College Students

Student Protests

In August 2018, Greta Thunberg skipped school to start a climate strike in front of the Swedish parliament Riksdag; millions of people around the world joined her Fridays for Future protests and Time magazine named Thunberg person of the year for *creating a global attitudinal shift* (Deutsche Welle, 2019). ::: {.content-hidden unless-format="pdf"}

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College Students in Taiwan

Taiwanese culture is influenced by Confucianism and Daoism, which affect education to be teacher-centered, where traditionally the role of students is to listen and absorb knowledge; there are open opportunities to revisit *dialogue-based* education, where students would be encouraged to take a more active role and gain ownership of their education (Chang, Wegerif and Hennessy, 2023). When it comes to learning about environmental issues at the pre-university level, Taiwanese government has been promoting green schools through a green school network; however surveys at middle school and high school level suggest there is no impact on *sustainability consciousness* among students in comparison with regular schools (Olsson et al., 2019). Rather, Taiwanese students are influenced towards environmental action by *group consciousness* (Yu, Yu and Chao, 2017).

College students and sustainability Liu et al. (2023, NEED ACCESS).

Taiwan has an aging population (Goh et al., 2023).

- Taiwanese government launched the Sustainable Council in 1997 to promote of environmental and sustainable development; a survey of university-level teachers (n=100) in central Taiwan (Taichung, Changhua, and Yunlin) shows a positive attitude toward environmental sustainability among teachers however implementation of environmental sustainability practices is from low to medium range (. and , 2015).

- The devastating nuclear disaster in Fukushima, Japan, after 2011 earthquake, had an effect on Taiwanese energy and sustainability education (and , 2011).

- Elementary-school teachers in Taichung (n=536), have positive attitudes towards environmental education are positive, proactive and demonstrate high awareness; they have participated in many sustainability-related workshops (Liao et al., 2022).

- Chen and Tsai (2016) reports a positive attittude yet moderate knowledge about ocean sustanablity among Taiwanese college students (n=825).

- (2003) reports a good knowledge of sustainable development among junior high school students in Da-an District, Taipei City (n=596).

- . (2009) similarly reports a positive attitude and good knowledge of environmental sustainable development among senior high school students towards in Taipei City (n=328).

- Several Taiwanese studies focus on the physical environment of school campuses, for example about sustainability of elementary school campuses (and Chih-Chien, 2006).

- Manchanda et al. (2023) survey (n=726) administred at shopping malls in New Delhi, India, found similar levels of sustainability consciousness between Millenial (n=206) and Generation-Z (n=360) age groups; people with high level of materialism were found to be less sustainability-conscious; the effect of mindfulness on sustainability was found to be stronger among females than males, supporting the hypothesis of the moderating effect of gender.

- Comparing university students' education for sustainable development (ESD) in Taiwan (n=617) and Sweden (n=583); Sweden has a long history in environmental education while in Taiwan environment became a focus area with the 1998 educational reform Berglund et al. (2020).

- Sustainablity behaviour of Taiwanese University students; the COVID-19 pandemic also brought more attention on environmental topics Liu et al. (2023)

- Taiwanese college students and SDGs Ho et al. (2022).

Sustainability in the Taiwanese Context

Musical garbage truck are a success story of the environmental progress in Taiwan (Helen Davidson and Chi Hui Lin, 2022). Indeed, they are a *user interface innovation* and the main way how people in Taiwan interact with sustainability issues.

The popular narrative about Taiwan recounts the story of the economic and environmental transformation of the country. In the late 1980s during the heights of an economic boom Taiwan became famous as the Taiwanese Miracle ( ) (Gold, 1986; Tsai, 1999). By the early 1990s another less flattering nickname appeared: "garbage island", for the piles of trash covering the streets and overflowing landfills (Rapid Transitions Alliance, 2019; Ngo, 2020). In the two decades that followed, from 1998 to 2018, Taiwan made progress in municipal waste management, rising to the status of a world-leader in recycling (2nd *effective recycling rate* after Germany); in addition to an effective recycling system, the average waste amount generated per person by 700g (from 1140g to 400g) per day; nonetheless, industrial recycling rates were less stellar, standing at 80% in 2020 and there were unrealized opportunities in using industry 4.0 technologies, such as internet of things (IoT) sensors for better waste tracking (Wu, Hu and Ni, 2021; Bui et al., 2023).

Progress in sustainability is possible but achieving results takes time and innovation. Rapid Transitions Alliance (2019) credits the Taiwanese Homemakers United Foundation ( ) for initiating the transformation in 1987, suggesting a small group of people can have an outsized impact on the whole country. Their activity didn't stop there and (2020) recounts a timeline of their achievements on their website until the present day.

- Progress in other areas of environmental protection has not made similar progress.
- There are documentaries about oil product
- Plastic production documentary
- I've seen several.. find and cite them to show the progression of the environmental movement in Taiwan
- The Taiwanese Green party
- Contact SOAS?

Developing Personas

User research makes extensive use of user *personas* to represent a group of people with similar attributes. Designers use personas to *articulate assumptions,* which, if used well, is useful for *user-centered design*, to create better products. Personas help to reflect on what kind of *biases* might exist in the design. Within the larger cohort of college students several different personas could be defined, for example grouping people by interests, knowledge, habits, levels of anxiety, and other attributes.

Humans have a long list of cognitive biases, which a good design should take into account.

There is extensive research on the attitudes of U.S. college students towards climate change. American Press Institute (2022) reports only 37% percent of U.S. Generation-Z and Millenials follow news related to environmental issues. Schwartz et al. (2022) reports some adult US students in a small study (18-35, $n = 284$) express feelings of insignificance of their actions to achieve any meaningful impact. Thomaes et al. (2023) reports U.S. adolescents don't find sustainability relevant to their daily life. Ross et al. (2016) says most people in the U.S. don't act on climate change. "Action on climate change has been compromised by uncertainty, aspects of human psychology".

- Students in the Generation-Z age bracket (abbreviated as Gen-Z or Zoomers) are born between 1997 and 2012 (Branka Vuleta, 2023). Over 98% of Gen-Z owns a smartphone while only 80% of the general world population does (Global Web Index, 2017; BankMy-Cell, 2022).

- High levels of technology adoption worldwide

- Credit Suisse (2022) suggests young consumers are more eco-friendly and drive the speed of change. Yet the Economist has ran a few anonymous articles calling gen-z green ideals into question (Anon., 2023; The Economist, 2023).

- Deyan Georgiev (2023)

- Alex Reice (2021)

The above studies give foundation for creating a persona of a U.S. College Student who doesn't follow environmental news and thinks climate action doesn't make a difference. This doesn't necessarily mean this group of people with similar ideas would deny climate change is happening. Rather "Climate Denier" could be another persona, grouping people into a cohort who thinks climate change is not real. Further research would be needed to define relevant personas which have meaningful predictive and generalizing power.

Table 1: College Student Personas

Description	Name	Beliefs
Climate Change Denier	Jake Alice Sam	Climate change doesn't exist.

- Crabb (2023)

Rooney-Varga et al. (2019) shows the effectiveness of ***The Climate Action Simulation*** in educating users about **success scenarios**.

Social Trust

- When disaster hits we need high levels of social trust.

Climate Anxiety

A large Hickman et al. (2021) worldwide study (n=10000, age 16-25) provides evidence the youth is anxious about climate in Australia, Brazil, Finland, France, India, Nigeria, Philippines, Portugal, the UK, and the USA. Similarly, Thompson (2021) finds young people around the world have climate anxiety. Whitmarsh et al. (2022) shows worry about the climate in the UK is generally widespread (over 40% of the respondents, n=1332), while climate anxiety is highest among young people and is a possible motivator for climate action. Additionally, Ogunbode et al. (2022) finds climate anxiety in 32 countries and also supports the idea that climate anxiety leads to climate activism. Thibodeau (2022): "In 2021, the BBC polled 1,000 people in Scotland to understand the barriers to taking climate action. What they found was even though many people were aware of actions needed to take to address climate change, and had intentions to their behaviors didn't change. This is a phenomenon called the intention-action gap."

- Designing for Health and Sustainability: Health and sustainability are intrinsically connected. Kjrgård, Land and Bransholm Pedersen (2014) shows how "understanding health and sustainability as a duality, health both creates conditions and is conditioned by sustainability, understood as economic, social and environmental sustainability, while on the other hand sustainability creates and is conditioned by human health"

- Design for Human Rights UNFCCC (2023) text refers to "human right to a clean, healthy and sustainable environment".

- Refi podcast: "people need agency".

- Martiskainen et al. (2020) (need access)

- Seabrook (2020) (need access)

- Older research on young adults (Millenials at the time) highlights how Millenials "use Google as a reference point for ease of use and simplicity" Kate Moran (2016).

Embodied Carbon

- "embodied carbon"
- Carbon Neutral Cities Alliance
- Builders for Climate Action (2021)

Community

Humans working together are able to achieve more than single individuals. "Any community on the internet should be able to come together, with capital, and work towards any shared vision. That starts with empowering creators and artists to create and own the culture they're creating. In the long term this moves to internet communities taking on societal endeavors."

- Building a culture of sustainability? Lakshmi Rebecca (2018); Armstrong and Staff (2021)

The focus on *group consciousness* suggests community-based sustainability action may be effective.

Zero Waste Lifestyle is the opposite of overconsumption. Zero waste suggests people buy in bulk to save. Buying in bulk for more savings and to reduce packaging. Through group purchases and community investing while also reducing consumption.

Minimalism is a movement of people living a simple life. This is always going to be a small percentage of people. Costa (2018): Finnish socialists: minimalism. Tokyo Tokyo Simple Eco Life (2021).

What are the building blocks of a thriving community?

Empowerment

- I would like to have an AI agent to set my requirements and preferences and give a "fuck you" middle finger to companies that don't meet them. I could also give a thumbs up to companies that meet my expectations. Perhaps the user interface could like Tinder where I can swipe left and right.

Trust

- plap

Memes

- Coined by Richard Dawkins in 1976 in the context of biology.
- Internet memes and meme stocks
- Memes from daily life, business to war, are relevant to penetrating through the noise of the web.
- Memes and sustainability?

- Meme research has become an academic discipline

- Memes have become a popular communication tool..

- Zidani (2021)

- Zidani and Miltner (2022)

- Irina Lyan, Limor Shifman and Sulafa Zidani (2015)

- Zannettou et al. (2018)

- Peters-Lazaro, Shresthova and Jenkins (2020)

Design Implications

- Community

  - Taiwanese students are influenced by the actions of their peers; the app should show what other people are doing.

  - People exist in relation to other people.

  - Psychology of 'fundraising clubs' vs individual investing

  - Anon. (n.d.) Ukraine DAO to support Ukraine through web3.

  - These social movements are small and require too much effort to be feasible for the app? Most college students are not zero waste or minimalist.

  - Group Purchases.

  - Find Your Composting Community.

  - Provides a community for pooling money with like-minded investors.

- Climate Anxiety

  - How to support the youth? Design to reduce climate anxiety? Is getting people to go to nature more a good way to increase ecological awareness? Empowered by Design. Youth empowerment: The design should empower young people.

  - Consumer branded carbon credits like angry teenagers?

  - Invest time not money, student don't have money?

- Social Trust

  - **Show Success Scenarios!**

  - Ask how much time you want to contribute.

- Match with other people based on time.

- Create a group chatroom.

- Use AI to help out with tips.

- Ask university students what do they study and match with that industry to become expert and sustainability leader in this field.

- People want to help and make a difference. Give people things to do. The Don't Look Up (n.d.) part of the **Don't Look Up** movie's social campaign provides 5 user models / roles for the audience to follow: Consumer, Investor, Activist.

- Choose Your Climate Solutions.

- Younger people show higher motivation (participants in climate protests). How to be relevant for a younger audience?

- Yet action remains low.

- Targeted and gated to college students.

- FB, etc, Gas all had the same launch strategy - start with students

- Kuzminski (2015) ecology of money

- Young people are mobile-first.

- Persona: I care mostly about… fashion, art, …

- Young people like to follow trends.

- Food ordering apps are popular.

- Monoculture -> regenerative food forests Oil -> electric cars / bicycles.

- Mobile-first.

- Social

- Educational

- Edutainment

- Fun

- aespa (2020): Karina from Korea. It makes sense your sustainability assistant would talk to you. Studies show gen N is speaking to computers all the time. Interacting with the user is on the rise. For example, Chime makes tipping suggestions on the place of purchase.

– The demographics that stand to win the most from the green transformation of business are the youngest generations, with more years of life ahead of them, and more exposure to future environmental and social risks. It would be advisable for Generation Z and their parents (Millennials) to invest their resources in greener assets, however, it's still difficult to pick and choose between 'good' and 'bad' financial vehicles to invest in.

– This creates an opportunity for a new generation of sustainable investment apps, focusing on the usability and accessibility of ESG for a mainstream audience. Generation Z and Millennials expect a consumer-grade user experience.

– What would that experience look like? I've chosen these demographics with the assumption that if given the right tools, the emotional demand for sustainability could be transformed into action. The exploration of systems of feedback to enable consumers to apply more direct positive and negative pressure to the businesses and consumers signal consequences for undesirable ecological performance is a major motivation of this study.