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TRAINING DESIGN STUDENTS THROUGH A BEHAVIOUR LIFE PREDICTION GAME SIMULATION

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ABSTRACT

So far, during human evolution, we (humans) have been going against nature instead of adapting and evolving with it and in this aspect Covid-19 outbreak has been a humbling experience. Many so-called solutions are designed without considering or evaluating the negative consequences that we are all facing nowadays and that are going to get worse over time if changes are not made. We claim that designers have the responsibility of stepping up human evolution as our role in this Material Realm (Margolin, 2002). For that, we propose the concept of a simulation game (Second Planet) that aims to shape design students' actions towards solutions that will improve human evolution. As a simulation, students would be able to prototype, test and implement their solutions in the Second Planet where the consequences of their solutions could be analyzed from societal, environmental and ethical dimensions without causing harm in the real world. A tool to promote a change in the student's behavior towards the implementation of social responsibility in Design. An initial idea of this game proposal was presented at the Responsible Innovation event in March 2021 as part of the Responsible Innovation (United Nations) and received with enthusiasm (Annex I).

KEY WORDS

Design in the Anthropocene; Design for sustainable behavior; Design for social innovation; Human evolution; Systemic design.

1. INTRODUCTION

Imagine a civilization so artfully and carefully designed that it would protect posterity, ecological processes, and the larger fabric of life on Earth, for as long as one can imagine (ORR, 2018).

Humans have come a long way in making tools and using them to their own benefit. We have come to the point where our tools make new tools which was supposed to benefits us, humans. Yet why would someone consciously ignore to understand the possible consequences of their design? A systematic decision making that has negatively affected us all for at least a couple hundred of years. As part of the human (as a species), designers have not consistently shown how this profession can change the human world for the better but rather, have been playing a big part to worsen the manmade complex problems humans face, also known as the Grand Challenges, "formulations of global problems that can be plausibly addressed through coordinated and collaborative effort" (GEORGE *et al.*, 2016).

We argue that all humans are designers to some extent as we, regardless of age or background, do plan and bring to reality projects and solutions. Notwithstanding the facts above described, intelligent design, as classified by Orr, when properly used can "reduce material, water and energy use and therefore, pollution". Important authors have expressed their concerns on the role designers play in society (MARGOLIN, 1998, 2002, 2009; MARGOLIN & MARGOLIN, 2002; ORR, 2018; PAPANEEK, 1971). As Orr (2018) similarly emphasized in his work "The political economy of design in a hotter time" starts with a good example of how design choices can and are used to create and deepen exclusion in society by designing a super life style for super humans who can feel better when treated and seen as unique or superior to other people in some way; a made up, airbrushed "Super-human perfection" shown through "higher profits" that promotes "exclusion". These Superhuman aspects are not to promote better humans but sadly provide a narrow unnatural perspective of a make-believe story on how we should live our lives and achieve (a never achievable) happiness.

In order to better understand it one must understand the Affordances' definition adopted in this article, brought up by Davis (DAVIS, 2020), as in a "multifaceted relational structure", that permeates the whole fabric of technological paraphernalia developed by designers. Such technologies, as he clearly expresses, "do not make people do things but instead, push, pull, enable, and constrain. Affordances are how objects shape action for socially situated objects.". Another important definition is on the terms "developed" and "developing" countries where here they are going to be used as "exploiter" and "over-exploited" countries, as well expressed by Michael Parenti (1986) "Poor countries are not 'under-developed', they are over-exploited".

There are indeed many ways one could deal with this worldwide endemic problem. With this in mind, the British economist Kate Raworth (2012) from Oxford University developed a visual framework called "Doughnut model" to help societies to prosper harmoniously within this planet. As humans certainly need to learn a new way of living within this planet, this work is focused on Tertiary design students as the future generation will need to deal with this complex problem. As they will need a tool to faster understand the consequences of their design solutions, this game simulation idea aims to improve their critical level of thinking and therefore, the solutions proposed by them.

In order to guide the reader, we are going to ask three questions: Could we use a technological tool, in this case a game, to offer students more experience on the consequences of the solutions they propose? How complex would that tool be? What parameters to be used by the game simulation? With this game tool concept, the intention is to offer students more experience in a shorter amount of time, to slow down the production of unnecessary prototypes and to only use real humans to test solutions that are focused to improve humans' lives and therefore, our species evolution.

2. THEORETICAL FOUNDATION

We, as humans, have built a material world, Realm of the Material World (EEKELS, 2000), all around us that is not building us up but rather making us weaker and sicker due to our physical, economic, political, and sociocultural contexts that promotes unhealthy behaviors since childhood (BROWN *et al.*, 2015; SENTALIN *et al.*, 2019). The exploiter countries (PARENTI, 1986) in the world shall lead as an example to other countries and this position also comes with the responsibility of doing what is best in many different aspects but the most important might be what is best for humans. As a design student learning the level of complexity in which countries operate, their social, cultural and economic differences, this level of complexity is not something a student can get his head around easily as much as institutions and professors do their best. This complexity can be tackled by Systemic Design approach that, as defined by Barbero and Toso, the Systemic Design approach seeks to create not just industrial products, but complex industrial systems. It aims to implement sustainable productive systems in which material and energy flows are designed so that waste from one productive process becomes input to other processes, preventing waste from being released into the environment (CESCHIN & GAZIULUSOY, 2019).

As a way of speeding up some of the experience a student may encounter in real life, that is what the simulation is for. It can offer the same level of complexity and is able to forward in time showing the consequences (including behavioural) of the solutions (products/services/systems) that are being tested by the student. Offering the student a real-life experience that would take months, years or even longer, through a game reality simulator that is fed with proper parameters and data from the real world is a potential tool to adopt. One factor that must be taken into consideration on the parameters in this game simulation is to make sure students understand that Humans are one of the species that inhabit this planet and more than often we forget about it, that we are part of nature like any other species that also share this planet. Re-incorporating nature in our urban lives is not an option. It is a need. Although, it may be the other way around as in re-incorporating ourselves in nature. Nature is far bigger than us, humans, we are not here helping nature, we are fighting to survive and if we, as any other species, do not adapt to nature, we will fade away like any other species that has failed to adapt so far. And when thinking about adaptability is hard to avoid mentioning Darwin's work here.

Yes, change is the basic law of nature. But the changes wrought by the passage of time affects individuals and institutions in different ways. According to Darwin's Origin of Species, it is not the most intellectual of the species that survives; it is not the strongest that survives; but the species that survives is the one that is able best to adapt and adjust to the changing environment in which it finds itself. Applying this theoretical concept to us as individuals, we can state that the civilization that is able to survive is the one that is able to adapt to the changing physical, social, political, moral, and spiritual environment in which it finds itself (MEGGINSON, 1963).

In other words, it is not the adaptation of the planet that should be under work here as it has been the mindset since the Industrial Revolutions but rather, the human adaptation to an ever-changing humanity that inhabits a planet that has its own limits. Humans should be able to adapt to their environment and to nature rather than copying or trying to act or manipulate nature. Our mindset must change. As Orr (ORR, 2018) framed "ecological design then still exists as a patchwork in a larger society, not as a coherent solution to the systemic problems of a capitalist society". The economic and social so-called "progress" over the last century has been accompanied by environmental degradation that is endangering the very systems on which our future development and very survival depend. COVID-19 offers an opportunity to develop recovery plans that will reverse current trends and shift our consumption and production patterns to a more sustainable course. (UN - SDG, 2020). The lifestyle humans have adopted for approximately the last 260 years, counting from the First Industrial Revolution back in 1760, is unsustainable in many ways and levels as defended by the UN and its SDG: "the equivalent of almost three planets could be required to provide the natural resources needed to sustain current lifestyles".

The emergence of COVID-19 has underscored the relationship between people and nature which essentially revealed the fundamental tenets of the trade-off we consistently face: humans have unlimited as so-called "needs" (created by consumerism and not real human needs), but the planet has limited capacity to satisfy them. We must try to understand and appreciate the limits to which humans can push nature, before the impact is negative. Those limits must be reflected in our consumption and production patterns (UN - SGD, 2020).

2.1. Preparing design students for changing our world

Why focus on design students? It is clear that designers have a social responsibility to assume and do better. However, they're still taught to keep the status quo by serving and developing solutions to an unsustainable economic system that continues to degrade our own habitat and disregard any consequences, even when being directly confronted by them, as emphasized by most authors mentioned in this article so far. This paper focuses on design students as an attempt to fill the gap other young and not so young designers lack, more experience in understanding the consequences of their decisions, direct and indirectly over the course of time in a complex system (the relationship between our society and this planet). To do so, we offer a concept of a gaming tool that in a short period of time could

potentially offer design students the kind of experience without compromising the real world and real lives, just as medical students use dummies to practice performing surgeries, a simulation-based learning.

The Second Planet game can be used as a “technique, rather than just a technology that promotes experiential and reflective learning” (DATTA *et al.*, 2012) just as the dolls used by medical students (Figure 1).



Figure 1: "Birthing DOLLS train doctors to cope with pregnancy complications - and even come complete with 'blood' and a pained expression". SOURCE: www.dailymail.co.uk.

Change in a student's mindset ought to be a good start point: as long as we allow ourselves and teach students to live and work for a system that rewards psychopathy (BODDY, 2011), most of us are definitely fated to live in misery. Much has been said about sustainability (About 1,380,000 results on Google Scholar since 2015 to 2020) and from many voices (ABBOTT, 1995; BONSIPE, 2011; CESCHIN & GAZIULUSOY, 2019; CHAN, 2018; FISHER, 2004; LOSCHIAVOS, 2014; MARGOLIN, 1998; NATIONAL RESEARCH FOUNDATION – NRF, 2016; PAPANKEK, 1971) and yet little has been done when compared to what we needed to have done (BODDY, 2011).

Another important definition to be made regarding how this Second Planet simulation game' concept works is about what 'Social' work means as it does carry a great variety of meanings thus, creating a belief used by some professionals that their work has nothing to do with Social work/project. Here are the definitions that are going to be used in this work, according to Collins dictionary, "Social means relating to society or to the way society is organized.", on the Oxford dictionary, "connected with society and the way it is organized", on Cambridge "relating to society and living together in an organized way" and "relating to society and the way people live together". In short, 'social' here means the relationship among human beings regardless of the group size, either consisting of a small group of students in a specific school/classroom or an entire population that belongs and shares the same continent or, why not, planet. A more general approach as to how social work is perceived and how it goes hand in hand with developing solutions for a complex system like the globalised society we live in. For a better comprehension we bring the definition from Redig (2011) that points out that those who are involved in social work normally are divided into two subgroups: one thinks that the way is to create (another) NGO focused on social assistance provided in stimulating sports, artistic and professional activities for the needy population of the hills of Rio de Janeiro. The other wants to stimulate the local economy, expanding and perfecting the city's production, trade and services, while the first wants to train professionals, the second wants to create demand for these professionals. The first calls itself social, but it is not, because it addresses only a part of the problems of part of society - even if it is huge, and its problems are also. The second, on the other hand, is social because it turns to the whole society, from the "lower" to the "upper" class, seeking to improve the

economic living conditions of the city as a whole. While the second group seeks definitive, or structural, solutions, the first reaches palliative, or cyclical, solutions (REDIG, 2011).

Bridging this concept with the Second Planet game simulation, the intention is that in the game focus should “stimulate the local economy, expanding and perfecting the city's production, trade and services” (REDIG, 2011) by “seeking to improve the economic living conditions of the city as a whole” (REDIG, 2011).

Even though there is a huge amount of design methodologies that claim to better humans’ (users’, clients’) life just a quick look around the news will tell you otherwise. As empathized by Orr (2018) Designers’ mission “would be to design social systems that work with, not against, natural processes. Imagine a civilization so artfully designed that it would protect prosperity, ecological processes, and the larger fabric of life on Earth, for as long as one can imagine.” (ORR, 2018).

3. METHOD AND DEVELOPMENT STRATEGY

The Sims is a game that dynamically simulates an entire system of networks and focuses mostly on human relationships. It has been described as a human behavior or psychological simulator. Rather than employing purely player-inhabited characters or purely autonomous characters, the game puts players in the role of influencing semi-autonomous characters. They are semi-autonomous because while they have their own innate behaviors, they depend on player influence to dictate their actions. The viewpoint is isometric rather than first person, allowing players to have a god-like view over the game terrain (PEARCE, 2004).

As Pearce (2004) mentioned “The Sims is a cross between a dollhouse, a Tamagotchi, and the television program Big Brother”, where the player will have a house and relationships to care for, a job or some sort of income to maintain its status and comfortable material lifestyle. The player can even be a thief in the game but it has to find a way to survive as the Sim can and will die eventually. The Sim will have their own free will to some extent and forcing it to do things it won’t want to do, will cause the Sim to demonstrate problems such as irritation and depression. In the words of Pearce

Sims’ characters are built from a kit of character parts that induces various physical (mostly having to do with appearance), as well as personal traits. The emphasis here is more on personality than in skills, however. You can construct your own configuration of such traits as neatness, friendliness, etc., or you can select an astrological sign that will automatically configure a personality for you. Based on this, the character will have certain natural qualities and aptitudes. Your characters can also acquire skills that will enable them to avoid things such as kitchen fires, or improve their job performance, thereby earning promotions at work. Sims are very moody and when they aren't getting their needs met, they will throw tantrums, shaking their fists and calling to you in "Sim-ish," a combination of verbal gibberish and symbols that appear in comic book bubbles over their heads. Images such as food, kissing, and recreational activities provide indicators of what Sims want or what they are conversing about. The Sims has taken a radically different approach to narrative than most of the games that preceded it (PEARCE, 2004, p.150).

The game has been used for scientific purposes such as behavioral sciences (KÜHN *et al.*, 2018; Lin, 2015; TORNQVIST, 2015) for its database on a diverse range of possibilities (Figure 2) on psychological and behavioral traits (Figure 3). The game offers an option that allows the player to select actions to be done by its Sim and forward time to see the consequences of all the actions that were made by the player and by the Sim itself as it has, to some extent, its own free will.

THE POSSIBILITIES ARE LIMITLESS

Create an entire town of Sims with their own style, personalities, and dreams!



Figure 2: Possibilities with The Sims game life simulation.

SOURCE: The Sims game official page <https://www.ea.com/games/the-sims/the-sims-4>.



Figure 3: Shows a small selection of the "Select Traits" option on The Sims.

SOURCE: Fan page <http://simcitizens.com/personality-traits-genetics-in-the-sims-4-cas-demo/>.

In addition to that human relationship simulation game, there is The Cities Skylines, which is a city simulation game that allows you to construct your city from the ground up. This game has been rated PEGI 3+ which means that it is easy to learn, but hard to master (Figures 4 and 5).



Figure 4: A small simple village created on the game Cities: Skylines.

SOURCE: Steam website <https://steamcommunity.com/sharedfiles/filedetails/?id=1287466587>.



Figure 5: A more complex city built in Cities: Skylines. SOURCE: The Guardian

<https://www.theguardian.com/cities/gallery/2015/jul/15/bulldoze-white-house-real-cities-cities-skylines-in-pictures>.

The player is the mayor of the city to be built and has to find balance in essential requirements such as education, water, electricity, police, fire fighting, healthcare and much more along with the city's real economy system. Citizens within the city react “fluidly, with gravitas and with an air of authenticity to a multitude of game play scenarios” (Cities: Skylines on Steam).

What we argue is the development of a behavior life prediction game simulation, Second Planet simulation game, that uses The Sims and Cities: Skylines parameters to be used as a tool on the development of a different behavior among students towards the solutions they propose. This Second Planet game can be built by using a human behavior database that is collected from social media and many other virtual tools, which will offer a closer to real life simulation. This allows students to try out their ideas/proposals/solutions and by doing so, having a laboratory to experiment their ideas, projects, products, systems etc., which would offer the students the opportunity to gather more experience while still in the university and offering better solutions later on as the life experience needed to provide those would be given, partially, by this game tool. Schools could use such a tool as a curricular component where the student would face real world problems and try to solve them in game as a first step in the development of their projects prior to trying it out in the real world with real people where damages cannot be undone. That would also minimize the use of unnecessary prototypes that are mostly a waste of material and time from all stakeholders.

The parameters involved in the Second Planet to evaluate the impact caused on the game by the student's solution can be based on the 17 Development Goals by United Nations, or guided by global goals to be achieved and based on studies that show how we can evolve human species to live better with nature to which all humans are part. For example, the Goal 11 “Sustainable Cities and Communities” which aims to make cities and human settlements inclusive, safe, resilient and sustainable. Its Targets shall be fed into the game as metrics to indicate the effectiveness to be achieved as described below.



Target 11.1

By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.

Indicators 11.1.1

Proportion of urban population living in slums, informal settlements or inadequate housing.

Figure 6: Sustainable development Goals, Target and Indicators number 11 “Sustainable Cities and Communities”.

As a curricular component, students would have a semester/term to write a critical review on the consequences of their solutions tested on the simulation Second Planet game. Students should be prepared to think critically when joining the workforce upon graduating from an educational institution, although “Despite widespread agreement on its importance, classroom assessment methods do not often accurately engage and capture students’ critical thinking skills.” (SHIVELY K, 2018, p. 151). To better assess student’s critical thinking, Shively K. (2018, p. 152) developed Eight Universal standards:

1. all reasoning has a purpose;
2. all reasoning is an attempt to conclude a problem;
3. all reasoning is based on assumptions;
4. all reasoning is done through a point of view (POV);
5. all reasoning is based on evidence;
6. all reasoning is shaped by constructs;
7. all reasoning contains interpretations by which we draw conclusions, and;
8. all reasoning has implications.

With these Eight Universal standards Shively aims to help teachers “evaluate students’ abilities to apply these universal standards to their reflection, analysis, and evaluation” and have highlighted them in the rubric developed on Table 1 below.

	Novice	Developing	Expert
Summarizes topic or argument	Does not organize information, leading to inadequate understanding	Inconsistently demonstrates ability to organize information, leading to inadequate understanding	Consistently demonstrates ability to organize information, leading to adequate understanding
Considers previous assumptions	Assumptions are defined, but not explained as having significance to the position	Assumptions are defined and linked to topic ideas, but not clearly explained or elaborated upon	Assumptions are defined and linked to topic ideas; student can elaborate on assumptions and discuss implications
Communicates point of view	Does not identify own position on the issue	Identifies own position on the issue, drawing support from experience	Identifies own position on the issue, drawing support from experience, and information not available from assigned sources
Provides evidence of research	No evidence provided to support argument	Accepts evidence at face-value, even if incorrect, inadequate, or misrepresented to support argument	Information is gathered from appropriate and credible sources to support argument
Analyzes data	No analysis of a topic. Student only lists or defines concepts of topic	Demonstrates ability to analyze and make interpretations of topic	Demonstrates ability to analyze and elaborate on interpretations of topic
Considers other perspectives and positions	No identification of other perspectives and positions	Identifies other perspectives and positions	Identifies and assesses other perspectives and positions
Draws implications	Cannot explain or testify to the impact of new information	Explains or testifies to the impact of new information	Explains the impact of learning new information, making predictions, and generates new ideas
Assesses conclusions	No reflection of idea evolution on argument development	Limited reflection of idea evolution on argument development	Extensive reflection of idea evolution on argument development

Table 1: Using the Components of Critical Thinking to Develop Assessment Criteria.

The limitation of the Second Planet game idea is still how to find a common ground on how to use behavioral data and how to effectively avoid the information to be backtracked to a specific individual. As well known, Mark Zuckerberg, Founder, Chairman and Chief Executive Officer of Facebook has been in court several times due to Facebook's privacy issues as people are not aware about how their private and behavioural information is being used (most of the time manipulating them into engaging into more consumerism behavior). We believe that using these behavioral data to contribute to the Second Planet game here proposed would not only help students change their behavior towards their social responsibility "(as suggested by Jelsma (2006), designers need to take moral responsibility for the actions of people as a result of interactions with designed artefacts)" (CESCHIN & GAZIULUSOY, 2019). It also helps developing a mindset focused on developing human evolution as long as people's information were to be used as randomized numbers and not being identified as the game does not need to pinpoint a specific person to produce results.

For educational matters the Second Planet game can be as important as simulation dolls are for medical students.

Simulation is the artificial representation of a complex real-world process with sufficient fidelity with the aim to facilitate learning through immersion, reflection, feedback, and practice minus the risks inherent in a similar real-life experience (DATTA *et al.*, 2012).

The Second Planet game concept should help reduce material, water, energy use and therefore, pollution in the process of learning to develop design solutions for a complex system like our society.

The second section presents the theoretical foundation on the subject investigated.

4. CONCLUSION

Designers' mindset needs to be changed into a social type of mindset, a focus that would improve human evolution instead of corroborating with its demise. As design school's responsibility is to develop those students' skills and guide them into what they should do as professionals, focusing on them is just a matter of practicality although the game could easily be used by design professionals or even companies for a broader and quicker change.

Regarding three questions made earlier: Could we use a technological tool, in this case a game, to offer students more experience on the consequences of the solutions they propose? How complex would that tool be? What parameters to be used by the game simulation? The Second Planet game concept proposed has the potential of helping developing students' social responsibility by understanding the possible consequences of their solutions in society and to the environment. Furthermore, it allows students to comprehend how design decisions may impact in the complex world we live in and ultimately, giving students more experience while still in their college years.

The level of complexity for its development may not constitute a problem as it would not be a new tool but rather a tool that would allow a deeper complexity into its system. On the other hand, the amount of data needed to feed the game is an issue due to the level of behavioral data required. The game may not be viable in countries where the law towards privacy issues is not flexible enough. However, it's very important that people's privacy is protected and their data must not be backtracked to the individuals (from which the behavioural data is being gathered). As it is a matter of policies that vary from country to country, the Second Planet game would definitely raise discussion on privacy matters and also a good way to show that sharing data can be beneficial when used correctly.

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ANNEX I



March 2021

Certificate of Participation on the Responsible Innovation Challenges and Opportunities, March 2021.