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Synergetic Landscapes Unit: The Multispecies Biodigital Community Codesign

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Synergetic Landscapes Unit:

The MultiSpecies BioDigital Community CoDesign

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Abstract

The paper unfolds a work of Synergetic Landscapes unit of Master of Architectural Design at the Welsh School of Architecture. This collaborative design unit focuses on generating potentials for coperforming landscape of human and non-human, living and non-living, natural and artificial participants of Grangetown community, Cardiff, Wales, UK. The term community in this project is extended from what used to be understood in anthropocentric culture. In 21st century, i.e. rivers (such as Whanganui River) and others are reclaiming their legal personhood. This work aims to integrate variety of living and non-living agents within the community in codesigning flourishing environment with and for All. It aims for transition towards the era of Post-Anthropocene where living and non-living beings and systems coexist together in synergy. The methodology of Systems Oriented Design and full-scale prototyping has been implemented into a real life codesign laboratory that is performing in real life and real time.

Introduction

This paper discusses the first year of Synergetic Landscapes unit of Master of Architectural Design at the Welsh School of Architecture, Cardiff University (Davidová, 2020a). It is investigating a specific biodiversity support community based project within a larger Cardiff University project 'Community Gateway' (Cardiff University, 2019) in Grangetown, Cardiff, UK. In 2012, a group of around twenty residents began meeting around kitchen tables to talk about how they might instigate the development of a neighboring vacant and deteriorating building through a Community Asset Transfer (CAT), a process whereby civic structures and services are transferred from central or local government to individuals or organizations in one of the most deprived areas of UK. Their ambition sat within a broader context of austerity cuts to civic facilities and services in the UK (McVicar, 2020). These long-lasting attempts resulted in much larger community-based activities where the Synergetic Landscapes unit comfortably nested in with its agendas. The project is addressing Future Generations Act released by Welsh Government that is clearly stating that every activity must act in the aims of sustainability for and aims of future generations (Future Generation Commissioner for Wales, 2015).
Recently, many architects and urban designers are searching for ways to adapt our cities for coliving with other species. Examples can be found in work of Terreform One (Joachim & Aiolova, 2019), Rewild My Street group (Moxon, 2019) or pedagogical work of Michael Hensel and coll. (Hensel, Santucci, Sunguroğlu Hensel, & Auer, 2020). This project is referring to a report of Professor Sir Partha Dasgupta on The Economics of Biodiversity that claims that the true value of the various goods and services nature provides is not reflected in market prices because much of it is open to all at no monetary charge. These pricing distortions have led us to invest relatively more in other assets, such as produced capital, and underinvest in our natural assets (Dasgupta, 2021). Therefore, the Synergetic Landscapes unit is introducing a system, where also non-human beings and items have their own wallet (Davidová & McMeel, 2020). The project is based on ecosystemic circular economy that is integrating DIY full-scale prototyping from local natural resources with local small environmental businesses within a token economy (Davidová, 2020a).

Methodology

This project has been and is in ongoing codesign with a local community. At first point, gigamapping has been used within both the unit's collaborative work as well as within codesign workshops with local community. Gigamapping is a primary methodology in SOD [Systems Oriented Design] and is known as a technique for collaborating groups to map, contextualize, and relate complex systems, revealing their environment and landscapes (of interaction), their current states, as well as preferred future states. Gigamapping has been a central tool for co-inquiry where experts, users, and other stakeholders are brought together and are immersed in dialogue across their specialized cultures and terminologies (Sevaldson, 2018b). This also applies to non-expert stakeholders, ranging from children to excluded community members. This project was combining such with prototyping where tangible prototypes were placed and related on gigamap. This engages better participation, specifically from children and vulnerable groups.

The unit was codesigning both, tangible 'prototypical urban interventions' (Doherty, 2005) that are to support cross-species edible and habitable landscape as well as intangible systems around them. The prototypical interventions were proposed to the community in form of recipes for DIY in their front and back gardens within the COVID locked down neighbourhoods (Davidová, 2020c). Therefore, the system was proposed as generative through their community participation rather than tangible physical placement. Along with this generative approach, an interactive online map was created to motivate biocorridors creation across the neighbourhoods (Wang, 2020). Such generative real life prototyping is discussed by the author as 'real life codesign laboratory' because it is generatively codesigned in real life and real time (Davidová, 2020b; Davidová, Pánek, & Pánková, 2018).

The Gigamapping

The unit's collaborative design is developed through 'gigamapping' exploration and development around six key topics synthesised in six individual 'ecosystemic prototypical interventions' (Davidová, 2020b) designs. The topics cover: a) synergising gigamap relating all; b) biocorridors' potential in the locality; c) interaction and codesign with the community; d) circular economy and blockchain; e) materials and prototyping. Besides that, each prototype design had its own gigamap (Davidová et al., 2020). Each prototypical gigamap related to all other prototypes as well as to each topic. The same way each topic related to all other topics as well as to all prototypes.

Synergised Topics Gigamapping

The synergising gigamap relating all together

The synergising gigamap (see Figure 1) is to relate and synergise all the explored topics as well as all the designed prototypical interventions into a rich and holistic picture. It is integrating all analogue gigamaps from codesign and collaborative workshops. It serves as a tool for orientation across the processes within the unit. It covers multi-disciplinary and multi-stakeholder team as well as representatives of those who cannot be heard (Sevaldson, 2018a) such as when dendrologist represents a tree (Davidová & Zímová, 2018). This gigamap covers a legend with 'library of systemic relations' (Sevaldson, 2011) as well relations interpretations (see Figure 1). The relations' interpretations are specifically important in gigamapping because without those, the relations have no meaning. These interpretations cover types of connections and existing or possible actions from existing stage to possible desired or non-desired future states. These also cover desired and catastrophic scenarios, speculations, and agendas. The thicknesses suggest cross-topics importance and the dashed/nondashed density level of interaction. The

colour coding the topics, sizes of the sets the grouping. Though the gigamap might look hierarchical, it is not the case. The gigamap is marking different relations across different types of sets.
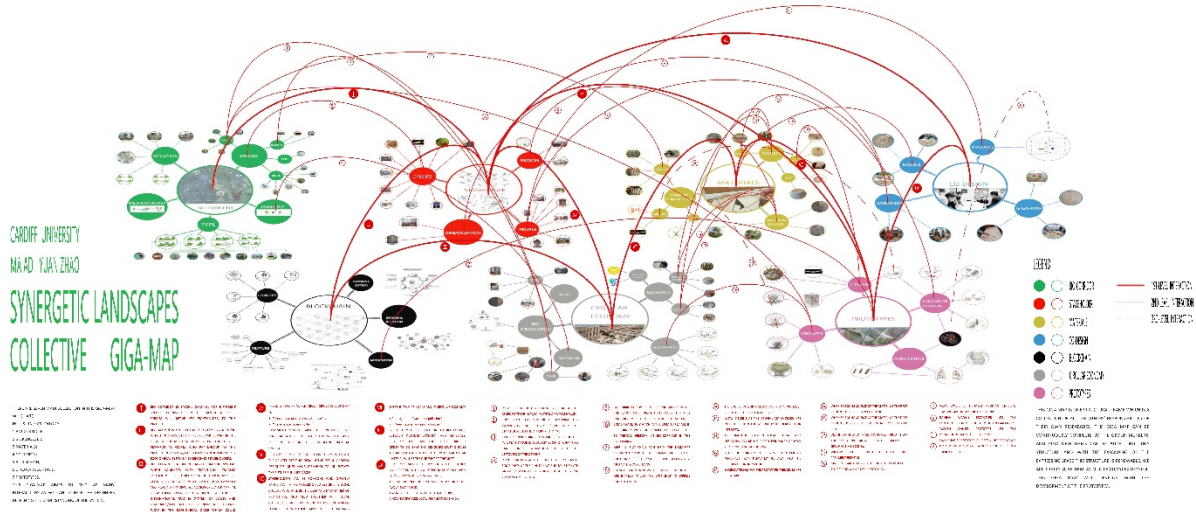

Figure 1: Synthesising gigamap with a legend of the library of relations and relations interpretations (Zhao, 2020)

The biocorridors' potential in the locality

The aim of the interventions is to support biocorridors and its biotops across the territory, generating a connection between the city's two rivers and natural parks (Wang & Davidová, 2020). This is investigated in extensive gigamapping (see Figure 2). Grange Gardens, the original spot for the tangible interventions, is a park on a square in central Grangetown with its community centre that was newly restored through Cardiff University's Community Gateway project (Cardiff University, 2019). The central urban biotops of parks, front and back gardens and cemeteries are crucial for urban connectivity across the natural, rural, peri urban and urban areas, therefore critical for biodiversity (Ossola & Niemelä, 2018). Due to the COVID 19 pandemic, we did not place the tangible interventions in Grange Gardens. Instead, we focused more on interaction design, motivating the community to DIY the prototypes in their front and back gardens. The gigamap is zooming in and out of different scales, relating types of biocorridors on city and community scale with existing and future prototypes as well as with local species across different biotopes. The central lines are relating these different scales with different actors and interventions.
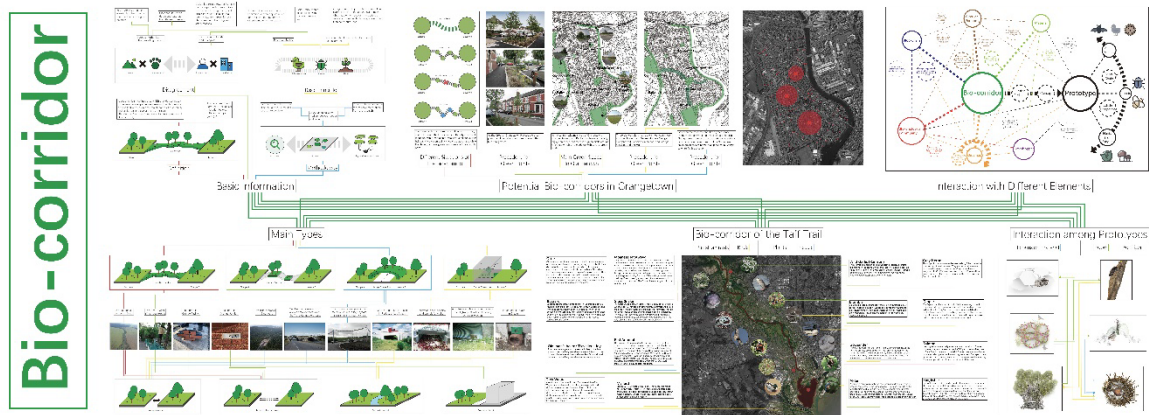

Figure 2: WIP gigamap of the territory's connectivity and its species (Wang, D. 2020)

The interaction and codesign with the community

The community gigamapping resulted into two codesigning workshops that helped to cocreate the local specificity of the topics' systems as well as of the individual prototypes. The codesigning covers specifically an interaction design that motivates to cocreation across variety of species and digital technologies that are enabled through the prototypes. The gigamap on Figure 3 is mapping such relations and processes. Such relations cover habitable and edible landscape cogenerated with all, enabled through interaction and DIY iterations of the firstly codesigned prototypes. This codesign also covered prototypes DIY competitions for local schools and an online interactive map for uploading DIYed prototypes and generating biororridors across the city. The interaction strategy is suggesting prototypes placement and motivation for such as one sees the missing points in the biocorridors on the map. This community gigamap (see Figure 3) is relating human and non-human stakeholders' actions and interactions and edible and habitable prototypes as well as existing landscape. It is organised in rows covering different topics. The relations suggest the topics' cross-sections.
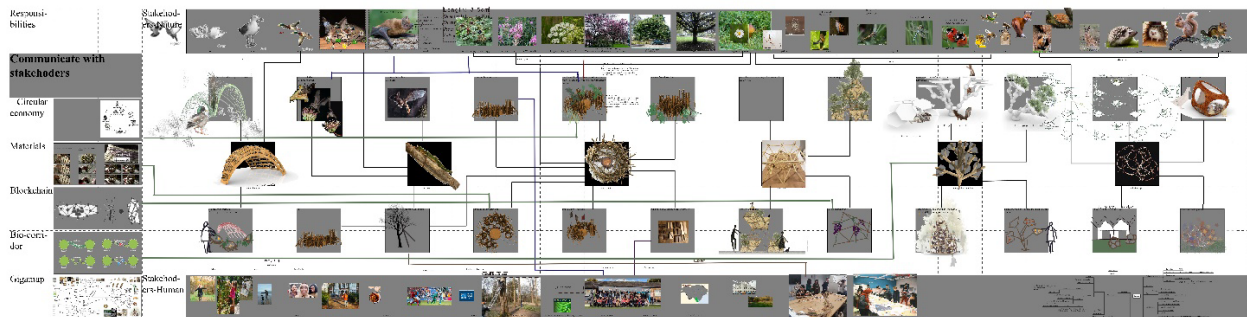

Figure 3: Community gigamap mapping human and non-human stakeholders' interaction opportunities and events (Feng, 2020)

The circular economy and the blockchain

Within this system, the discussed variety of living and non-living agents own their own token wallet to cocreate circular economy around the above coproduction (see Figure 4 and Figure 5). As the system is based on materials and actions found in nature, there is no need for initial investment. This is specifically important for deprived communities, such as Grangetown as well as for non-human actors. Such approach is inspired by Artists Re:Thinking Blockchain project that is assigning a wallet and decision making to coffee machine (Cathlow, Garrett, Jones, & Skinner, 2017). If the coffee machine can have a wallet, why not a duck? - Remember, a river can have the personhood. - Would you pay a duck to eat overpopulated slugs in your garden so that she can buy her habitat? Would you pay pollinators to pollinate your tomatoes? And, to gain tokens to pay them, would you DIY reproduce an insect hotel or a duck house? Can we integrate small local sustainable businesses so that children can get a candy for extending habitats for foxes that eat the shop's mice? This project is eager to set up such systems that will be developed through the community and will develop its biotops and biocorridors where all can flourish. The gigamaps on Figure 4 and Figure 5 are setting scenarios of different systemic actions across the species, integrating their engagement and ecosystemic circular economy for regenerative community that is based in local nature. This local nature also includes humans.
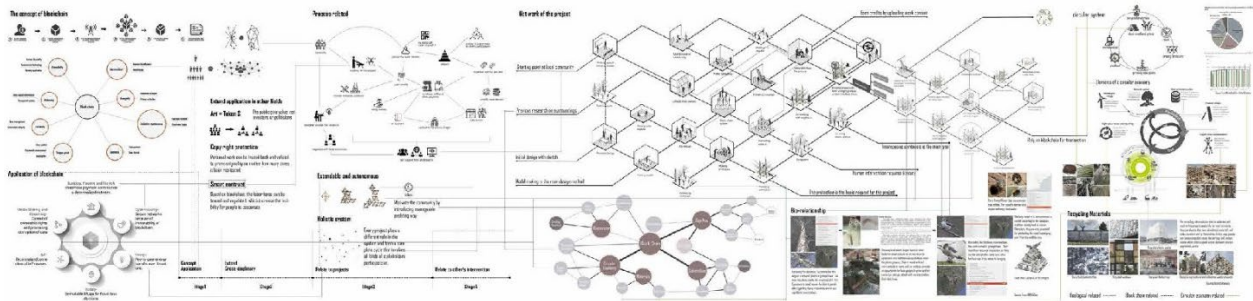
Figure 4: Gigamap developing systems on circular economy and blockchain (Wang, Y. 2020)
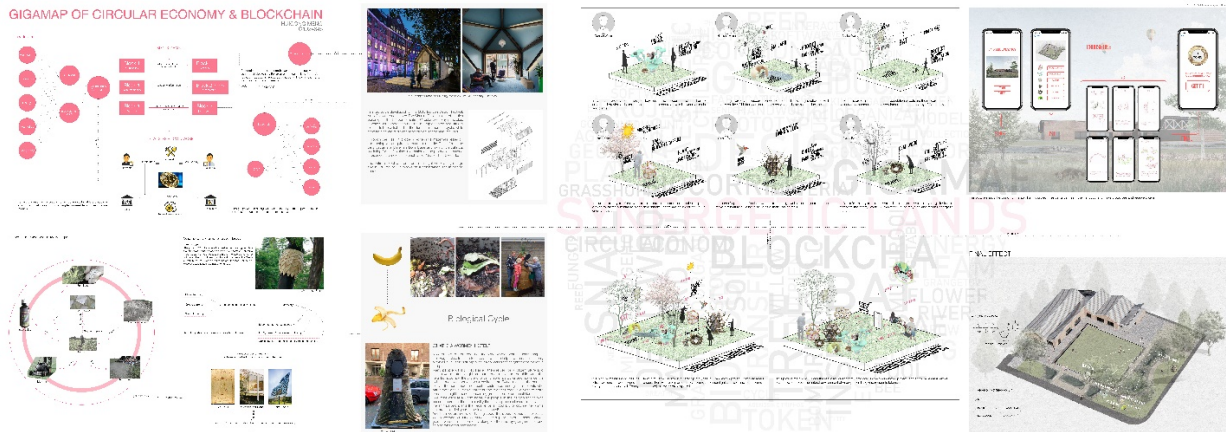

Figure 5: Gigamap developing local specific blockchain and circular economy scenarios for the prototypes and their systemic relations (Meng, 2020)

The materials and prototyping

Based on an ecologist advice, we decided to use only materials found in local nature. This advise is based on species' safety and preferences. Such materials are also the most accessible to the members of the deprived community. With this idea in mind, we also explored local traditional techniques, as they were developed over generations to produce craftmanship objects from 'what was there'. The real life prototypes are to be produced from both, living and nonliving hedges, willows and other wood, straws, ivy, leafs and needles (see Figure 6 and Figure 11). The unit planned to place its final physical prototypes into the 'real life codesign laboratory' (Davidová, 2020b), means the existing ecosystem for its interaction, in April. This obviously did not happen due to COVID-19 pandemic. Instead, we focused on developing DIY recipes and online platforms for their distribution. This way, the prototypes will spread to local front and back gardens of the locked down people, securing educational programs for children. The gigamap (see Figure 6) is relating different local natural materials and tree species with potential habitats for local animals. It is suggesting diverse local traditional techniques such as weaving, hedging and their contemporary adaptations.
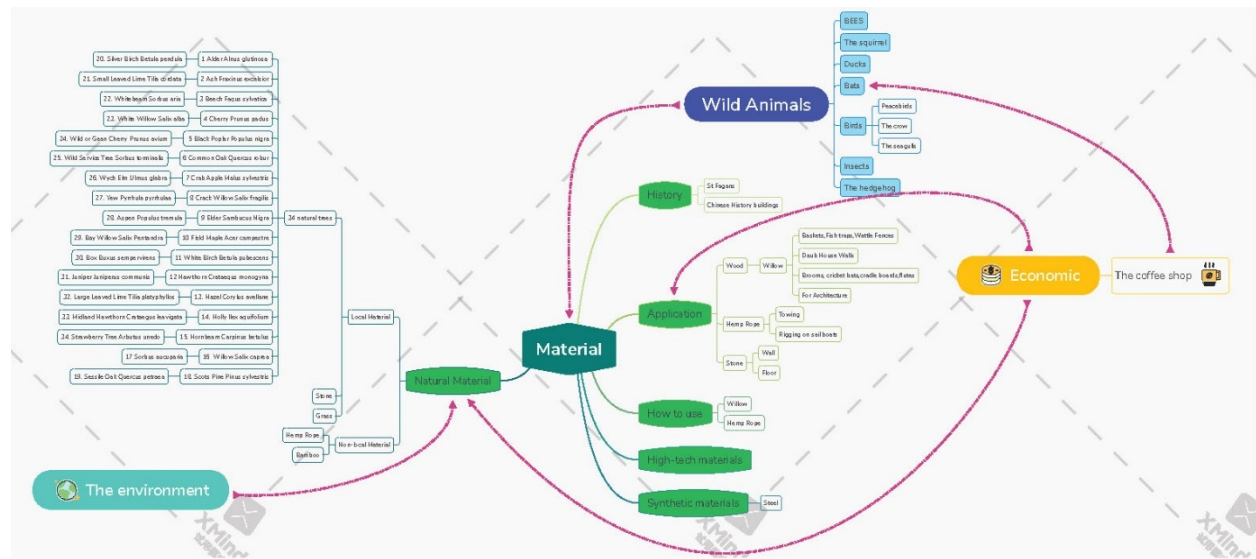
Figure 6: Natural materials and prototyping gigamap (Wang, M. 2020)

Prototypes Gigamapping

The prototypes were designed to support edible and habitable landscape in Grangetown community. They aim on creating biotops that together generate 'punctuate biocorridors' (Wang & Davidová, 2020). The prototypes' gigamaps (see Figure 8, Figure 9, Figure 10 and Figure 11) are relating scenarios of cross-species interaction and DIY on various urban scales, the design process, the materials and prototyping and their integration into the systems described above. They also relate the systems amongst each other prototypes.

The gigamap by Yuan Zhao (see Figure 8) is showing both, complex and linear relations. The linear relation is to navigate and exemplify the complex relations. Such type of gigamap is good for project presentation, showing one detail as well as the rest. The gigamap by Danjian Wang (see Figure 9) is relating the design process, the performance within the biocorridors as well as relations to others through a central line. It also enables fast navigation through its organisation to different feeds. The gigamap by Yutao Feng (see Figure 10) is zooming in and out of different scales and design processes, relating inspirations with analogue and digital prototyping. The gigamap by Yuchen Wang (see Figure 11) is axonometrically showing different layers of the city, relating them with different actors and the cocreation process of people and other species through tree growth scenarios. It is suggesting this on a city as well as the local level.
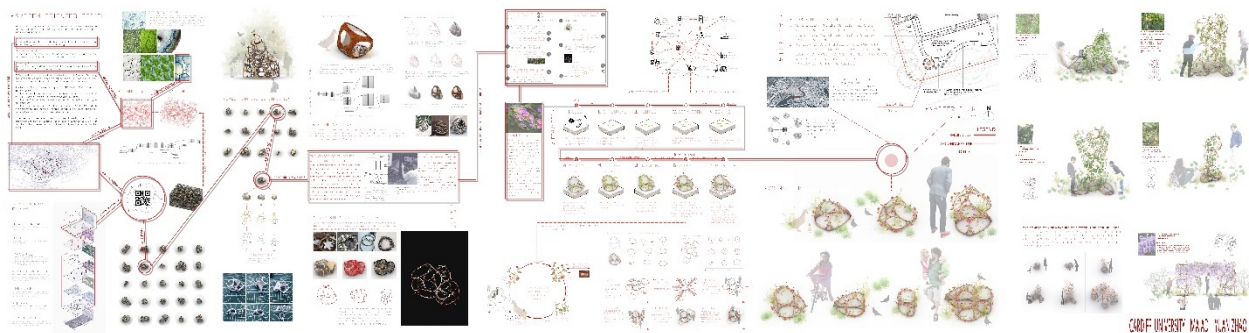

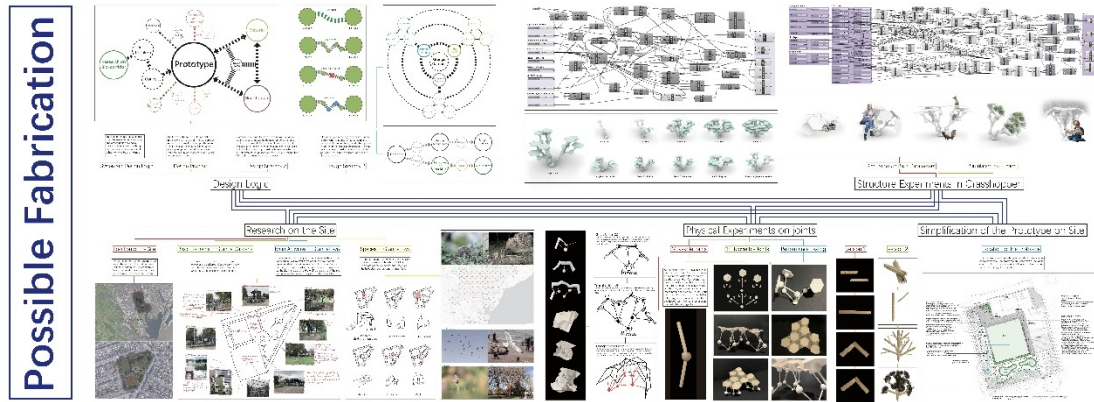**Figure 7: City Grow prototype gigamap (Zhao, 2020)**

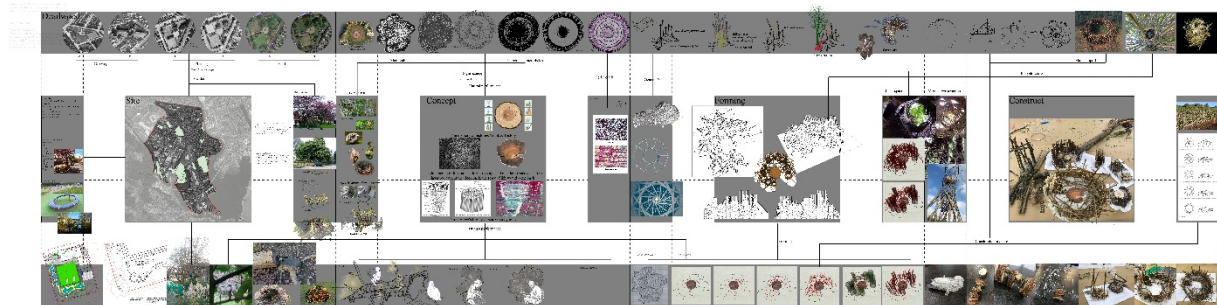**Figure 8: Possible Fabrication prototype gigamap (Wang, D. 2020)**

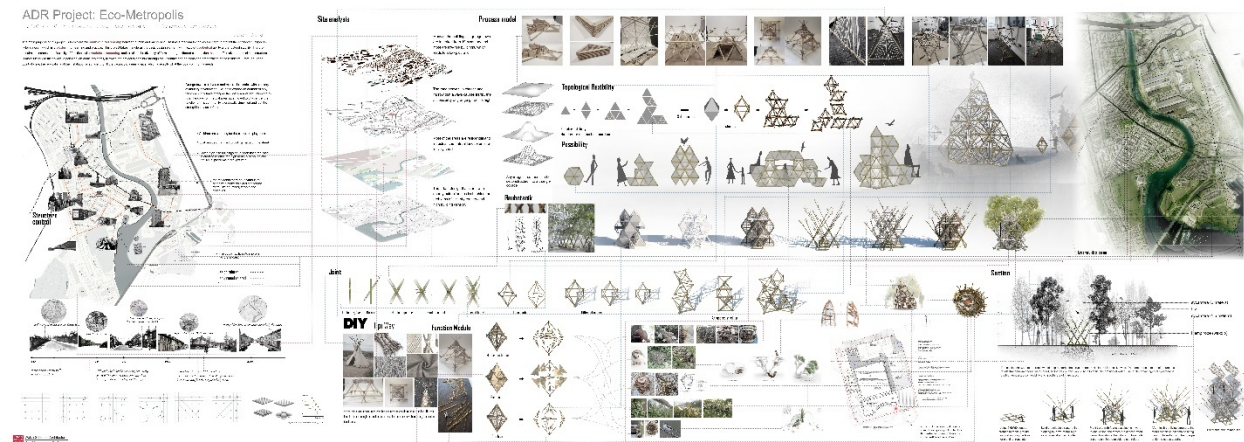**Figure 9: Natural Growth prototype gigamap (Feng, 2020)**

Figure 10: Eco-Metropolis prototype gigamap (Wang, Y. 2020)

The Real Life CoDesign Laboratory

The real life codesign laboratory is synthesised from the prototyping, DIY recipes for the prototypes and the real life environment and actors. This is integrated in an interactive online map to upload photos of the DIYed prototypes and link to their recipes, motivating the community in punctual biocorridors generation. The DIY prototypes' recipes request attachment of a QR code with a link to the recipe of the prototype. Therefore, each prototype supports its dissemination through the map as well as through its physical placement in the location through the QR code. Such way, the project is cocreated by the

community in real life and real time. At the same time the prototypes' performance that supports habitats and edible landscape cocreate the environment. The human and non-human community is adapting, inhabiting, and redesigning the prototypes in time and real life. Therefore, the location serves as real life codesign laboratory.

The Prototyping

Prototyping as opposed to traditional model making integrates the performance testing of the prototype (Davidová, 2017). As mentioned above, the prototyping in this project involved only materials found in local nature. This included both, living and non-living materials. These were adapting local and non-local traditional techniques, integrated in contemporary research. I.e. the design by Yuchen Wang (see Figure 11) was combining Tee Pee structures and hedging with current research on Baubotanik led by Ferdinand Ludwig (Ludwig, Schwertfreger, & Storz, 2012). The student Yuan Zhao (see Figure 7, Figure 11 and Figure 12) was combining Voronoi structure with handcrafting of pergolas for growing flowers and vegetables. Meihui Wang's prototype (see Figure 13 and Figure 14) was combining willow weaving with an inspiration by current research by Living Architecture Systems Group (Beesley, 2019). The prototypes had to be easily replicable through DIY even by a school child from a poorest family. Therefore, no advanced materials, tools and techniques could be used. The students typically started from more advanced prototypes and kept on simplifying them for easy replication possibilities.
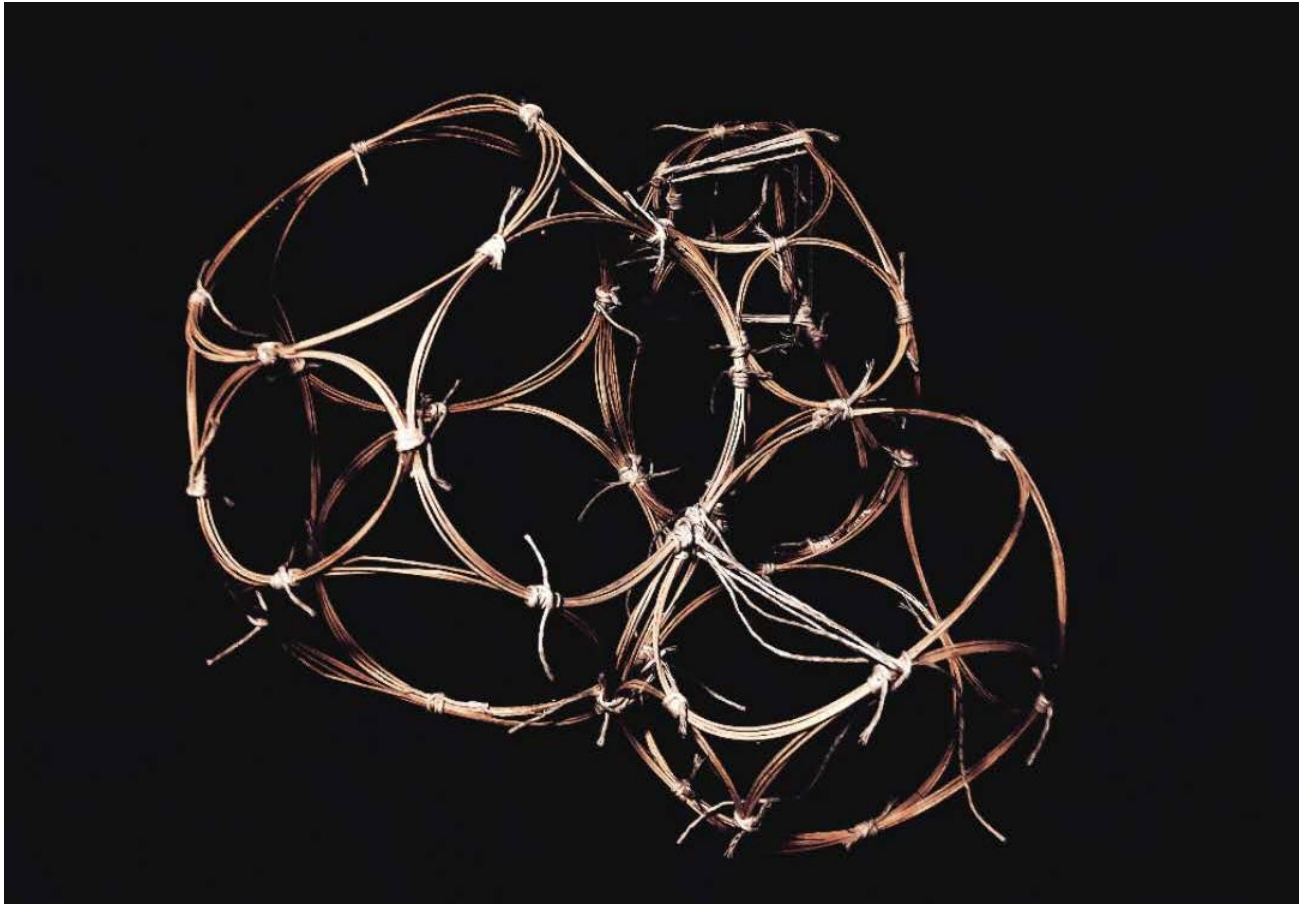

Figure 11: WIP prototype of Yuan Zhao for plant growing (Zhao, 2020)

- By カールおじさん − 草花写真館, CC BY-SA
  3.0, https://commons.wikimedia.org/w/
  index.php?curid=24'3666
- LUFFA
  is a genus of tropical and subtropical
  vines in the cucumber family
  (Cucurbitaceae).The fruit of these species
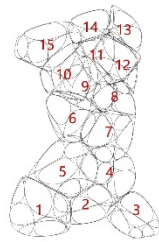 is cultivated and eaten as a vegetable.
- https://en.wikipedia.org/wiki/Luffa

Figure 12: One of the possible scenarios of Zhao's prototypes (Zhao, 2020)

Figure 13: Meihui Wang's WIP batbox prototype (Wang, M. 2020)

Figure 14: Meihui Wang's WIP batbox prototype (Wang, M. 2020)

The DIY and Interaction Design

For the DIY video recipes with QR codes (see Figure 16) existing blog on Systemic Approach to Architectural Performance (Davidová, 2020c) has been used. The blog has been used for such recipes before and has its own followers. Therefore, the prototypes spread also globally (Davidová, 2019). The DIY was launched with introduction video and DIY competition for Grangetown's primary schools (see Figure 15). We have created our own Twitter account. However, our posts were also reshared by Community Gateway project's accounts for rising better audience. Also, we benefitted from this project's community manager Lynne Thomas' communication history, channels, skills and mailing lists. For better DIY engagement and monitoring, an interactive online map was created. People upload photos with their prototypes and are requested to add a link to the recipe and obtain token. This year, Synergetic Landscapes unit obtained funds to develop an interactive mobile application 'CO-DE'. In this application, both the discussed prototypes recipes as well as the ones from this year will be uploaded. Furthermore, the community can upload their own. This app will be synergising circular economy around the Synergetic Landscapes project. People will be able to be users themselves as well as act on behalf of other species. Therefore, they will be able to do both, paying a butterfly for pollinating a tomato as well as to buy honey producing plants seeds for Grange Garden on its behalf.

Figure 15: Poster for DIY competition for Grangetown primary schools (Wang, M., Feng, 2020)
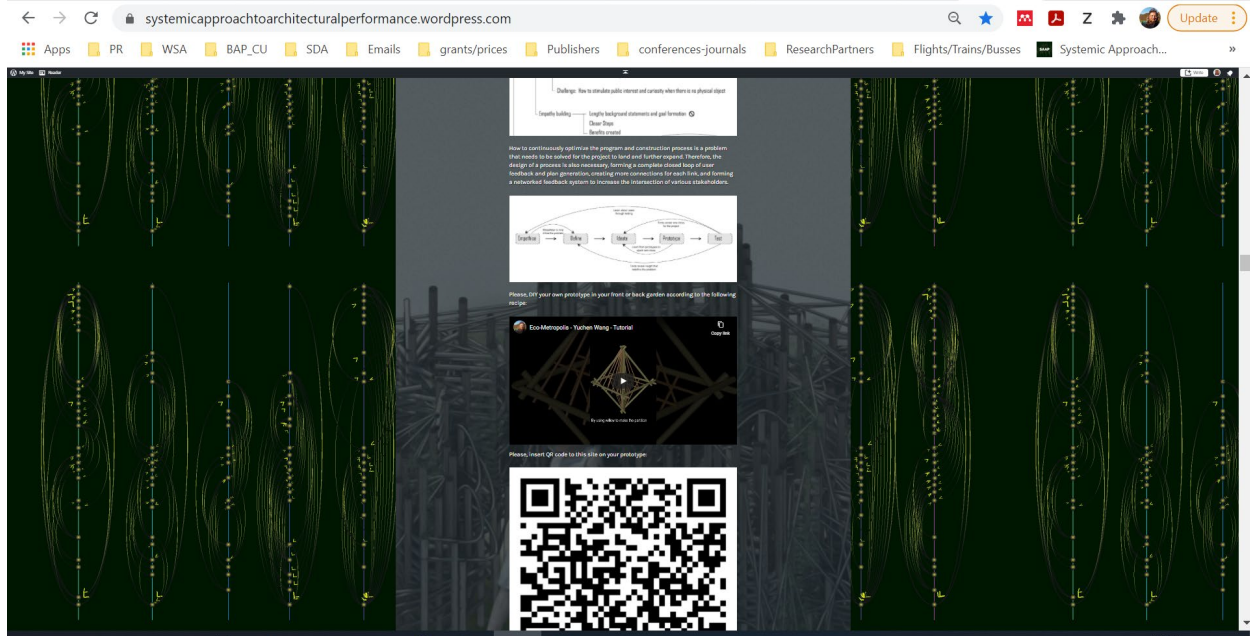
Figure 16: Yuchen Wang's prototype recipe on SAAP blog (Wang, Y. 2020)

Reflections and Conclusions

The paper is mainly reporting on the first year of the unit and new advancements are expected this year. As a pilot project, not all was achieved and i.e., the interactive map was lacking complexity of the touched topics. However, the work served as a basis for developing cross-species token economy that is integrating the overall ecosystem. This should be resolved by this year's mobile application 'CO-DE'. This is being created in real life codesign laboratory through real life codesign practice. Prototyping with materials purely found in nature can serve as a good starting point for such economy as there is no need for initial investment as well as the materials will be circularly used and recycled by nature.

As the unit had no history and due to COVID crisis, we struggled with low interaction with local community. Also, a low knowledge and skills in interaction design of mainly architectural students was problematic. The gigamapping helped to synergise different topic areas, relations understanding and scenarios development. However, the students struggled with low collaborative design skills and it was their first moment to interact with any community at all. Also, it was the students' disadvantage that they were new to both UK and European culture. Therefore, many points lacked connectivity and integration. The prototyping with local materials found in nature and without an advanced digital workshop was also new to the university level architectural students. The DIY for a deprived community required that no advanced materials and tools could have been used, and the recipes should be hand made easily replicable by a school child.

The project must focus better on promotion strategies, engaging local communities. This, however, requires more time. We hope to obtain more local ambassadors to promote and maybe to take an ownership of the project's continuity in the future. At this moment, the project will be promoted through Cardiff University Sustainability Week in March 2021, where the DIY recipes and the mobile application will be demonstrated to the public. Also, more short promotion videos will be spread through social media. The application is targeting on gaming design which we hope will engage larger audience amongst youngsters to increase the project's generative real life agenda.

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