Cassandra Rousseau
Student ID: 40177594
cass201001@gmail.com

Critical Reflection —
Our Symbiotic Life: An Exploration of Interspecies Relations

CART 360: Tangible Media and Physical Computing
Elio Bidinost

December 6, 2021

Our Symbiotic Life: An Exploration of Interspecies Relations by Katja Budinger and Frank Heidmann focuses on how every living being is intertwined from an environmental perspective. The text explains how we depend on each other within the ecosystem. The main goal of this study is to find causes and consequences of climate changes within our interdependent relationships through design fiction. Design fiction is scenarios that help to find plausible futures for the ecosystem. It gives more insights into the ecosystem and reduces the topic's complexity. Different types of socioeconomic contexts explored in these scenarios are called *Shared Socioeconomic Pathways* (i.e., *SSP*s). These methods led to four main paths: *harmony*, *invasion*, *on demand* and *bottle garden*. Many scientists and activists spread these possibilities regarding the planet's future and humanity. However, the actions taken by politicians and big corporations do not save the planet. The promising advancements, the denial of the politicians regarding climate changes are factors that might lead humanity into a not-so-happy path.

Agreements in *COP26* show some advancement in politics regarding eco-conscious actions, leading to the *harmony* scenario. *SSP*s scenarios focus on three main factors: a socioeconomic framework, the current technology trends and the relationship between humans and plants. These possibilities will help to find solutions to climate change. The *SSP*s use five of these factors: demographic, human development, economics, lifestyles, policies, institutions, technologies, environments, and natural resources. The *harmony* scenario focuses on sustainable technologies like autonomous and sufficient self-driving landscapes. This idea arose due to the eco-conscious citizens and their will to save the planet. Some ecological advancements happened during the *COP26* (i.e., *26th Conference of the Parties*). *COP* is a global climate summit that brings every country to discuss the possible actions regarding climate change.[1] This year, multiple measures have been taken. More than 100 countries have joined the coalition to reduce 30% methane gas emissions by 2030.[2] Global Methane applies to countries that account for half of the worldwide methane emission and 70% of global GDP (i.e., gross domestic product).[3] An agreement on phasing down the use of coal was made during the summit.[4] A pledge between the United States and China has been completed.[5] This collaboration agrees to produce more clean energy, mitigate deforestation, and reduce methane emissions. The target of reaching 1.5 Celsius degrees by 2030 was

[1]"What is a COP?," UK Presidency, UN Climate Change Conference UK 2021, accessed December 3, 2021, https://ukcop26.org/uk-presidency/what-is-a-cop/.

[2] Emma Newburger, "What the COP26 climate conference really accomplished," *CNBC*, November 16, 2021, https://www.cnbc.com/2021/11/16/un-cop26-climate-summit-what-was-accomplished.html.

[3] "What the COP26."
[4] "What the COP26."
[5] "What the COP26."

strengthened.[6] These actions could lead to a more positive future and make the happy path happen. However, these changes are not as significant as they appear to be.

This lack of action by the leaders shown during the summit proves there is still a long way to go, leading to either the *invasion*, *on demand*, or the *bottle garden* scenarios. The *invasion* scenario describes the survival war between species. Certain species will use technology for their own needs. This idea comes from the rise of nationalism and protectionism in various countries and the overconsumption of natural resources. These visions enter in conflict with the cohabitation nature of plants. The *bottle garden* scenario is based on global inequalities. High-income citizens will access technological development and food. Lower incomes will have difficulty feeding themselves and will tend to upcycle and repair their material possessions. Teenagers will insulate themselves into digital universes. Species will struggle to survive through continuous climate changes. It will be a collaborative survival. The *on demand* scenario explains the use of plants as accessories rather than considering them as living beings. This tendency is due to consumerism, individualist social values, and their faith in geoengineering as the problem-solver of climate change. During *COP26*, the agreement on coal was softened. At first, the countries agreed on phasing out coal and inefficient subsidies for fossil fuels. However, China and India (i.e., big coal consumers) insisted on changing the term to "phasing down."[7] This change slows down the process of reducing pollution. The deadlines on certain decisions are not tight enough. Keeping the golden rule of reaching 1.5 Celsius degrees is not enough anymore for all the work the world needs to do.[8] Indigenous communities call back the decisions taken during the summit. The communities called out the regulated global carbon trading market.[9] This trading market allows countries to meet their environmental objectives partially. These green energy projects like biofuel monocrops and hydroelectric dams are linked to environmental destruction and even displacement, arbitrary arrests, and murder making them unethical and illogic resources.[10] This exploitation could sequester lands, forests and rivers used by Indigenous and local communities.[11] These exploitations do not guarantee a massive drop in gas emissions. Critics explain this offset the gas emissions rather than cutting them. Indigenous communities are often put aside during environmental negotiation when 80% of the biodiversity is in their territories.[12] Around a thousand

---

[6] "What the COP26."
[7] "What the COP26."
[8] "What the COP26."
[9] Nina Lakhani, "'A death sentence': Indigenous climate activists denounce Cop26 deal," *The Guardian*, November 16, 2021, https://www.theguardian.com/environment/2021/nov/16/indigenous-climate-activists-cop26-endangers-native-communities.

[10] "'A death sentence'."
[11] "'A death sentence'."
[12] "'A death sentence'."

activists have been murdered after the Paris accord due to defending lands from polluting projects.[13] The creation of carbon sink through reforestation and afforestation might threaten livelihoods, food security, traditions of Indigenous communities and small farmers for the sake of tree planting.[14] This solution is not wrong, but this will only change an issue to another. The 30 by 30 initiative will cause the most significant displacement of the population to conserve 30% of the planet's lands and seas.[15] *COP26* agreements threaten Indigenous communities by fossil fuel companies and climate crisis. Many are worried that richer polluting countries will obstruct any help for communities already victims of climate change.

The comparison between the *SSP*s and current situations shows the importance of *SSP*s in the take of action regarding climate change. These different perspectives help define and start a concrete dialogue within the population. However, the population depends on the high leaders to make more significant changes, but the results challenge humanity's future. Their indifference and ignorance become worrying and dangerous.

[13] "'A death sentence'."
[14] "'A death sentence'."
[15] "'A death sentence'."

Bibliography

Budinger, Katja and Frank Heidmann. “Our Symbiotic Life: An Exploration of Intersepcies Relations.” Report, University of Applied Sciences,2019.

Lakhani, Nina. “’A death sentence’: Indigenous climate activists denounce Cop26 deal.” *The Guardian*. November 16, 2021. https://www.theguardian.com/environment/2021/nov/16/indigenous-climate-activists-cop26-endangers-native-communities.

Newburger, Emma. “What the COP26 climate conference really accomplished.” *CNBC*. November 16, 2021. https://www.cnbc.com/2021/11/16/un-cop26-climate-summit-what-was-accomplished.html.

UN Climate Change Conference UK 2021.”What is a COP?.” UK Presidency. Accessed December 3, 2021. https://ukcop26.org/uk-presidency/what-is-a-cop/.

Cassandra Rousseau
Student ID: 40177594
cass201001@gmail.com

Critical Reflection —

Textile Game Controllers: Exploring Affordances of E-Textile Techniques as Applied to Alternative Game Controllers

CART 360: Tangible Media and Physical Computing
Elio Bidinost

December 6, 2021

Textile Game Controllers: Exploring Affordances of E-Textile Techniques as Applied to Alternative Game Controllers is a paper that describes remote workshops that covered e-textile techniques by making alternative game controllers. The purpose was to prioritize creative exploration within marginalized makers, allowing diversity, equity, and inclusion within the game-making field. The main research goal was to explore and elucidate the overlap between e-textiles and experimental game making. The workshops served as a research method on embodied experience. Giving marginalized communities space to express themselves reduce the inequalities. However, there are still a lot of issues within the video game field. The game community and industry poorly recognize women in the community, give few spaces to people of colour, and games are poorly accessible to people with disabilities.

The workshops served to give space to women, which are not acknowledged in the field. In the industry, only 24% of workers are female.[1] This low percentage is due to being poorly represented in the game industry and the cultural issues within the community. Many women workers and gamers live harassment. Female protagonists' characters in video games represent only 5% and are often objectified or hypersexualized.[2] The gaming experience shifts towards men (e.g., violence, sex, competition, etc.) This environment makes women feel underappreciated and unrecognized. Some measures have been applied within the community. Some universities such as *UCA* (i.e., *University for the Creative Arts*) have used a 60/40 students' ratio.[3] Some created inclusive courses about game design. Many groups exist to give space to marginalized groups and promote intersectional practices such as *Dames Making Games* or *Women in Games*.[4] Their goal is to raise awareness regarding gender discrimination in the gaming field. Maker groups helped raise feminism in critical design in craft practices. One of the game jam objectives was to provide domain expertise to participants within an equity-seeking community. The do-it-yourself approach of the game jam gives a diverse and equitable space in technology making.

[1] Tomoko Yokoi, "Female Gamers Are On The Rise. Can The Gaming Industry Catch Up?," *Forbes*, March 4, 2021, https://www.forbes.com/sites/tomokoyokoi/2021/03/04/female-gamers-are-on-the-rise-can-the-gaming-industry-catch-up/?sh=4058655af9fe.

[2] "Female Gamers."

[3] Becca Caddy, "'I was always told I was unusual': why so few women design video games," *The Guardian*, February 17, 2020, https://www.theguardian.com/education/2020/feb/17/i-was-always-told-i-was-unusual-why-so-few-women-design-video-games.

[4] "Female Gamers."

Giving space to people of colour was also a goal during this game jam due to their poor exposure in the field. Only 2% of professionals in the game industry in the U.S. are black people.[5] 4% of workers worldwide in the game industry are people of colour.[6] Some measure has been taken. The *Big Five in Five* campaign wants to boost Black employment to 5% in the next five years.[7] Companies like *Electronic Arts* inserted programs to employ more Black workers.[8] Intersectionality was vital during the game jam. Organizers wanted workshops to enable material development and share skills and domain knowledge across participants. It offers a way to consider sustainability in research outcomes. The involvement of numerous cultures shows the importance of inclusion in game making. Intersectionality allows developing better creations due to various perspectives.

Accessibility was a strong theme in this game jam due to poor consideration regarding disabled people. The game industry has difficulty understanding how to do appropriately accessible games. Accessibility does not depend just on the difficulty of the levels in the game. Accessible features should complement the game. These options should not remove anything from the gaming experience but help those with disabilities to appreciate it even more. Some measures have been taken. Multiple companies now hire accessibility consultants and developers to make their games playable for disabled people.[9] UI and UX get more and more adapted to disabled people, users can customize controls, workspace becomes more inclusive regarding disabled workers.[10] Alternative controllers made during game jam allowed removing established conventions in games and design. The material play approach used during the jam is central to physical experiences of making, haptic and multi-sensory feedback core to learning and developing e-textile and wearable technology projects. Organizers used play, in which this mechanism for transmission involves the public in social spaces to extend the research to a broader audience. During the jam, five workshops were offered, focusing on creating alternative game controllers using textile sensors and microcontrollers. Each workshop explored different topics, materials, methods, and game types. It served

---

[5]Karen Toulon and Bloomberg, "Black workers find little opportunity in growing video game industry," *Fortune*, March 16, 2021, https://fortune.com/2021/03/16/video-game-industry-lacks-diversity/.

[6] Chella Ramanan," The video game industry has a diversity problem – but it can be fixed," *The Guardian*, March 15, 2017, https://www.theguardian.com/technology/2017/mar/15/video-game-industry-diversity-problem-women-non-white-people.
[7] "Black workers."
[8] "Black workers."

[9] Grant Stoner, "How accessibility consultants are building a more inclusive video game industry behind the scenes," *The Washington Post*, February 25, 2020, https://www.washingtonpost.com/video-games/2020/02/25/how-accessibility-consultants-are-building-more-inclusive-video-game-industry-behind-scenes/.

[10] "How accessibility."

as an opportunity for iterative development. Controllers produced were used to control existing games. The first workshop, *Introduction to Textile Game Controllers*, introduced a selection of materials and prototyping methods to gauge interest in topics for future workshops. The game jam introduced three sensing methods: capacitive sensing, digital switches, and analog sensors, all made with conductive textiles. The used methods were connecting e-textiles on *Makey Makey* (i.e., prototyping board creating *DIY* interfaces for games) and using *Arduino Micro* board to enable textiles switches to control browser-based games on a *USB*-connected laptop. The second workshop, *Body-Centric Game Controllers,* dived into creating game controllers using analog sensors. Sensors are made with conductive fabric and resistive plastic sheeting. The workshop designs pressure-sensitive textile buttons for specific body parts. The third workshop, *Wearable Game Controllers*, focused on a more complex implementation of digital switches, introducing the idea of *social switches*. A piece of conductive fabric on another person's body part will close the switch and make an electrical connection. The fourth workshop, *Stitch and Stuff: Making Embroidered Games,* focused on creating capacitive sensors using embroidering techniques with conductive thread. Took a hardware-only approach to make a textile game controller; the game does not rely on a screen-based device. The last workshop, *Fun with Felting*, used the same sensing technique (i.e., capacitive) with a different crafting technique - felting. These explorations are steps that lead the industry to a more accessible space. However, these solutions will not solve every disability.

The game jam created an inclusive space where marginalized communities could feel welcomed. The intersectionality between different genders, cultures, and realities brought unique visions to change the game industry's narrowed mindset. However, it will take more actions than equity-seeking workshops about alternative game controllers to engage more significant changes for the communities in this field.

Bibliography

Bloomberg, Toulon, Karen. “Black workers find little opportunity in growing video game industry.” *Fortune*. March 16, 2021. https://fortune.com/2021/03/16/video-game-industry-lacks-diversity/.

Caddy, Becca.”’I was always told I was unusual’: why so few women design video games.” *The Guardian*. February 17, 2020. https://www.theguardian.com/education/2020/feb/17/i-was-always-told-i-was-unusual-why-so-few-women-design-video-games.

Ramanan, Chella.” The video game industry has a diversity problem – but it can be fixed.” *The Guardian*. March 15, 2017. https://www.theguardian.com/technology/2017/mar/15/video-game-industry-diversity-problem-women-non-white-people.

Stoner, Grant. “How accessibility consultants are building a more inclusive video game industry behind the scenes.” *The Washington Post*. February 25, 2020. https://www.washingtonpost.com/video-games/2020/02/25/how-accessibility-consultants-are-building-more-inclusive-video-game-industry-behind-scenes/.

Yokoi, Tomoko. “Female Gamers Are On The Rise. Can The Gaming Industry Catch Up?.” *Forbes*. March 4, 2021. https://www.forbes.com/sites/tomokoyokoi/2021/03/04/female-gamers-are-on-the-rise-can-the-gaming-industry-catch-up/?sh=4058655af9fe.

Hartman, Kate, Emma Westecott, Izzie Colpitts-Campbell, Jennie Robinson Faber, Yiyi Shao, Chris Luginbuhl, Olivia Prior, Manisha Laroia. “Textile Game Controllers: Exploring Affordances of E-Textile Techniques as Applied to Alternative Game Controllers.” Report. OCAD University and Dames Making Games, 2021.

Cassandra Rousseau
Student ID: 40177594
cass201001@gmail.com

Critical Reflection —
Making Sense of Sensors: Discovery Through Craft Practice With an Open-Ended Sensor Material

CART 360: Tangible Media and Physical Computing
Elio Bidinost

December 6, 2021

This report explores sensors material through the movement of conductive elements within a magnetic field. Craft-based research and Material Driven Design methodologies are effective in this study. These methods show how using craft-based processes, exploring the material uses and understanding materials' agency allow designers to create meaningful projects.

Craft-based research allows effective and refined results. The craft itself means learning and understanding through material experience.[1] In this process, artists need to indicate the research issue, demonstrate an understanding of the research process, acquire research methods, and consolidate them while verifying the results and contribution of the research.[2] Positioning craft practice in research facilitates reflection and articulating practitioner knowledge and experience. Hybrid crafting techniques and processes used in this study are all principles of craft research. Making sensors from "craft materials" and focusing on craftsmanship with technology can lead to inclusive use of technology. The study acknowledges that effective digital handcrafting processes require stepping back from the technologically driven desire to produce "toolkits," limiting unique craft responses.[3] The paper experimentation followed the process by dividing the research into three stages. The first one was a design exploration done by one of the researchers, Charlotte Nordmoen. The second was a workshop gathering eight designers, and the third was a longer-form exploration workshop involving four designers. In the first exploration, Nordmoen desired to understand how sensors work. The inquiry was divided into two main steps. The first step served at finding the different characteristics of a signal. This exercise aimed to check the possibility of producing a signal with this method and visualize the magnetic field. The second step of exploration focused on finding the parameters of the sensor material. This first stage investigates their abilities, richness of gestures and nuance. Two workshops happened during two half-days for the second and third stages. The workshops focused on teaching participants how to make their sensors. The first workshop has a formula of constant discussions and presentations between the eight participants while creating their objects. The second workshop was divided into two parts: the first one allowed the four participants to explore the material and the second part served to iterate their sensor object. The purpose was to observe how designers came to terms with the sensor material and these improvisatory explorations and investigate their meaning-making processes. This process allows putting the craft into a scholarly perspective, defining better the properties of sensors.

[1] Nithikul Nimkulrat, "Hands-on Intellect: Integrating Craft Practice into Design Research," (Report, Loughborough University, 2012), 1.

[2] "Hands-on Intellect,"2.

[3] "Hands-on Intellect,"2.

Exploring sensor materials through Material Driven Design (i.e., MDD) allowed designers to understand better their used components. The Material Driven Design aims to support designers to design meaningful experiences with the material at hand, qualifying material for what it expresses to designers and making them do.[4] This methodology facilitates creating meaningful experiences when the material is the starting point in the design process. It allows the material to afford curiosity and exploration of possibilities. Material Driven Design processes are found in HCI, where interactions between the designer and the material develop an implicit or explicit understanding of its properties and characteristics. Sensors' study was based on HCI's "material turn" in which the physical and digital are intertwined. Material Driven Design challenges designers' capability to design and restrict affordances with hybrid physical-digital objects. The "potentially endless" use cases make it harder to designers to constrain the affordances of the materials. The study experiments a wide variety of conductive and non-conductive materials from which the sensor can be crafted. Many outcomes emerged from these experimentations. They were three processes where the designer responds to the material that share the well-established baseline that designers "follow the materials": *Logical*, *Conceptual* and *Intuitive* approaches. In the *Logical* approach, understanding emerges through exploration and precedes application. An exploratory process directs toward an established conceptual goal in the *Conceptual* approach. In the *Intuitive* approach, artifacts and material understanding are co-created in an improvisatory way, with the possibility for understanding is inferred retrospectively from specific application scenarios. The explorations, particularly those following the Intuitive approach, could be described as material improvisation: co-creating interactive objects and material understanding without a solid preconceived notion. These approaches found through Material Driven Design allow a better understanding of how to play with sensor material.

Agency provides a way to talk about how creativity emerges in situated interactions between designers and materials. The notion of agency focuses on emerging properties of materials and how they actively contribute to how design activity unfolds.[5] Materials are performative objects that actively contribute to the design process. Continuous additions of physical properties in various materials actively shape the ongoing design and provide a specific direction and possibilities for generating new ideas. [6] It is through unfolding that agency emerges. By assuming people and technology interplay, it is possible to scrutinize

[4] Taner Olcay, "How Can Material Driven Design Create Playful Interaction?," (Report, Malmö University, 2017), 2.

[5] Jakob Tholander, Maria Normark, Chiara Rossitto, "Understanding Agency in Interaction Design Materials," (Report, Stockholm University and Södertörn University, 2012), 2499.

[6] "Understanding Agency," 2504.

how design materials shape the design process.[7] In the study, organizers noticed that the created objects' interactivity during the workshops could be classified into two categories: proximity and deformation. In proximity-oriented objects, the conductive material and magnet are separated by air. The proximity of the two materials creates various interactions. Deformation-oriented objects were situations where the magnet and conductive material are part of an ordinary object but separated by material. Any exchange that causes the material to deform triggered this type of interaction. Agencies allow a better understanding of the material properties.

The methodologies used allowed participants and researchers to develop further the study and discover more about the studied material. Craft-based research, Material Driven Design, and agency structure the design process. Participants had various ways to approach unfamiliar sensors material concerning their ideas and concepts of what they wanted to make. Many similarities emerged between the projects, but all had different meanings. This whole process shows how craft can be used in a scholarly environment.

[7] "Understanding Agency," 2501.

Bibliography

Nimkulrat, Nithikul. “Hands-on Intellect: Integrating Craft Practice into Design Research.” Report. Loughborough University, 2012.

Nordmoen, Charlotte, Jack Armitage, Fabio Morreale, Rebecca Stewart, Andrew McPherson. “Making Sense of Sensors: Discovery Through Craft Practice With an Open-Ended Sensor Material.” Report. Queen Mary University of London and University of Auckland, 2019.

Olcay, Taner. “How Can Material Driven Design Create Playful Interaction?.” Report. Malmö University, 2017.

Tholander, Jakob, Maria Normark, Chiara Rossitto. “Understanding Agency in Interaction Design Materials.” Report. Stockholm University and Södertörn University, 2012.