. After each task they will fill a reflexion card where they can reflect on the exercise how they liked it or achieved it. The output and the reflexion card will be shown to the educator to get the parts they have to collect for the robot.

All outcomes of the project will be collected in one folder or box etc.

At the end of the game (2-3 months) children will present their project outcomes and their individual Musu.Bi Robot. They can decide how and what they want to present to their peers.

In the end children will have experienced various learning methods and can decide for their own which one they liked the most/least. They will have their reflexion sheet and can always refer back to that throughout the year.

## How to Assess?

Children will collect all their outputs of tasks and exercises in a folder.

As there is no right or wrong of doing the tasks the educator can still see how much effort and motivation the child put into the project.

The tasks fit with the national curriculum and focus on capabilities that 10-12-year-olds in school have to learn and achieve.

The presentation at the end of the game must be graded in some way, but without pressure or fear of failure. It is very subjective to grade these projects but since one main goal is to experience all the different learning methods and finding all the mandatory pieces of Musu.Bi the teacher can make assumptions if the children really engaged with all of them.

Children have to reflect at the end of each task how they liked it and what they learned for themselves on some sort of reflexion sheet.

# Parts of the Game

Based on the game development toolkit by the Institute of Play.

## Goals

Introducing different learning methods  
Learning is fun and very broad  
Learning is equal  
Foster self-directed learning, critical thinking, creativity and systems thinking

## Challenge

Children working independently, collecting parts and going through all the continents, create something they can be proud of

### *Challenge for us*

The game provides a real learning outcome for the children, focusing on heterogeneous groups and equality, make a creative and attractive design. Make it attractive for teachers and schools as well as home educated children

## Core Mechanics

Find the missing parts of Musu.Bi through achieving the tasks, main tasks will give children the essential components, extra tasks make the robot even better and individual.

Each child has their individual robot sheet where they can colour and draw the missing bits they find on it. After task is done by half of the class the educator will tell students which part they have found now. Extra bits and parts will be given by the teacher in form of a sticker and can be added to original drawing as a bonus part.

Travel and explore the continents and find the parts there, exercises and tasks will make travelling possible -> if half of the class has one task done, next can be revealed and after all main tasks they go to next continent. Children can always go back to continent and do more extra tasks to find extra pieces.

Collect all the outputs of each task in a folder or box and present it in the end.

## Components

- 1 board (poster) showing a map of the planet with the grey continents
- 50 task cards (35 main tasks, 15 additional tasks)
- 1 logbook
- 1 educator's manual including additional stickers for bonus tasks
- 1 letter of Musu.Bi
- 1 Spaceboat pawn
- Musu.Bi robot template (for each child one)
- emergency cards (for each child 5)
- reflexion sheet (for each child one)

## Space

Classroom and at home, school building, libraries, natural environment, social environment

## Rules

Every child must achieve the main tasks, no moving between continents if not every participant has accomplished main tasks, journaling of the progress, no main task will be done twice, work on your own but collaborate with others during the tasks, help others if they need help, educator is a guide and managing the game but not teaching!

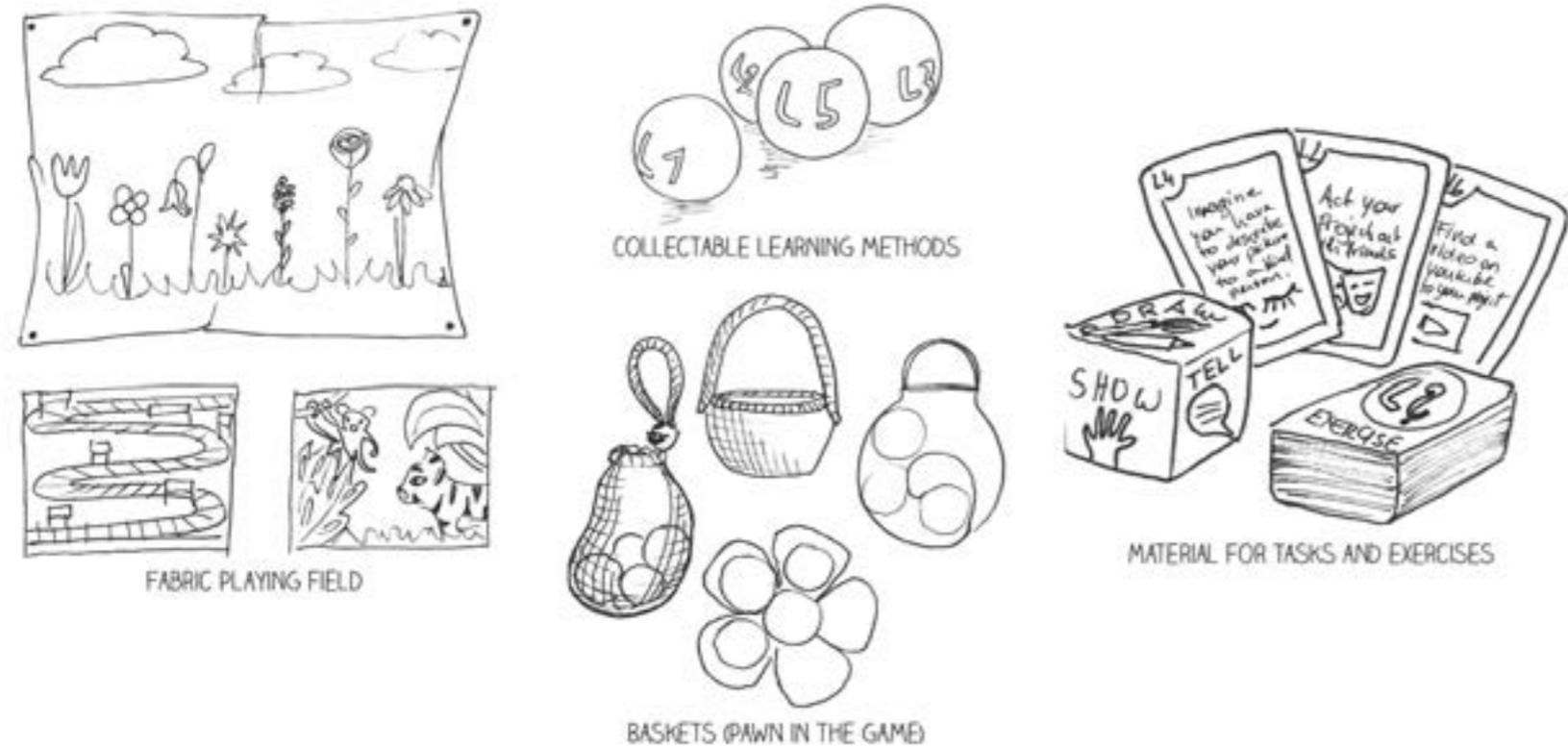


Fig. 26: First Ideas

## First Ideas

As the research for the studio module has concluded with creating a game that fosters equality, skills and other defined values of education, first ideas about how this could look like were born. The initial idea was about collecting the learning methods while travelling with your pawn over the board of the game. The learning methods could be collected through achieving tasks, similar as the final version now, but there was no real storyline or adventure behind it. It was all about collecting marbles in different colours and comparing those to your peers, with the final goal of being an expert in a topic of your own choice. Fig. 26 shows the first drafts of the storyboard and how the two collaborators thought of the game before. Those ideas were especially influenced by the research about unschooling and schooling because it should bring the unschooling spirit and benefits into the schooling environment and the other way around.

But after more research into several games and talking to experts this idea didn't sound like a fun game to play. The motivation and spirit for the children was missing. As Jeanette Müller described it in our conversation "Children won't be happy with only collecting marbles in a bag and having no idea why they actually collect them or what's the final achievement in the end".<sup>103a</sup> The basic idea was good, but the story and playful factor was missing. The first drafts were more like tools for teachers to introduce various learning skills into a classroom, but for the children there was no real fun included. The two game developers wanted to keep the collection part but had to focus on an individual goal and a collaborative goal for the children to achieve beside their individual projects. Ideas about building a city with collecting buildings, planting plants in a garden or exploring planets in the universe were developed. Finally, they ended up with the idea of a fictive figure that needs the children's help to get to its goal. Musu.Bi was created, Pangea got developed and the story of the explorer robot that got caught in a storm emerged after several team meetings and collaborative brainstorming sessions. The decision of using a robot as fictional figure and a planet that doesn't remind of planet earth has been made to prevent racist behaviour and exclusion. The communal goal was to explore each continent to find the missing parts of Musu.Bi and to get to the final point of the board together as a team. The individual goal is to attach the missing parts to one's own Musu.Bi template, make the robot more skilled and powerful through achieving extra tasks and to have a complete project of a topic of choice in the end. Finding bits and parts and travelling with the spaceboat can only be done through finishing tasks and helping others who need help. The tool developed from a simple and basic idea to a promising and complex educational game that can be played in an unschooled and schooled environment.

<sup>103a</sup> Müller Jaenette, Talk about Musu.Bi, systems thinking and playing, June 24, 2020. Recorded, not published.

## Analogue vs. Digital

Through the development of the game it was always a bit of a debate whether it should be digital or analogue. The designer and researcher decided to keep it as an actual board game as research showed that children are already spending a lot of time with technology. They get distracted by too much time in front of the screen and lose interest in traditional subjects and topics as well.<sup>104, 105</sup> Furthermore children should have some time off screen and focused learning with social interaction too.<sup>106</sup> Whereas including technology into education is recommended and much promoted, Musu.Bi will only have some tasks that ask children to use electronic devices and the internet as not everybody has the same possibilities to do so.<sup>107</sup> “ [...] educationally privileged youth with effective learning supports at home who are able to take full advantage of the new learning opportunities that the online world has to offer and to translate these opportunities to their academic and career success” (Mizuko Ito et al. Connected Learning, 2013, page 25) but this design output is addressing that qualitative education shouldn't be a privilege. Therefore, technology is included but not as the focus. This game introduces to some the world outside of the technological void. Not everything has to be googled, the community around one knows sometimes a lot more than the world wide web.<sup>108, 109, 110</sup> In case of Covid-19 it would be beneficial to have an online version as well, with a PDF version of the logbook and an online interactive map of Pangea. Tasks could be exchanged and delivered through video calls easily, even though the recent experiences with online learning has shown that communication and collaboration isn't the same as with physical interaction.<sup>111</sup>

<sup>104</sup> Ito, Mizuko with Kris Gutiérrez, Sonia Livingstone Bill Penuel, Jean Rhodes, Katie Salen, Juliet Schor, Julian Sefton-Green, S. Craig Watkins: “Connected Learning: An Agenda for Research and Design.” Irvine, CA: Digital Media and Learning Research Hub. 2013.

<sup>105</sup> Auer, Valentina. “Sustainability in education for sustainability”, Sustainable Design Presents workbook. Brighton, 2020

<sup>106</sup> OpenIDEO with imaginable futures: “Learning Reimagined: Radical thinking for equitable futures.” 2020.

<sup>107</sup> Auer, Valentina. “De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society”. Sustainable Design Studio workbook. Brighton, 2020.

<sup>108</sup> Auer, Valentina. “De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society”. Sustainable Design Studio workbook. Brighton, 2020.

<sup>109</sup> OpenIDEO online webinar: “Reimagining Learning: During COVID-19 and Beyond.” June 9, 2020.

<sup>110</sup> Ito, Mizuko with Kris Gutiérrez, Sonia Livingstone Bill Penuel, Jean Rhodes, Katie Salen, Juliet Schor, Julian Sefton-Green, S. Craig Watkins: “Connected Learning: An Agenda for Research and Design.” Irvine, CA: Digital Media and Learning Research Hub. 2013.

<sup>111</sup> Auer, Valentina. “De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society”. Sustainable Design Studio workbook. Brighton, 2020.

“What is clear from this snapshot, is that the world and our communities need brave collaboration now more than ever.”

OpenIDEO, *Learning Reimagined: Radical thinking for equitable futures*, 2020. page 73.



Fig. 27: Collaboration Game Design

## Collaboration

The following paragraph will be written from the designer's and researcher's perspective as it makes it more graspable and understandable for the reader and the writer herself.

The decision about a collaboration has been made as designing something valuable includes research but also collaboration with other disciplines.<sup>112</sup> In this case, I decided quite early in the process to include Elena Hirsch into the development of the final design output. She was one of the interview partners for the studio project and therefore was aware of the research I have done. Following the perfect collaboration to create an educational game according to the institute of play, the roles have been divided as followed. I am the designer and design researcher, Elena is the teacher and together we are the game developers. The design of Musu.Bi, the core idea and the research behind most of the task has been done by myself. My collaborator offered the pedagogical expertise, the academical language for the instructions for teachers and the theoretical background of teaching skills in the classroom. While working together it showed that even though we had the same vision, we had different approaches and ideas about the game. Mine were more creative and experimental, whereas Elena's ideas were very structured and "schooled" as she is influenced by her education herself. It was good to have not always the same opinion to either chose the better idea from each of us or find middle ground as a combination of both thoughts. Sometimes it was really hard to agree, but this only made each of us more convenient and stronger. This led to the great outcome that the game can be used in a schooled and unschooled environment, fits with the curriculum and is (hopefully) attractive for teachers to use in the classroom. We could share and develop our individual expertise and talents through this collaboration, and we are proud of what we have achieved so far through only online meetings and digital communication. It is a great experience to work together with somebody from a completely different expertise and Elena profited from this project as well. She started to critically question her education and how young teachers are getting trained in Austria. Since she will graduate in 2021, she wants to take up the game and my research behind it and write about it in her Bachelor thesis.

Through this we want to foster the team spirit and mixture of disciplines within an educational context but also in a broader spectrum among professionals.

All our talks and calls have been recorded, audio and sometimes video recorded if we used some brainstorming tools. We worked together on google drive files to create the tasks and the texts for the logbook and teacher's manual. The recordings can be found in the appendix, but they are not translated from German to English and not transcribed.

<sup>112</sup> IDEO LLC.: "Design thinking for educators" 2012.

“Don’t make it too simplistic but also not too complicated.”

“You really need to consider the **really weak** students and the **really strong** students.”

*“I love the idea of the help cards because it is ok to ask for help.”*

“I think the storyline is really good.”

“It is confidence building!”

“Kinaesthetic skills in school are missed, so I agree with this lovely idea as a game.”

“This game offers people an outline and a way of how they can teach at home.”

“No one questions a robot.”

“You should consider giving it out to adults.”

“I don’t think it would be hard in any way to put this into a school environment.”

*“You are encouraging other ways of communication and thinking.”*

“I would like one for my students!”

## Interviews and Talks

Throughout the development of the design output several talks with experts and a playtest of a demo version have helped to get the ideas further and more realistic. Among others the idea has been presented to Bec Barnett, Co-Director at Relative Creative, educator and specialist about decolonizing design and games in Australia. Jeanette Müller, systems thinking specialist and artist in Austria, has been asked for her input as well. Both liked the first general ideas, but it was too less of a real game, more like a toolkit. Bringing the idea of a robot in has helped to create a real story and motivation for the children to engage with the game.

After further development the designer presented the ideas to home educated children that have been interviewed earlier in the process of the project. They are aged between 12 and 14 years and both, as well as their parents, liked the idea, the design and the background of it. On a scale from 0 to 10 (with 0 worst and 10 best) they all rated a 9-10. The game has also been introduced to practicing teachers. They gave a lot of valuable input and mentioned that it would be great to have an online version as well. Especially during the Corona crisis. This is a very good point for the board game, but as mentioned earlier there are several reasons why the decision has been made to keep it a physical board game. Maybe for future development there will be online material available or a digital version of it because it could work very well with the story and character to be animated. They also really liked the idea of self-directed learning and introducing the various learning methods and skills to students in that way because it is mandatory in the curriculum now but hard to do in practice without useful material. Teacher would be very happy about this product because it supports them and their curriculum projects they have to do. On the scale from 0 to 10 one rated the game with 7.8 and one with 9. Another feedback talk with a home educating mother and her daughter, who is already an adult and a teacher for higher education herself, has been very insightful. Both agreed that the game is brilliant, and it should be further developed for older children and even adult education. They really encouraged the designer to expand the idea further and make advanced variations of it once the original idea has been completed. It touches all the lacks and tweaks of a conventional education system and includes the most valuable skills that children are missing nowadays. In terms of a home educated environment they saw a lot of potential in Musu.bi, whether it is for a single child or more children in the household. It can be perfectly used as a guideline, especially for parents who are less confident with teaching and structure. They were both very enthusiastic and rated the game with a 10+ on the scale.

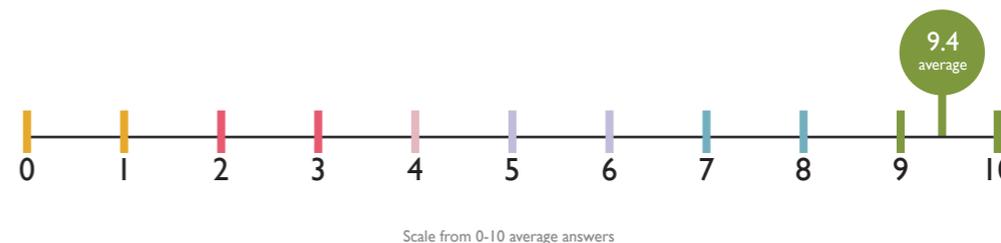




Fig. 28: Playtesting

## Playtesting

The next step, playtesting, is very important for an actual game design. No matter if digital or analogue, the idea must be tested for further development. There are different ways and types of playtesting a game. Commercial playtesting for example involves people who are game publisher or developer themselves, they are experts in this field and know how to ask the critical questions. But it also depends on the reason for the playtesting.<sup>113</sup> In this case the playtesting has been done with the main target group, schooled children. The purpose of the testing was to see if the children can understand the instructions in the logbook on their own, if they manage to do the tasks, if the graphics are attractive and the story is catchy and motivating as well.

After creating the first design drafts and building the prototype, the designer had the chance to playtest the game with two children, aged 7 and 10 years old. They are both attending the local school in England and are talented with creativity and reading skills.

Even though there was an age gap of three years between the two girls, they both engaged very well with the game and it was easy for them to understand. If the younger one didn't understand something in the first place the older one explained it to her and helped her. They even exchanged "Emergency Call" cards among each other. Including a break in between the testing took about 2,5 hours. They had to accomplish 8 tasks in total and due to the short time frame they had a given time to do them as well. The original game wouldn't have these short time frames and has more tasks to do.

The younger one wasn't focused in the end anymore and solved the tasks the way she wanted to do them without really caring on the described task outputs in the logbook. This showed that the game is more suitable for older children.

Both did very well and it was very motivating and empowering to see that the concept and idea works well.

After the final presentation of their project (crabs and sharks) they filled out a questionnaire for feedback. The file can be found in the appendix but the questions were about if they like the design of the robot, the scale from 0-10, if they would like to play the game at school and what they enjoyed the most and the least. The questionnaire was developed based on research from "Design Pack – Games and Learning" and "The snakes and Ladders of Creative thinking". The designer concluded with some minor changes on the layout and graphics for the game. Since the whole concept is based on a long-time frame, the functionality and success couldn't be tested, but it was great to observe that the children understood everything and enjoyed playing it a lot. Their mother also mentioned that it is a great tool and she will use some of the tasks introduced to them for their future distance learning situation with school due to Corona. It inspired both, children and parents, to learn differently and explore things on a broad level.

In conclusion from the design development research, which has been very fruitful and successful, Musu.bi got very positive ratings and comments. Especially the "emergency call cards" as a component of the game have been mentioned every time as very valuable. Children are often afraid to ask for help or are not familiar with helping others, therefore this rule of the game makes it great for them to not be ashamed or afraid of failure and mistakes.

<sup>113</sup> Dee Johnson and Billy Langworthy: "The snakes & ladders of creative thinking". London, 2019.



Fig. 29: Age Group

## Age Group

The talks to experts and playtesting has also shown that the first estimated age group from 8-12 years is too broad and that the game developers should rather focus on a smaller age range that is more realistic. The final age group of 10-12-year-olds fits with year six in primary school and year seven in secondary school, in Austria this is equivalent to the 4th grade in primary school and the 1st grade in secondary school. Children at this age have the basic reading skills, are able to work alone and don't need too much guidance anymore. They learned most of the basics and know how to collaborate as well.<sup>114</sup> For home educated children the age group could vary, this is only an estimated age that doesn't mean every child is at the same level. If the educators feel that the game could be done by their children without fitting the age group, it doesn't really matter. The playtesting has shown that the 7-year-old girl could do the tasks easily as well, but she needed a bit more guidance and help from the older player.

<sup>114</sup> Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.

# S.W.O.T Analysis

Based on "The Snakes and Ladders of Creative Thinking" by DeeJ Johnson and Billy Longsworthy.

## Strenghts

It addresses a gap on the market and the system. Very good feedback from many people. Playtesting worked well. Includes all the values of education that have been mentioned earlier.

Learning and social skills of the children get fostered with this game a lot.

## Weaknesses

Not done with the educator's manual yet and it will probably be hard to communicate and advertise it in a way that educator want to engage with it. They must be very motivated to play this game as well and probably need a very detailed instruction to understand all the tasks.

Doesn't combine with the current social distance learning as there is no digital version developed yet.

## Opportunities

To adapt it to different countries and systems so it can actually work all around the world. Since there are no direct limitations about culture or language, it should be easy to adapt and no discrimination or colonization will happen. The game will be tested in winter term in schools in Austria (integration classes and regular classes) to see if it is doable and successful.

Also to make it available for other age groups, for adult education etc. Can be a great tool for autistic children and children with learning difficulties. Also for children who are not able to attend qualitative education in developing countries or refugee camps.

Some parts of the game could be digitalized for example an introduction video instead of the letter from Musu. Bi or a digital version so children have access to the materials online at home as well. This would ensure a broader audience for home educated families too.

Instead of the drawing template there could also be a real 3D robot that can be built (cardboard or wood) for each student.

## Threads

It sounds complex but it actually is very simple once the game has started. Hard to communicate it with only a few sentences.

## Final review

The design output of previous research has to be critically reflected according to the defined values of education. The whole development has been focused on the keywords equality, individuality, 21st century skills, learning through playing and collaboration. Furthermore, systems thinking, communal learning and diversity have been influential too. Since a lot of comparative games research has been done in this project, the researcher and designer wants to review this game in the same way.

Musu.Bi is fostering equality and various ways of learning. Collaboration and communication are key rules to travel with the space boat. Children get motivated to ask for help, to help each other and to communicate with their peers and people outside of the classroom/social environment. Through giving each other feedback and looking at things through different perspectives they develop critical thinking skills. Since they are exploring a topic of their choice and they have to do most of the tasks without a lot of guidance they experience and train self-directed learning inside and outside a schooled environment. As most of the tasks include some creative interaction with the topic they will develop their creative thinking skills as well. Finally, and most important, the children will have fun and learn unconsciously through playing. Of course, this design output asks for more testing and further development. The designer is planning to create a test version for two schools in Austria. Furthermore, it would be good to test it among different age groups, children with special needs and adults who have to be the guides of the game. It is planned to do this after graduating from this course.

**MUSU.BI**

10-12 years | Board game with cards

**DESCRIPTION**  
Find the missing parts of Musu.Bi through achieving the tasks, main tasks will give children the essential components, extra tasks make the robot even better and individual. Each child has their individual robot sheet where they can colour and draw the missing bits they find on it. After task is done by half of the class the educator will tell students which part they have found now. Extra bits and parts will be given by the teacher in form of a sticker and can be added to original drawing as a bonus part. Travel and explore the continents and find the parts there, exercises and tasks will make travelling possible -> if half of the class has one task done, next can be revealed and after all main tasks they go to next continent. Children can always go back to continent and do more extra tasks to find extra pieces.

EVALUTATION	LEARNING GOALS
<input checked="" type="checkbox"/> equality & inclusiveness	Children will learn how to gain and mediate knowledge through different methods. They will learn how to learn for their own needs.
<input checked="" type="checkbox"/> play & enjoyment	Children will explore their own topic of interest and will become experts in their field.
<input checked="" type="checkbox"/> collaboration	Children will get introduced into systems thinking, collaboration, playful learning and self-directed learning. They will get independent and develop a critical mind.
<input checked="" type="checkbox"/> communication	Children will see that school is not only about learning and learning can happen outside of school too.
<input checked="" type="checkbox"/> creativity	
<input checked="" type="checkbox"/> critical thinking	
<input checked="" type="checkbox"/> community learning	
<input checked="" type="checkbox"/> systems thinking	
<input checked="" type="checkbox"/> self-directed learning	
<input checked="" type="checkbox"/> individuality	
<input checked="" type="checkbox"/> matches curriculum	
<input checked="" type="checkbox"/> easy to access	

Valentina Auer and Elena Hirsch

# Design Outcomes

Part 2



Fig. 30: Website

## De-schooling Education Website

Another design output in combination with the studio project and other outputs is a homepage called “De-schooling education”. This online space creates an overview and summary of the whole project from the beginning to the final designs. Even though this workbook discusses the equality of internet access, this is the best and most effective way to spread the work and inspire people all around the world. It makes the work accessible and understandable without reading all the workbooks which are written in an academic and less personal way. The homepage is and will be still under construction as the game “Musu.Bi” is in development and other applications are still pending. This design output got promoted during the “End of Year show” of the school of architecture and design at Brighton University, which was an online platform where final year students could present their work. This project got some attention from different organizations and people, and the homepage therefore seemed to address the target group. Furthermore, it helped the design researcher to structure and simplify the work and make connections between the different outputs and research topics.

As this is another design output that has to be critically reviewed, it definitely doesn’t include all the values that have been defined earlier about education. But it shouldn’t be seen within an educational context for children but for the grown-up target group, which include designers, educators, policy makers and parents. Since the texts are written from a personal perspective and using “easy” language, it is equal. The homepage can’t be found on Google yet, it is only accessible through a special link, but after the graduation Valentina will give the page public access and share it on various social media channels. Communication and creativity are represented in this output because the main purpose is to spread the thoughts and ideas of the designer to a broad audience. The connections between the individual research topics and design outputs are communicated too, therefore systems thinking to understand the system of this project is addressed in an abstract way.

The website can be visited at <https://auerva29.wixsite.com/deschoolingeducation>

## Summer School

Valentina had the chance to be part of this year's summer school as a super ambassador at the University of Brighton student recruitment programme. Her previous work and the participation of a workshop earlier this year have encouraged her to take part and deliver information about product design to interested teenager. The participants were between 16 and 18 years old, just finishing year 12 of school. Many of them had migration backgrounds or are the first generation in their family to apply for university. The role as an ambassador was therefore not only to talk about design and design education but also the life at university, finances, and accommodation. Due to the impact of Covid-19 the summer school was all online, using a platform where the participants could have access to presentations and recordings and could chat to the ambassadors during a certain time frame. Of course, it wasn't the same interaction as with a physical summer school workshop, but the participants were already used to this kind of communication and education from the previous months. Together with a master student of architecture Valentina had to organize and talk to students who are interested into product design, interior design and architecture. The researcher of this project could include her ideas about sustainable design, critical thinking, systems thinking and the importance of design thinking within a process into her presentation for the participants. They got mediated how to design a product properly, how to think about all the possibilities within design and how to deal with complexity. Each student had to do a little task that fit with their field of interest, in this case Valentina decided to let them do a mind map about a product of their choice. The mind map should show them how complex a simple object like a pen, a water bottle or an USB flash drive can be. Within this complexity the students had then to identify where are the touchpoints for design, how to improve and what can be improved at the current design of the product. Within the exercise explanation they got some articles to read and Ted talks to watch for more academic information. The full task description can be found in the appendix of this workbook. The participants showed a lot of interest into the topic and even wanted to get more resources for research. The workshop should help them decide what they want to study and give them tips and tricks how to build their portfolio to apply for different universities. Each ambassador had to review and give feedback to the final submissions of the participants. It was fascinating to observe how the students understood and executed the task, as well as how much effort they spent on doing it. Even though all participants in the product design workshop showed interest and talent, all the outputs were different. This experience showed the researcher and designer of this workbook how important diversity and individuality in education and profession is.



Fig. 31: Summer School Example

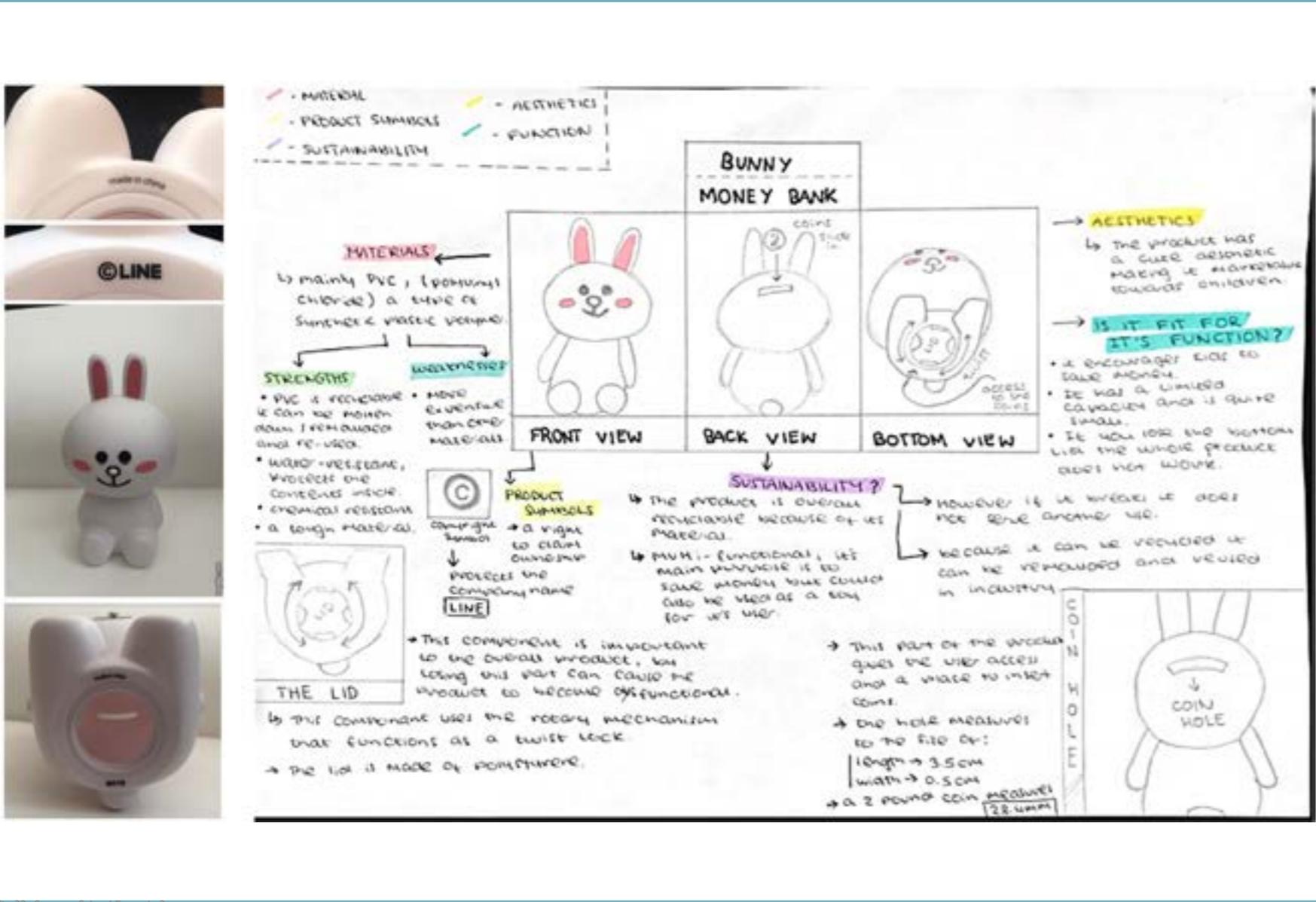


Fig. 32: Summer School Example 2

Beside the workshops and information about studying at Brighton University there was also a social night on one of the summer school evenings. The purpose of this was to give the students a better feeling of belonging and teamwork, even though they couldn't enjoy the summer school all together at the same place they should be still aware of the fact that they are not participating alone. Using the same chat room on the platform a scavenger hunt and a riddle quiz has been organized by the sports department of the university. The students had to solve riddles in a certain time frame and then had to search for various objects in their home during the scavenger hunt. The teams were divided into the different departments of the university, Valentina was together with five other ambassadors and some students part of the team from the school of Architecture and Design and Design and Arts. It was a fun experience but at the same time this can never replace physical interaction of students and ambassadors. Still, the students who participated gave very positive reviews and feedback that they enjoyed the 2020 summer school a lot and could learn many useful things for their future development. Not only the students who were taking part in the summer school, but also the ambassadors could learn a lot from this experience. For example, how to prepare pre-recorded presentations and provide the most valuable information there. Skills of online communication, ice-breaker games and how to deal with anti-social behaviour have been improved and trained through this one-week experience. For example, the trick of returning a question to the participants to test their knowledge and interest was a very valuable input. Valentina could test one of her task for the Musu.Bi game during the summer school and could mediate the idea of sustainable and socially valuable design to the participants who were interested.

This design output of the de-schooling education project included communication as a core value. Since the whole purpose of working as an ambassador was to communicate to the students about various topics, it showed that people can learn a lot from each other and with each other. Collaboration among the ambassadors and the students was a key factor too. The students could chose their preferred workshop and task out of 13 different courses and therefore the summer school encouraged them to think about their own interests and individual talents. As this programme is part of the student recruiting programme for children with less chances to enter university, it implements equality as well. It should motivate and help those students to apply for higher education and to provide them with information they can't receive from their social environment. During the presentations and the social night play and fun was included as well, but as mentioned earlier the summer school would have been more enjoyable for all involved parties if it wouldn't have been online and isolated from each other. The research could have fostered more critical thinking about product design during the conversations but since there was only limited time in the chat room the participants asked more relevant questions to them and didn't want to interact much through this "anonym" and unpersonal platform. Systems thinking could be introduced through the task about mind mapping and complexity, but it is not sure how the participants could engage with that.

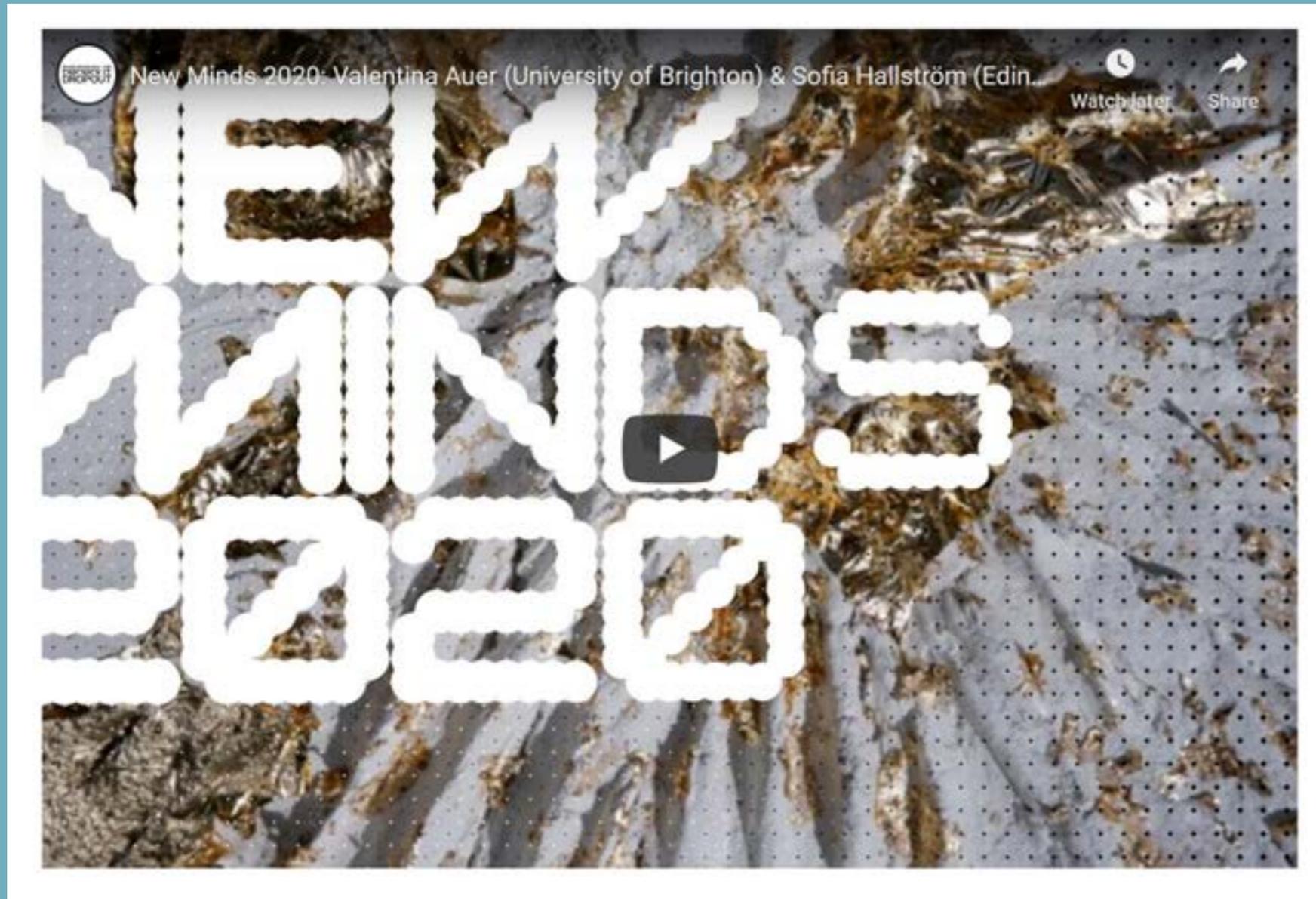


Fig. 33: New Minds

## New Minds 2020

During the end of year show from the school of architecture and design, Valentina got contacted by Ollie Nicholas, co-founder of “Dropout”. Dropout is a platform where graduates from creative disciplines all over the UK get invited to create change in society and find solutions for world problems. “At DROPOUT, we focus on creative people who innovate through their ideas, and create change through their practices.” (quote <https://dropoutmag.com/our-ethos/>) The platform exists since 2019 and creates a space for critical discourse and collaboration among various designers and artists. The “New Minds” talks brings two students and one of the founders together to talk about their projects, visions and ideas of creative change. Valentina had her talk with an art student from Edinburgh University, Sofia Hallström, and the co-founder of Dropout, Ollie Nicholas. Together they discussed what each of them thinks of education, including higher design and arts education, and how we would and could improve the system. Sofia’s project is about mapping, she used maps to visualize her feelings and experiences. She was using different materials to create these maps and got inspired by various mapping advocates. Furthermore, we talked about how mapping can be important for education and children, which fit perfectly with the output of the summer workshop Valentina was part of a few weeks before. The current Covid-19 pandemic had a huge impact on design and arts education as well, especially the graduation exhibitions got influenced by that. Collaboration and communication as well as creative freedom in a studio and workshop is important for creative students, but this year Valentina and Sofia together with many other students had to finalise their work at home with the materials and technology they had to offer there. This opened many new perspectives but also closed a lot of possibilities for them. In the end we agreed that the education system is too less focused on individuality and creativity and should empower communication and collaboration between subjects and disciplines more to gain understanding about the complexity of our environment and society.

It was an honour for Valentina to be part of the New Minds 2020 talks and being invited into an exciting and fruitful community of creative and critical thinkers.

The talk can be watched online at <https://dropoutmag.com/featuring/new-minds-2020-valentina-auer-sofia-hallstrom/>

Through the talk it was interesting to observe how the participants inspired and informed each other. The two projects were not similar at all but were both looking at society issues through a creative’s perspective. Obviously, communication, collaboration, creativity and critical thinking are included in this output. Individuality has been shown through the different approaches of the two students and that Ollie Nicholas has a degree in politics. Which shows that the collaboration of various disciplines works well together. Furthermore, Valentina was able to communicate the values of education and what she would wish to change for the future in the system. Through this talk her message will be spread even further and could open interesting and critical discussions among designers and artists who are working with or for the education system.



Fig. 34: Global Grad Show

## Global Grad Show 2020

Another success of the project is the application for the global grad show. After submitting the project for the end of year show online, the administration office of the Global Grad show contacted Valentina and encouraged her to apply for this unique opportunity. Her project seems very promising as they are looking for graduate student's projects focusing on social innovation and social change from design and innovation courses all over the world. The exhibition takes place in Dubai in November, probably this year only online due to the pandemic. 100 students from the applicants get the honour to present their work and are able to make connections with influential people who can help them realize their vision and designs. Valentina applied with the game Musu.Bi as an output of her research about de-schooling the education system. It seems to fit very well with the requirements of the Global Grad show as the game seeks to change and improve the education system through design and creativity. The full application can be found in the annex of this workbook.

Due to mitigating circumstances the deadline for the application got extended for a full month. The result if the project will be exhibited in the Global Grad Show 2020 will be announced by the end of September. However, the designer feels very motivated and supported by the fact she got contacted by the organizers to apply and participate.

The application enables the designer to communicate and show her design output (Musu.Bi) to a broad audience. Collaboration is included as well as creativity because this exhibition is going to be about the game that has been developed. The design will foster critical thinking and hopefully a different perspective on the school system.

## PhD Application

During the development of the project the opportunity to apply for a funded PhD position about systems oriented design at the AHO university in Oslo, Norway, was given. Birger Sevaldson coined the theory about systems oriented design, which is about the importance of including systems thinking into the design process. Mapping and giga mapping are an important tool within this design approach as well as the collaboration between arts and science.<sup>115</sup> Valentina really wants to work further on her research and design outputs and decided to write a proposal for the position. She proposed to do research about how systems oriented design can be implemented into the education system, with special focus on interior design education. Furthermore, the proposal was about the importance of how to mediate systems thinking and systems oriented design to a young age group. As children can handle complexity and are able to understand it, it is all about the way they get introduced to it. Usually, and as discussed earlier, complexity should be communicated through a playful and creative approach. Everyone can engage with it if it is done in an appropriate way. This was the essence of the proposal which can be found in the annex of this workbook.

It was a great practice for her to think about further development of her project and focus more on systems thinking and mapping again. This also inspired her to the mapping exercise in the summer school workshop and the mapping task for the Musu.Bi game.

---

<sup>115</sup> Sevaldson, Birger. Redesigning Systems Thinking. Form Akademisk - forskningstidsskrift for design og designdidaktikk. 2017.

# Conclusion & Futuring

# Research Questions

***How can design help to make the education system in the UK and other countries more sustainable, adaptable and resilient?***

Design can give teachers and policy makers a different point of view on education. Through creativity and critical thinking, they can offer various outputs for discourse, system change and improvement in the society.

***What is the value of schools in the 21st century in the UK and countries with a similar education system?***

The values are: Inclusiveness & Equality, Play & Enjoyment, Collaboration, Communication, Creativity, Critical Thinking, Community, Individuality, Systems Thinking, Self-Directed Learning.

***How are the design outputs from previous modules fitting with the critical context and adding value to the education system and society?***

All outputs are focusing on creating critical discourse and offering opportunities for the target audience to act. The development of the game and the final version includes all the values of a sustainable education system for the 21st century. It offers great opportunities for further development and not only benefiting the education system of the UK and Austria but also other countries, especially developing countries. Other outputs are specifying in communication and equality, creativity and individuality as well as community and enjoyment. None of the outputs is based on a traditional schooling pattern but is influenced by the findings of the primary and secondary research.

## Conclusion

Education is a very broad and sensitive project, everybody around the world is affected by it and it has a huge impact in people's lives. For the future of our society and the environment the system has to be reimagined and redesigned. Sustainable education has to acknowledge the individual, the agency of the children and the power of the community. Equality has to be given in any case, every child has the right for qualitative and valuable learning and knowledge. The interdisciplinary work between designers and other professionals has to be fostered to create change in the system. Current influences like the Covid-19 pandemic and Black Lives Matter awareness are influencing the system already and show a lot of possibilities for creative innovators to act. Home education is getting more and more attractive, unschooling is a serious alternative to schooling. The project asks for de-schooling the system to get more value from the institution "school" itself and the way children and teenager are interacting with learning and teaching. Furthermore, fun and enjoyment have to be included when talking about learning. Therefore, "Musu.Bi – learning to explore" has been developed to show children in a playful way to learn differently, improve skills and involve the community while researching. Through collaboration this output of the research could be achieved and will be further developed for possible publishing.

## Personal Conclusion

Through this project I didn't only learn a lot about schooling and unschooling, politics and systems, I also earned a lot about my personal ways of learning and achieving goals. The MA in sustainable design course has inspired me a lot with my outputs, especially self-directed learning and implementing creativity into research methodology. The Covid-19 pandemic was a blessing and a curse at the same time. For the project it was amazing as the education system all around the world got highlighted again and everybody had to experience home education from one day to the other. It was a rapid change and a real boost for my motivation to keep on working with this topic. For the creative development it was very frustrating at first. Not getting inspired by other classmates in the studio anymore or talking to people in person was a real disappointment. Collaboration and communication had to be done online, strange at first but luckily everybody adapted fast and easily to the new circumstances. My fellow classmates helped me a lot with recruiting people for interviews, taking part in interviews and testing, sending me useful articles and information and especially just being there when I felt alone in the "battlefield" against myself. Not only my expertise and skills improved, my personality grew a lot as well and I am proud to say that I created something valuable and meaningful for the future society.

### *Acknowledges*

At this point I want to take the chance and acknowledge everybody who has influenced and supported my work. Starting with all the amazing people who have taken part in interviews and design development talks. A big thank you to fellow sustainable design students and tutors, Tom, Sally and Gab, who were always open for feedback and provided useful resources and references for this project. My collaborator, Elena, without your expertise the final design output would only be half as brilliant as it is right now. My family and friends, who listened to me on good and less good days, who supported me while being lonely during a crazy period of this year. Last but not least, I want to thank Valentina the designer and researcher, acknowledge what she could achieve in this short time, mostly all by herself and with a very uncertain idea about the future.

**“‘Futuring’ allows us to imagine possible outcomes with the hope of exploring, better sensing and equipping ourselves for the potential realities ahead of us.”**

*OpenIDEO, Learning Reimagined: Radical thinking for equitable futures, 2020. page 9.*

## What's next?

This project is not finished yet, it is an ongoing process the researcher and designer wants to develop further. Especially the game, Musu.Bi, will be properly designed and tested at schools in Austria and possibly in the UK as well. Her collaborator, Elena Hirsch, will pick up the research and write her own Bachelor thesis about the game and critical reflection on the education system. Together they are motivated to contact institutions and people who are keen to publish the final output as a game that can be used then in schools and homes and beyond an educational background. A digital version for smartphones and computers would be a great accomplishment after further development. This would engage a broader target audience and even children from less developed countries but with access to technology could engage with the game and benefit from the values of education.

The homepage will be updated accordingly and depending on the success of the project, Valentina is thinking about researching further and actually working together with educators and innovators to create change in the system beyond the already existing design outputs. Asking critical questions starting with “What if...?” and using the design thinking process for good will open exciting and promising future possibilities for her. Especially right now, where innovation and support towards teaching for the future is necessary and highly promoted.

Futuring about... What if design will have a major impact into the education system to make it equal and enjoyable for every child no matter where it is situated?

Thank you.

# Bibliography & Annex

## List of Figures

- Fig. 1: Portrait - Private Photo by Valentina Auer  
Fig. 2: Musu.Bi - Photo by Valentina Auer  
Fig. 3: Summer School - Illustration by Valentina Auer  
Fig. 4: Design Thinking - Illustration by Valentina Auer  
Fig. 5: Collaboration - Illustration by Valentina Auer  
Fig. 6: Interviews - Illustration by Valentina Auer  
Fig. 7: Literature - Photo by Valentina Auer  
Fig. 8: Unschooling - Illustration by Valentina Auer  
Fig. 9: School - Illustration by Valentina Auer  
Fig. 10: Values - Illustration by Valentina Auer  
Fig. 11: Impact of Design - Illustration by Valentina Auer  
Fig. 12: Game Testing - Photo by Valentina Auer  
Fig. 13: Musu.Bi Box - Photo by Valentina Auer  
Fig. 14: Musu.Bi Template - Photo by Valentina Auer  
Fig. 15: Musu.Bi Components - Photo by Valentina Auer  
Fig. 16: Musu.Bi Letter - Illustration by Valentina Auer  
Fig. 17: Musu.Bi Instructions - Photo by Valentina Auer  
Fig. 18: Musu.Bi Task Cards - Photo by Valentina Auer  
Fig. 19: Musu.Bi Logbook - Photo by Valentina Auer  
Fig. 20: Musu.Bi Logbook Example - Photomontage by Valentina Auer  
Fig. 21: Musu.Bi Cover - Photomontage by Valentina Auer  
Fig. 22: Musu.Bi Emergency Call Cards & Reflexion Sheet - Photo by Valentina Auer, Illustration by Valentina Auer  
Fig. 23: Musu.Bi Board - Photo by Valentina Auer  
Fig. 24: Musu.Bi Board Example - Illustration by Valentina Auer  
Fig. 25: Musu.Bi Educator's Manual - Photomontage by Valentina Auer  
Fig. 26: First Ideas - Illustration by Valentina Auer  
Fig. 27: Collaboration Game Design - Illustration by Valentina Auer  
Fig. 28: Playtesting - Photo by Valentina Auer  
Fig. 29: Age Group - Photo by Valentina Auer  
Fig. 30: Website - Screenshot by Valentina Auer  
Fig. 31: Summer School Example - Material from Summer School, unknown  
Fig. 32: Summer School Example 2 - Material from Summer School, unknown  
Fig. 33: New Minds - Dropout New Minds 2020. Online: <https://dropoutmag.com/featuring/new-minds-2020-valentina-auer-sofia-hallstrom/>  
Fig. 34: Global Grad Show - Global Grad Show 2020. Online: <https://www.globalgradshow.com/>

## Bibliography

- Auer, Valentina. "De-Schooling Education: A project about how to make the public school system more sustainable and valuable to create a more sustainable future society". Sustainable Design Studio workbook. Brighton, 2020.
- Auer, Valentina. "Sustainability in education for sustainability", Sustainable Design Presents workbook. Brighton, 2020
- Barnett, Bec, Talk about Musu.Bi, decolonizing design and education. June 12, 2020. Recorded, not published.  
BBC News: "A-levels and GCSEs: How did the exam algorithm work?" London, August 20 2020. Online: <https://www.bbc.co.uk/news/explainers-53807730>
- Bildung trifft Entwicklung, „Das Weltspiel“. Online: <https://www.das-weltspiel.com>
- Buland, Rainer: "Spiele in sozialen Innovationsprozessen." Ein Podcast. Podcast. Online: Bundesministerium Bildung, Wirtschaft und Forschung, „Volksschul-Lehrplan“. [www.bmbwf.gv.at/Austria,2019](http://www.bmbwf.gv.at/Austria,2019). Online: [https://www.bmbwf.gv.at/Themen/schule/schulpraxis/lp/lp\\_vs.html#heading\\_Pflichtgegenstaende\\_der\\_Grundschule\\_und\\_der\\_Volksschuloberstufe](https://www.bmbwf.gv.at/Themen/schule/schulpraxis/lp/lp_vs.html#heading_Pflichtgegenstaende_der_Grundschule_und_der_Volksschuloberstufe)
- Busby, Mattha: "A-level students speak: 'I always dreamed of going to Cambridge'". The Guardian (London), August 15, 2020. Online: <https://www.theguardian.com/education/2020/aug/15/a-level-students-protest-at-classist-government-algorithm>
- Clapp Edward P., S. Lynneth Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "The Maker-Centered Learning Playbook for Early Childhood Education". Agency by Design, USA. 2020. Online: [http://www.agencybydesign.org/sites/default/files/AbD\\_Playbook.pdf](http://www.agencybydesign.org/sites/default/files/AbD_Playbook.pdf)
- Clapp Edward P., S. Lynneth Solis, Carolyn Kar Ning Ho, Katherine Laguzza: "Complicating STEAM: A Critical Look at the Arts in the STEAM Agenda". USA, 2019. Crossref DOI link: [https://doi.org/10.1007/978-981-13-2262-4\\_54-1](https://doi.org/10.1007/978-981-13-2262-4_54-1)
- Cwik G. (Ed.). (2009). Selbstständiges Lernen unterstützen. Berlin: Cornelsen.
- Cwik, G. & Risters, W. (2004). Lernen lernen von Anfang an I. Berlin: Cornelsen.
- Deej Johnson and Billy Langworthy: "The snakes & ladders of creative thinking". London, 2019.
- Denk, Natalie: "Mobility 360° - Card game for mobility education". Toolkit, Donau Universität Krems. Online: <https://toolkit-gbl.com/projects/482>

Department of Education "The national curriculum". United Kingdom, 2013. Online: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/425601/PRIMARY\\_national\\_curriculum.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/425601/PRIMARY_national_curriculum.pdf) (detailed national curriculum pdf)

Ferrary, A. (2012). 111 Ideen für den geöffneten Unterricht. Mühlheim an der Ruhr: Verlag an der Ruhr.  
FORUM Umweltbildung "Challenge accepted!", 2020. Online: <https://www.umweltbildung.at/index.php?id=2692&ADMCMDCooluri=1>

FORUM Umweltbildung "Empowerment für die 17 Globalen Nachhaltigkeitsziele", 2020. Online: <https://www.umweltbildung.at/publikationen-materialien/hintergrundinformation/empowerment-fuer-die-17-globalen-nachhaltigkeitsziele.html>

Forum Umweltbildung: „Bildungswellen: Ein Podcast zu Bildung und Nachhaltigkeit. Folge 5: Wir wollen spielen“ Podcast with Natalie Denk. Vienna, June 19th, 2020. Online: <https://www.umweltbildung.at/aktiv-werden/bildungswellen.html>

Forum Umweltbildung: „Bildungswellen: Ein Podcast zu Bildung und Nachhaltigkeit. Folge 2: Komplexität will gelernt sein“ Podcast with Rolf Jucker. Vienna, March 27th, 2020. Online: <https://www.umweltbildung.at/aktiv-werden/bildungswellen.html>

FORUM Umweltbildung: „Dare to be You“. Umweltdachverband, March 2020. Online: [https://www.umweltbildung.at/fileadmin/umweltbildung/dokumente/Tanz\\_aus\\_der\\_Reihe/Dare\\_to\\_be\\_you\\_Manual.pdf](https://www.umweltbildung.at/fileadmin/umweltbildung/dokumente/Tanz_aus_der_Reihe/Dare_to_be_you_Manual.pdf)

Fräulein Flora: "Heast #001 Serious Games". Podcast, June 15, 2020. Online: <https://www.fraeuleinflora.at/salzburg/heast-podcast-episode001-serious-games/>

Friedrich Verlag: „Planspiel Gute Schule: Informationen zum Planspiel“. 2020. Online: <https://www.friedrich-verlag.de/planspiel-gute-schule/infos-zum-planspiel/>

Harris, Steve: "Why education is basically chocolate cake...". Wellbeing Education, May 13 2020. Online: <https://www.wellbeingeducation.co.uk/post/why-education-is-basically-chocolate-cake>

Hella Jongerius & Louise Schouwenberg, Beyond the New: a search for ideals in design, 2015. Online: <https://www.dezeen.com/2015/04/10/hella-jongerius-louise-schouwenberg-manifesto-beyond-the-new-design-impooverished-field/>

IDEO LLC.: "Design thinking for educators" 2012. Online: <https://drive.google.com/file/d/1c4U3zusjDcYJwSkdjpszQ0QsEY7h9MYm/view>

Institute of Play "Q Design Pack – Games and Learning" 2020. Online: <https://clalliance.org/wp-content/uploads/2020/02/Design-Pack-Games-And-Learning.pdf>

Institute of Play, "Q Design Pack – Systems Thinking", 2020. Online: [http://educators.brainpop.com/wp-content/uploads/2014/07/IOP\\_QDesignPack\\_SystemsThinking\\_1.0.pdf](http://educators.brainpop.com/wp-content/uploads/2014/07/IOP_QDesignPack_SystemsThinking_1.0.pdf)

Institute of Play: "Absolute Blast". 2020. Online: <https://clalliance.org/wp-content/uploads/2020/02/Absolute-Blast.pdf>

Institute of Play: "Socratic Smackdown". 2020. Online: <https://clalliance.org/wp-content/uploads/2020/02/SocraticSmackdown.pdf>

Internations.com: "A Comprehensive Guide About the Education System and International Schools." Education in Austria. 2020. Online: <https://www.internations.org/go/moving-to-austria/education#the-education-system-in-austria>

Ito, Mizuko with Kris Gutiérrez, Sonia Livingstone Bill Penuel, Jean Rhodes, Katie Salen, Juliet Schor, Julian Sefton-Green, S. Craig Watkins: "Connected Learning: An Agenda for Research and Design." Irvine, CA: Digital Media and Learning Research Hub. 2013. Online: [https://clalliance.org/wp-content/uploads/2018/05/Connected\\_Learning\\_report.pdf](https://clalliance.org/wp-content/uploads/2018/05/Connected_Learning_report.pdf)

Jacobs Intiture: "Respecting our Relations: Dori Tunstall on Decolonizing Design". Medium, January 31, 2019. Online: <https://medium.com/@JacobsDesignCal/respecting-our-relations-dori-tunstall-on-decolonizing-design-d894df4c2ed2>

Japanese mythology & folklore: "The musubi gods: A comparative survey of binding gods, binding magic and their origins." Online: <https://japanesemythology.wordpress.com/the-musubi-gods-a-comparative-survey-of-binding-gods-binding-magic-and-their-origins/>

Johnson, David W. and Johnson, Roger T.: "An Overview Of Cooperative Learning". Cooperative Learning. Online: <http://www.co-operation.org/what-is-cooperative-learning>

Karsenti, Thierry : "Minecraft can increase problem solving, collaboration and learning - yes, at school". The Conversation, April 21, 2019. Online: <https://theconversation.com/minecraft-can-increase-problem-solving-collaboration-and-learning-yes-at-school-113335>

Mattes, W. (2018). Methoden für den Unterricht. Paderborn: Westermann.

McLaughlin, C. (ed.): "The Connected School: A Design for Well-Being – Supporting Children and Young People in Schools to Flourish, Thrive and Achieve". London: Pearson. 2015. Online: [https://www.ncb.org.uk/sites/default/files/field/attachment/the\\_connected\\_school\\_final\\_for\\_web.pdf](https://www.ncb.org.uk/sites/default/files/field/attachment/the_connected_school_final_for_web.pdf)

Mobility 360: "Mobility 360° Kartenspiel". 2018. Online: <http://www.mobility360.at/mobility-360-kartenspiel/>

Mojang: "Minecraft Education Edition". 2020. Online: <https://education.minecraft.net/>

Müller Jaenette, Talk about Musu.Bi, systems thinking and playing. June 24, 2020. Recorded, not published.

Nuffield Foundation: "Secondary school admissions system is still a work in progress". Nuffield Foundation, June 11, 2020. Online: <https://www.nuffieldfoundation.org/news/secondary-school-admissions-system-is-still-a-work-in-progress>

Omari, Tatum. "How to practice systems thinking in the classroom." *teacher-blog.education.com*, April 20, 2016. Online: <https://teacher-blog.education.com/how-to-practice-systems-thinking-in-the-classroom-9cbfa3dcd2cf>

OpenIDEO online webinar: "Reimagining Learning: During COVID-19 and Beyond." June 9, 2020. Online: <https://www.openideo.com/content/webinar-reimagining-learning-during-covid-19-and-beyond>

OpenIDEO with imaginable futures: "Learning Reimagined: Radical thinking for equitable futures." 2020. Online: [https://assets.imaginablefutures.com/media/documents/Learning\\_Reimagined\\_Radical\\_Thinking\\_for\\_Equitable\\_Futures.pdf](https://assets.imaginablefutures.com/media/documents/Learning_Reimagined_Radical_Thinking_for_Equitable_Futures.pdf)

Riley, Kathryn: "Re-creating Schools as Places of Belonging: The Art of Possibilities". 2017. Online: <http://www.theartofpossibilities.org.uk/assets/docs/ReCreatingSchoolsAsPlacesOfBelonging.pdf>

Riley, Kathryn: "The Belonging Imperative". *School Leadership Today*, Vol 9.3. Online: <http://www.theartofpossibilities.org.uk/assets/docs/Inclusion%20The%20Belonging%20Imperative.pdf>

Riley, Kathryn: "We're a long way from a sense of belonging". *Tes Scotland*, June 7, 2019. Online: <http://www.theartofpossibilities.org.uk/assets/docs/Essay.pdf>

Riley, Kathryn; Carmen Montecinos and Luis Ahumada: "Effective Principals Serving in High Poverty Schools in Chile: Managing Competing Realities" *EDUHEM* 2016, Almeria, Spain, 2016. Online: <http://www.theartofpossibilities.org.uk/assets/docs/PROCEDIA%20LEADERSHIP%20OF%20PLACE.pdf>

Rivers, Bradley. Talk about teaching and playing, August 4, 2020. Recorded, not published.

Rotherham Andrew J. and Willingham Daniel T.: "'21st-Century' Skills Not New, but a Worthy Challenge" *American Educator*, Spring 2010. Online: <https://dbweb01.aft.org/sites/default/files/periodicals/RotherhamWillingham.pdf>

Sevaldson, Birger. *Redesigning Systems Thinking. Form Akademisk - forskningstidsskrift for design og designdidaktikk*. 2017. DOI: 10.107577/formakademisk.1755.

Summers, Nick: "How the UK's algorithm-based grading fell apart". *Endadget.com*, August 18, 2020. Online: <https://www.engadget.com/uk-algorithm-a-levels-gcse-results-143503870.html?guccounter=1>

The Black Curriculum: "The Black Curriculum". 2020. Online: <https://www.theblackcurriculum.com/>  
The Black Curriculum: "The Black Curriculum Syllabus". 2020. Online: <https://static1.squarespace.com/static/5c4325439d5abb9b27980cd4/t/5da4692b9af31217ca7435ba/1571055917521/Lesson+Overview+-+Term.pdf>

"The School That Tried to End Racism", Channel 4, 47 Minutes Episode 2 of 2, March 2019. Online: <https://www.channel4.com/programmes/the-school-that-tried-to-end-racism/on-demand/67448-002>

"The School That Tried to End Racism", Channel 4, 47 Minutes Episode 1 of 2, March 2019. Online: <https://www.channel4.com/programmes/the-school-that-tried-to-end-racism/on-demand/67448-001>

Thoughtful Learning: "What are 21st century skills? 2020. Online: <https://k12.thoughtfullearning.com/FAQ/what-are-21st-century-skills>

Tortoise: "Tortoise Education Summit". Talk about "How do we break the link between inequality and educational outcomes?". June 23, 2020. Online: <https://members.tortoisemedia.com/2020/06/23/education-summit-iv-2/content.html>

Tortoise: "Tortoise Education Summit". Talk about "What should we teach?". June 23, 2020. Online: <https://members.tortoisemedia.com/2020/06/23/education-summit-iii/content.html>

Tortoise: "Tortoise Education Summit". Talk about "Which is the best education system in the world?". June 23, 2020. Online: <https://members.tortoisemedia.com/2020/06/22/education-summit-i/content.html>

Tuck, Eve and Yung K. Wayne: "Decolonization is not a metaphor". *Decolonization: Indigeneity, Education & Society* Vol. 1, No. 1, 2012, pp. 1-40. Online: <https://www.latrobe.edu.au/staff-profiles/data/docs/fjcollins.pdf>

UCAR, "The Systems Game", *scied.ucar.edu*, 2012. Online: <https://scied.ucar.edu/activity/2925/print-all>

UK Government online: "The national curriculum". *www.go.uk. United Kingdom*, 2020. Online: <https://www.gov.uk/national-curriculum/key-stage-1-and-2>

Van der Mescht, Caroline: "How playing the 'School Game' helps kids on their journey to literacy". *The Conversation*, November 24, 2015. Online: <https://theconversation.com/how-playing-the-school-game-helps-kids-on-their-journey-to-literacy-50984>

Wienerl, I., Fleischmann, S. & Rotte, U. (2007). *Das Methoden-Handbuch Grundschule*. München: Oldenbourg.

"What a School Means: A Conversation with Eve L. Ewing", YouTube live webinar, 1:31:20, uploaded by "Haymarket books", May 15, 2020. Online: <https://www.youtube.com/watch?v=NH02egETxvI>

# Appendix

Following documents can be found via this link:

- PhD Application and Letter of Motivation
- Global Grad Show 2020 application
- Materials for Musu.Bi

[https://unibrightonac-my.sharepoint.com/:f/g/personal/v\\_auer1\\_uni\\_brighton\\_ac\\_uk/EpDZF3nENS9Oj9U-VUIEToicByy68mbAzblFkXOOfkAgNLQ?e=W8IQ2D](https://unibrightonac-my.sharepoint.com/:f/g/personal/v_auer1_uni_brighton_ac_uk/EpDZF3nENS9Oj9U-VUIEToicByy68mbAzblFkXOOfkAgNLQ?e=W8IQ2D)

The recordings from the talks with experts and core participants can be found via following link. The file includes the presentation that has been shown to the participants as well. Collaboration Talks are saved there too, but they are in German and not translated.

[https://unibrightonac-my.sharepoint.com/:f/g/personal/v\\_auer1\\_uni\\_brighton\\_ac\\_uk/ErhDbsSnMIBlpU5e0w-h4cEBDfzHB6tXb5ifYQjrhT\\_YA?e=nnWwIF](https://unibrightonac-my.sharepoint.com/:f/g/personal/v_auer1_uni_brighton_ac_uk/ErhDbsSnMIBlpU5e0w-h4cEBDfzHB6tXb5ifYQjrhT_YA?e=nnWwIF)

The signed Consent Forms of the participants can be found via following link. The file includes the information sheet for experts and other core participants.

[https://unibrightonac-my.sharepoint.com/:f/g/personal/v\\_auer1\\_uni\\_brighton\\_ac\\_uk/EmJQIplBlnBCjJMIJ-zbVEpgBV57ynrSwkHRFE0K8qe6rQg?e=DSgXcW](https://unibrightonac-my.sharepoint.com/:f/g/personal/v_auer1_uni_brighton_ac_uk/EmJQIplBlnBCjJMIJ-zbVEpgBV57ynrSwkHRFE0K8qe6rQg?e=DSgXcW)

# Consent Forms



The image shows a consent form for adults. At the top, it features the University of Brighton logo and the text 'Sustainable Education' in red, with the subtitle 'Exploring more sustainable alternatives to the traditional education system'. Below this, the title 'Participant Consent Form' is centered. The form includes the following text: 'Title of Project: Musu.Bi - learning to explore' and 'Name of Researcher: Valentina Auer'. A section titled 'Please initial or tick box' contains seven items, each with a checkbox: 'I have read and understood the information sheet for the above study and have had the opportunity to consider the information and ask questions.', 'The researcher has explained to my satisfaction the purpose, principles and procedures of the study and any possible risks involved.', 'I am comfortable with the researcher mentioning my name in the workbook as an expert of the field.', 'I understand that the participation is voluntary and that I am free to withdraw from the study at any time without giving a reason and without incurring consequences from doing so.', 'I understand how the data collected will be used, and that any confidential information will normally be seen only by the researchers and will not be revealed to anyone else.', 'I agree that I didn't record, film or take pictures during the talks and that nobody else who is not part of the talk was listening and/or recording it.', and 'I agree to take part in the above study.'. At the bottom, there are two horizontal lines for signatures, with the text 'Name of Participant, Date, Signature' and 'Name of Researcher, Date, Signature' below them.

Consent Form Adults



The image shows a consent form for children. It has the same header as the adult form: University of Brighton logo, 'Sustainable Education' in red, and the subtitle 'Exploring more sustainable alternatives to the traditional education system'. The title 'Participant Consent Form' is centered. The text includes: 'Title of Project: Sustainable Education' and 'Name of Researcher: Valentina Auer'. A section titled 'Please initial or tick box' contains seven items, each with a checkbox: 'My child has read and understood the information sheet for the above study and has had the opportunity to consider the information and ask questions.', 'The researcher has explained to my and my child's satisfaction the purpose, principles and procedures of the study and any possible risks involved.', 'I am aware that my child was asked to take part in an interview.', 'I understand that my child's participation is voluntary and that I am free to withdraw from the study at any time without giving a reason and without incurring consequences from doing so.', 'I understand how the data collected will be used, and that any confidential information will normally be seen only by the researchers and will not be revealed to anyone else.', 'I agree that my child didn't record, film or take pictures during the interview and that nobody else who is not part of the interview was listening and/or recording it.', and 'I agree that my child is allowed to take part in the above study.'. At the bottom, there are two horizontal lines for signatures, with the text 'Name of Participant aged under 18' and 'Name of parent or legal guardian, Date, Signature' below the first line, and 'Name of Researcher, Date, Signature' below the second line.

Consent Form Children

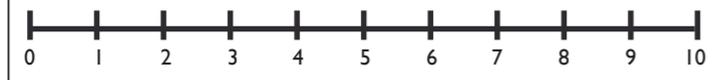
# Questionnaire



**PLAYTESTING SUMMARY**

Do you like the Musu.Bi character?  Yes  No

On a scale of 0-10 - with 0 being complete hatred, and 10 being total enthusiasm- how do you like this idea?



**Would you like to play this game in school?**  
 Yes  No

**Did you understand the rules after reading the instructions?**  
 Yes  No

**Which part did you like the most? And which the least?**

.....

.....

.....

.....

THANK YOU FOR YOUR HELP! :)



Filled Questionair and Reflexion Sheet

visit:  
<https://auerva29.wixsite.com/deschoolingeducation>

Valentina Auer  
Masters | MASD 2020