GEM – Course Concept and Experience Report

Seeing the Green Data Storytelling for Sustainable Development

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GEM – Course Concept and Experience Report

Seeing the Green workshop

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COURSE CONCEPT

Course Description

Course Goal

The goal of the course is to provide the students with essentials on information visualization and how different visualisation techniques can be used to deliver narratives in an effective and easily understandable way.

Data Narration as Macroscopes of Planetary-Scale Computation

The 21st century is marked by a paradox: the global sensing systems that enable us to recognize the climate catastrophe are the same systems that contribute to global warming. Planetary-scale computation both raises awareness and exacerbates the problem. The narration and aestheticization of data—whether as graphics, sounds, text, or moving images—sit at the intersection of the world's datafication and humanity's understanding of the process. Data representations possess the power to convey narratives that are otherwise unimaginable. Microscopes allow us to visualise processes too minute to be observed, while telescopes capture distant galaxies far beyond human reach. In this context, data representations can serve as macroscopes, illuminating complex, global, and otherwise unrepresentable aspects of our world. The 2024 edition of "Green Education in Media" will emphasise the food and land usage of the future. In this realm, scientific data offers insights into the future, made possible by the planetary-scale computation of global sensing systems, insights that would otherwise remain elusive. Narrating such data is a pivotal skill in the data-driven landscape of the 21st century. This skill is the central theme of "Data Storytelling for Sustainable Development."

Overview of module

In this module, 9 partner organisations including around 40 students and 20 lecturers will collaborate to tell visual stories on environmental data. We will explore the opportunities of data storytelling and information visualisation to create a more sustainable future, on the backdrop of Finnish nature and scenery in a multicultural setting. Through a well-balanced division between free time and studying, we aim to create an exciting intercultural learning experience for all participants of the workshop! Our major topic will focus on Data Storytelling (e.g. interactive data storytelling and visualisations, infographics, and visualising information in virtual and augmented reality). The subtopic will be agriculture and nutrition of the future. Various datasets are available on this topic. As a result of this module, visions of ideal places are researched, envisioned and described. Our focus will be on solutions, but there is also plenty of space for theorising and conceptualising.

In the first two preparatory workshops (02. 05./ 09. 05.) participants will learn about essentials of information visualisations.

The following two prep workshops (14.05./ 22.05.) will explore more advanced visualisation techniques. We will also study how interactive visualisations can be tools of exploration for the one who is using the visualisation.

In the Information Visualization Camp (25.05. – 31.05.) local groups from Croatia, Germany, Greece, Finland, Malta and Poland will get together in a one-week camp near Tampere. There we will have nature experiences and explorations and enjoy traditional Finnish sauna and swimming by the Pyhäjärvi lake. Furthermore, partakers will form groups of 4 people to collaborate and do a deep dive into the world of information visualisation. All participants in this module will get a briefing before the preparatory workshops are started. About the location (https://varala.fi/en/) Varala is a leading sports education institute, a training facility and a versatile centre for sports, leisure and recreational activities. Varala Sports Institute is an official education provider in the field of physical education and sports with an authorization to provide education and award qualifications granted by the Finnish Ministry of Education and Culture.

One of the pioneers of Finnish sports institutes, Varala, founded in Tampere in 1909, is a significant part of the history of sports in Finland. The oldest sports institute in Finland was originally established to promote physical education for women working in local factories through gymnastics. We at Varala want to be involved in creating a future where everyone can enjoy exercise or sports, achieve their goals and feel good, regardless of their age and background, both in their free time, at work and on the playing field. Varala was founded by energetic and courageous women who were ahead of their time. They firmly believed that one day the importance of physical activity would be understood and recognized.

Today, Varala continues to lead the way as a high-performance training center for sports. Varala also offers excellent leisure & camp offerings, well-being, meetings & wellness days for companies and groups, as well as sports and coaching activities. Address: Varalankatu 36, Tampere, Finland.

Platform and Support

- 1-2 mentors are assigned for each team of up to 4 students
- Work on online whiteboards and video meeting tools during prep workshops
- Communication platform Discord
- Dedicated learning & research materials will be available online
- Prep workshops and camp sessions will be facilitated by an international teaching team

Competencies taught in the Course

Knowledge

- Foundations of data visualisation (Gestalt Theory, Perception)
- Mapping data to graphics
- Using standard tools for data visualisation
- Knowledge about possibilities of data visualisation in moving images
- Different approaches to data visualisation: Human Computer Interaction, Information Design, Artistic approaches
- Data visualisation in XR (tentative)

Skills

- Critical reflection of data visualisation
- Customised data visualisations with coding frameworks (advanced skill for people with prior experience)
- Rapid content & interface prototyping
- Concept and project planning for (interactive) projects
- Pitching and reviewing a concept
- Exploring the creative potential of information visualisation technologies
- Future Skills;
- Social Competencies
- Building a transcultural team
- Working in an interdisciplinary team
- Creative processes and decision making
- Self-reliance and empowerment
- Self-organisation within teams
- Futures Literacy

Tentative tasks of teams during course

- International Teambuilding and Leadership
- Research and ideate based on a briefing
- Concept Development

Curriculum

Objectives

The course objectives may be divided into the core competencies and into the competencies that depend on the emphasis of the different implementations. The core competencies and objectives are:

- Knowing the basic terminology of data visualization.
- Having some idea of possible tools to create data visualizations.
- Ability to ideate weave data visualizations to other media production .
- Rapid content and interface prototyping for (interactive) media formats.
- Pitching and reviewing media vision concepts.
- Exploring the creative potential of new media technologies
- Collaborating in an international team.

The full list of competencies that the students can gain on the course, can be seen on the Competencies chapter.

Content

Preparatory Sessions: Data visualization methods and tools, finding data sources, ideas for prototyping, camp preparations

Seeing the Green Camp: Introduction, teambuilding, data walk, development of concepts and prototypes, expert lectures, reviews and presentations of concepts.

Diversity of Sustainability Topics:
Explore and enlarge levels of students' familiarity with sustainability and address models the students deal with in their artistic practice. Along with crucial topics such as climate change and biodiversity, to present and reflect upon wider range sustainability-related problems, such as social equity, economic sustainability, indigenous rights and related human rights, and urban planning. Having a wider scope enables better and more complex understanding of various phenomena which inevitably await us.

Sustainable Camp Practices:
It is of vital importance to ensure adhering to the sustainable policies and practices advocated throughout the whole GEM project. Continuous efforts at waste reduction, reduction of energy consumption, minimising environmental footprint of the workshop in general remain ongoing tasks for this year's camp. Following such protocols not only corroborates stated principles, but serves as a good example of conscientious organization of a fairly large event spanning a few days with a few dozen participants. For example, a lot of tasks were performed using only basic at-hand tools (pens, paper, bottles, scissors, threads), reducing the significant amount of energy online brainstorming usually takes.

Sustainability in visual data representation:
Integrate sustainable practices into the visual representation processes as a basic task. Discuss among students about different modes of more sustainable production practices, more energy-efficient use of equipment, widening the usual concept of visualization in order to include a diverse set of new tools and working procedures.

Global Perspective:
It is of vital importance to frame local and technical problems into a wider perspective, stressing the holistic view which only enables a complex picture of interrelated issues that at first hand may seem non-related. Experiences with sustainable solutions may come from experts, but also from indigenous knowledge developed in different parts of the world.

Integration of Cultural Narratives:
Acquaintance with legal framework is necessary for the introduction of concrete policies into artistic work, but deeper knowledge about autochthonous practices of knowledge production and distribution is needed. Encourage students to incorporate in their work versatile cultural practices and specific local narratives that contribute to the wider understanding of sustainability. Thus, a strong accent on hands-on, offline activities which include live participation of workshop members, with face-to-face communication when addressing urgent issues.

Ethical Considerations:
Include discussions on ethical considerations related to sustainability in visual representation of scientific data. Further discussion on data usage in public communication is needed, as well as through reflection upon the very concept of copyright, especially in the future production of food and medicines. Fair treatment of non-academic producers of knowledge is a vital aspect of social sustainability that we wish to broaden.

Public Awareness Campaigns:
Motivate students to develop approaches for effective intervention in the public landscape, with the clear aim of raising awareness on the topics dealt with in workshops. Since these issues produce direct consequences for the wider community, work on developing clear and direct communication of strategies, tools and practices that can be used in wider contexts.

Interdisciplinary Collaboration:
Insist on the interdisciplinary collaboration between students from diverse social, educational backgrounds and professional experiences. Beyond mere development of collaborative working skills, strengthen widening of personal perspectives by including a more nuanced approach to complex social and environmental problems.

Mentorship:
Assign mentors or coaches to student teams with clear working missions within the working group. Provide direct support by drawing on theoretical knowledge and professional expertise in respective areas of their work. Collaborate on a conceptual level and in the direct realization of ideas.

Continuous Learning
Devise a stable framework for continuous learning which can be used in future curricular or professional activities. Establish rather firm social connections between participants through addressing common issues in the field of sustainability. Use online tools for sharing participants' works and ideas and as a means for collaboration after the camp ends.

Evaluation and Feedback
Devise and apply a meticulous evaluation and feedback system for the camp. Gather feedback from students and mentors in order to further improve models of groupwork and group creation of knowledge. Include evaluation parameters beyond mere technical efficiency in creating data visualizations, stressing social impact and relevance.

Evaluation should include the work done during the course, in a procedural and productive sense, the student's participation in preparatory workshops and the final results, devised in the direct on-site work in each working group. Evaluate improvement in understanding multiple dimensions in which sustainability plays a significant role.

Prerequisites
Basic knowledge of concept development, acquired through preparatory workshops. Skills to work on digital productions and digital platforms. Readiness to revise one's usual working procedures and openness to different approaches.

EXPERIENCE REPORT

The experience report explicitly addresses how the course was implemented, i.e. what happened when the above plan was put into practice.
Seeing the Green workshop: May, 26 – 31, 2024
Preparatory Workshops: May, 2- 25, 2024, 4 sessions á 2.5 hours

Course Overview and Introductions

Course started on early May with series of 4 online workshops. Goal for workshops was to get students to familiarize with course goals and tools. Content for online lectures were created mainly by Markku Turunen(Tuni) and Kim Albrecht(FBKW). They also teached online lectures. During online sessions tutors also presented their groups topics so that student could start to formulate ideas around those topics.

The actual workshop happened during 26th – 31th May in Tampere, Finland. During those six days about 50 attendees, comprising students and educators, representing a diverse array of eight distinct European higher education institutions, learned new methods to present and visualize data focused on course topics.

Early on students were split into 5 different groups and groups started to formulate their ideas and what data they would collect and visualise. Each group also had their own methodology on how to present this data. Also on Monday right after groups were formed, students attended Data Walk where they were instructed to think about their surroundings in nature and what things could be quantified and visualized.

Each morning started with breakfast and yoga session and afterwards groups had their first design sprint sessions. Then lunch and possible guest lecture about relevant topic. Then a second design sprint session until dinner that was also served in Varala premises. For evenings there were some options like Finnish sauna on Tuesday and movie night for Wednesday.

Thursday afternoon each group presented their final results. Results are also presented here in this report, in a later section.

Camp schedule 26.05. – 31.05.2024

	26. May SONNTAG SUNDAY	27. May Montag MONDAY	28. May DIENSTAG TUESDAY	29. May MITTWOCH WEDNESDAY	30. May DONNERSTAG THURSDAY	31. May FREITAG FRIDAY
07:30 - 08:00		**Breakfast**	**Breakfast**	**Breakfast**	**Breakfast**	**Breakfast**
08:00 -08:30			Yoga	Yoga	Yoga	Yoga
08:30 - 9:00		Introductions				
09:00 - 09:30		**09:00 - 12:00 Data Walk** 5 groups made by lottery. Results will be presentend at final evening on Thursday. **Consortium Meeting** **Luentosali 3**	Preperations	Preperations	Preperations **Consortium Meeting / Planning next year**	Preperations
09:30 - 12:00			**Design Sprint** **> Luentosali 3 and Luentosali 4 (10 persons)**	**Design Sprint** **> Luentosali 3 and Hirsisaunan saunatupa (10 persons)**	**Design Sprint** **> Luentosali 3 and Kokoustila Pyhäjärvi (10 persons)**	**Individual outdoor activities (/*4) and Departure** **Luentosali 3 is available**
						Check-Out until 12:00
12:00 - 13:00		Lunch	Lunch	Lunch	Lunch	Lunch
13:00 - 13:30		**13:00 Camilla Food Plan /*1**		**Design Sprint** **> Luentosali 3 and Hirsisaunan saunatupa (10 persons)**	**Result Presentations** 2,5 h (Presentations 15-20 min / Feedback 10-15 min) **> Luentosali 3**	**Departure**
13:30 - 14:00		**Design Sprint** **> Luentosali 3 and Villa/Sali (10 persons)**	**13:30 Impulse: Data Science /*2** **Design Sprint** **> Luentosali 3 and Luentosali 4 (10 persons)**			
14:30						
15:00	**Start Check-In** **Individual outdoor activities /*4** **Lecture Room open for us (Luentosali 3)**					
15:30						
16:00					Survey students / Post-its Feedback Tutors (GEM Consortium)	
16:30						
17:00 - 17:30	Dinner	Dinner		Dinner	Dinner	
17:30 -18:00						
18:30	Documentation, Clean Up /*3	Documentation, Clean Up /*3	/*3 **Local green Food served at fireplace room in front of sauna.** **Room open until 24:00**	Documentation, Clean Up /*3	Documentation, Clean Up /*3	
19:00	**Evening Activity**	**Free evening entertainment for students and guests.** /*4	**FINNISH SAUNA**	**FILM EVENING** **Varala-Sali** **Consortium Meeting**	**Goodbye Event** **Cafeteria or Outdoors**	
19:30						
20:00						
20:30						
20:30						
21:00						
21:00						
21:30						
22:00						

/*1
Presentation of:
Camilla Food Plan
by Angelica Böhm
> Luentosali 3

/*2
Impulse by Shanghua Liu
ATB Potsdam
"Explainable AI in Grassland Monitoring: Enhancing Model Performance and Domain Adaptability".
> Luetosali 3

/*3 Upload your best pictures and videos so that we can tell interested parties about our camp on the GEM website and on social media.

Clean up the spaces you have used.
No rubbish should be left lying around.

/*4 You can ask for Frisbees, Boule and other fun stuff at the information des. Yoga-Mats and more fun stuff the GEM Team brought is stored in Luentosali 3
There is a also sports field with a football pitch nearby.

Luentosali is our main meeting room
Always check Discord for news and anouncements

Competencies

Both tutors and students exhibited substantial expansion in their comprehension of sustainability during the course. Through their rigorous research efforts, which were closely aligned with the prescribed tasks and subsequent presentations, students gained valuable insights into prospective future scenarios. For some participants, this educational journey served as a revelation, illustrating that even when conceiving seemingly novel and innovative ideas, there existed reference materials and antecedent concepts that bore relevance.

Moreover, the course provided an invaluable opportunity for enhancing international collaboration and fostering a heightened sense of global interconnectedness. During the camp, students were strategically assembled into international teams, an arrangement that catalysed the motivation of most groups to achieve commendable results in their respective assignments.

These teams were characterised by a rich diversity, incorporating students hailing from various countries and possessing distinct specialisations. For instance, in one team, members encompassed the skillset of webpage developer, few 3D artists, sound designer and project manager. This skillset produced interactive 3D food marked with custom made visuals, audio and data visualising methods.

The observed synergy was noteworthy, with students judiciously distributing tasks amongst themselves based on individual proficiencies and interests, thereby collectively crafting their collaborative output. Mutual learning was a prevalent theme throughout the camp, with interactions yielding significant knowledge exchange.

All teaching and information materials are published on the GEM website under the menu item: COURSES & EVENTS / DATA STORYTELLING

Google Docs served as a reliable repository for instructional materials, offering a convenient means of storing, accessing, and sharing course-related content. This platform was instrumental in housing presentation materials for expert sessions, offering students ready access to essential information and resources. Moreover, the collaborative nature of Google Docs allowed for the real-time editing and refinement of instructional content, fostering an environment of dynamic and responsive learning.

Discord communication software was used to communicate during the workshop. It provided an easily accessible method to send messages to large groups to their mobile devices and also provided methods to quickly send files like timetables etc. to select groups.

In addition to these digital tools, the camp also integrated a plethora of physical tools and materials. Workshop and prototyping materials, such as pens, glue, and post-it notes, were provided to students to facilitate hands-on activities and creative ideation. Moreover, the inclusion of VR and AR underscored the camp's commitment to embracing cutting-edge technologies, enabling students to explore innovative possibilities in the realm of sustainable media technology.

The comprehensive selection of instructional materials showcased the camp's dedication to providing a holistic learning experience that blended digital collaboration tools with hands-on resources. This approach ensured that students had access to a rich tapestry of materials, fostering a dynamic and interactive learning environment that catered to diverse learning styles and preferences.

Course Technology

Software used in camp included for example Discord for general communication, WhatsApp for group chat, and Google Docs for sharing learning materials.

In the camp the students used a lot of various techniques such as film shooting, rendering and 3D modelling, but also sketching, drawing, and photography AI was used to ideate narratives, and simple animations were created.

Students also used different softwares to produce prototypes. Unity game engine and HTML/javascript provided platforms for two different software focused prototypes.

Also, different data visualization tools like Tableau, Power BI and D3.js.

Most equipment, such as workshop and prototyping materials like pens, glue, post-its, VR and AR headsets and a VR-capable notebook were brought to camp. Furthermore, for the outdoor and group activities: e.g. guitars, camping materials and outdoor games.

Learner Support.

The provision of learner support within the context of the Seeing the Green camp played a pivotal role in enhancing the overall educational experience for participants. The emphasis was on creating a supportive and inclusive learning environment.

Content-specific Preparatory Workshops (Online Sessions): Learner support started a month before the summer camp, in regular weekly sessions. In preparatory workshops in the online environment students met and got acquainted with basic concepts, terminologies, working procedures and the digital tools they would be using in onsite workshops in Varala. This approach provided students with foundational understanding of data visualization design which is a prerequisite for planned workshops.

Practical Arrangements for Travel: The organizing team did thorough preparatory work to collect and provide all information needed for students to arrive safely at the venue, which eventually was the case. Organizers were fully available via email and personal mobile phones to meet any request and provide service if needed, in order to secure functioning of the camp.

Group Assignments and Educator Guidance: Once at the camp, participants were organised into groups, with each group assigned an educator who played a multifaceted support role. Educators provided guidance and mentorship, ensuring that students had the necessary resources and direction to engage effectively in group assignments and activities. This personalised support facilitated smoother collaboration and knowledge exchange.

Interdisciplinary and Cross-Cultural Teams: Teams intentionally consisted of members from different cultural and educational backgrounds in order to foster a fruitful epistemic crosspollination. Students thus learnt not only workshop content but also modes of collaboration in new surroundings. Such situations forced them to fine tune their sensibilities and patience while achieving common goals - ones envisioned before the start of workshops. In this way students not only gained new technical knowledge but also developed and broadened many social skills.

Collaboration and Soft Skills: Along with dedicated work on planned workshop activities, aimed at developing data visualization skills, a particular attention was paid to development and expanding of students' social and soft skills. Beside the usual hierarchical relations between mentors and students, a spirit of welcoming but critical companionship and collaboration was nurtured, and applied as alternative mode of knowledge transmission in which collaboration and mutual support are highly appreciated.

Feedback and Peer Learning: Already on the conceptual level continuous feedback was foreseen as part of the process so peer-to-peer learning and feedback sessions were supported from the very beginning. Participants were instructed to create a free space to share their ideas, prototypes, and results with peers, taking into consideration different backgrounds of colleagues in the workshop. In such a supportive atmosphere, constructive criticism grew organically and contributed to the quality of in-group dynamics.

Competency Growth: Beside acquiring technical skills in the narrow sense, development of wider competencies was one of the main goals of the workshop. When assessing the outcomes, students reported enrichment of their knowledge about data visualization, international collaboration, mutual support and interdisciplinary teamwork. Working in the atmosphere of mutual support, despite vast differences between students in starting competencies and prior understanding of the topic, proved useful for mentors as well since they had to adapt to novel circumstances while caring about how to deliver and co-create planned content.

Personalised approach: Taking into account versatile prior academic and artistic experiences of workshop participants, one of the primary pedagogical goals was to establish personalized approach, respecting each individual's identity, competences and needs in mastering required programs. According to the students' feedback given during the workshop, such an approach proved useful in bridging initial discomfort, usual in such utterly new circumstances. Communication with colleagues and mentors alike was flowing smoothly which significantly contributed to overcoming the initial communication challenges that arose in realization of the tasks.

Accessibility and Usability: The organisers of the GEM Camp made efforts to ensure accessibility and usability for all participants. The course materials were designed to be accessible to students with different learning styles and abilities.

Diet restrictions were collected before camp and provided to workshop premises so (Varala) which was able to take these into account for food service.

Short description of all Works

Group 1: "Interactive Data Visualization" (tutors: Markku Turunen, Kimmo Ronkainen)
This group, with a diverse skill set including web development and 3D art, focused on creating dynamic data visualizations that respond to user input. Their final project was a webpage with 3D graphics of a supermarket, where the "price" of selected items was displayed as a carbon footprint. They used tools like Tableau, Chart.js, HTML, and A-frame (for 3D visualizations) and successfully coordinated a complex project.

Group 2: "Artistic Data Visualization" (tutor: Kim Albrecht)
The focus here was on the intersection of art and data, using artistic expression to represent complex data. The students worked as one large group to visualize the ecological footprint of consumption using grocery receipts as their primary data source. Their stunning final project was the transformation of a pavilion into a 3D data sculpture with a complementary data sonification (soundscape). Despite challenges with task allocation in the large group format, they showcased high levels of innovation, creativity, and technical execution, effectively treating data as a medium for artistic expression.

Group 3: "Data in Move!" (tutor: Tuomo Joronen)
This group explored movement and physical performance as key elements of visual storytelling with data, using software like Blender and After Effects. Despite the workshop's focus on agriculture, the students chose to visualize a local dataset: the freezing and melting dates of Näsijärvi lake ice since 1870. The final outcome was a stop-motion animation of melting ice combined with a live, Hans Rosling-style physical presentation using text on paper to demonstrate changes and future prognoses. The process highlighted the challenges and learning experiences of stop-motion animation using software like DragonFrame.

Group 4: "Data Fiction" (tutors: Nicole Loeser, Angelica Böhm)
This group blended factual data with fictional narratives using Transmedia Storytelling principles to create engaging stories about food sustainability. Students with diverse skills individual thematic areas, such as sugar intake and water usage in production. The final outcome was a site-specific exhibition with different interactive formats, including films, a scientific quiz, and a TikTok channel (@water_slay7). They successfully used meditation and deep-dive research to develop creative outputs that communicated scientific data in tangible ways, promoting sustainable behaviour.

Group 5: "Virtual Reality" (tutors: Björn Stockleben, Dimitris Charitos, Caterina Antonopoulou)
This group focused on designing and implementing data mapping into 3D spaces for an immersive experience. They explored concepts like “texture is data” and used 3D scanning and Unity for development. The final project, titled “behind our backs,” was a VR experience that showed the present-day forest and then transitioned to contrasting dystopian and utopian future visions as the viewer turned around. The experience aimed to make the viewer feel the constant, often unnoticed, change happening in the environment. Despite some challenges in making ideas concrete and integrating the data aspect, the use of a time-scale visualization as a texture on virtual rocks was an effective artistic ambient data visualization. They found an effective solution for an outdoor presentation which enhanced the immersive quality.

Results of Student Works

Descriptive One-Pager by Group 1

Title: Immersive Supermarket

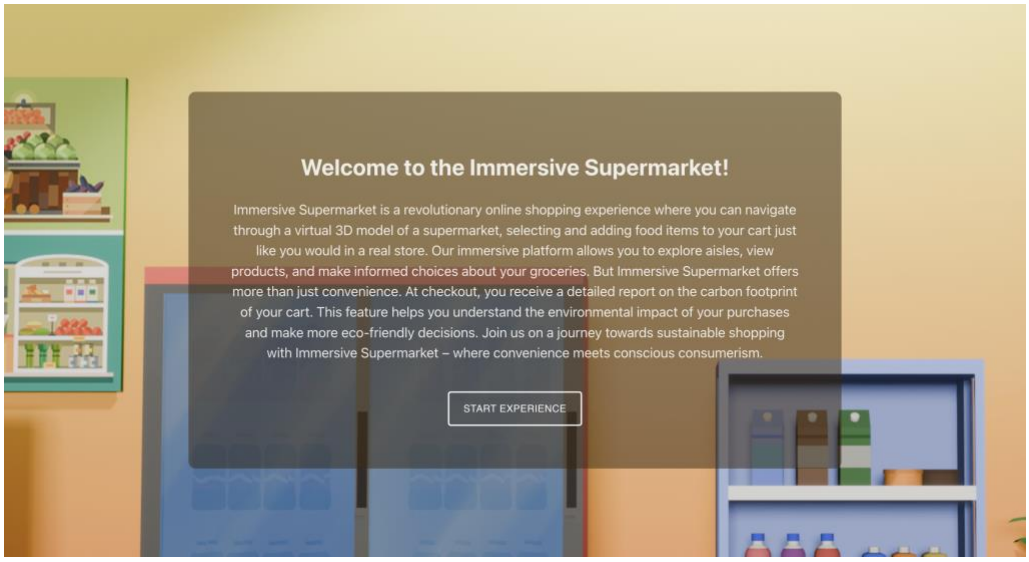
Group: Katja Schreiber (Programmer), Ana Grujić (Sound Design), Ruth Sciberras (3D-artist), Sini Torrki (3D-artist), Ania Hachula (Summarizer)
Group Tutors: Markku Turunen, Kimmo Ronkainen

Introduction:
Immersive Supermarket is a revolutionary online shopping experience where you can navigate through a virtual 3D model of a supermarket, selecting and adding food items to your cart just like you would in a real store. Our immersive platform allows you to explore aisles, view products, and make informed choices about your groceries. But Immersive
Supermarket offers more than just convenience. At checkout, you receive a detailed report on the carbon footprint of your cart. This feature helps you understand the environmental impact of your purchases and make more eco- friendly decisions. Join us on a journey
towards sustainable shopping with Immersive Supermarket – where convenience meets conscious consumerism.

Work process:
1. Discussing themes
2. Brainstorming ideas
3. Task dividing
4. 3D Modelling, Sound Designing
5. Sourcing Information
6. Programming everything together

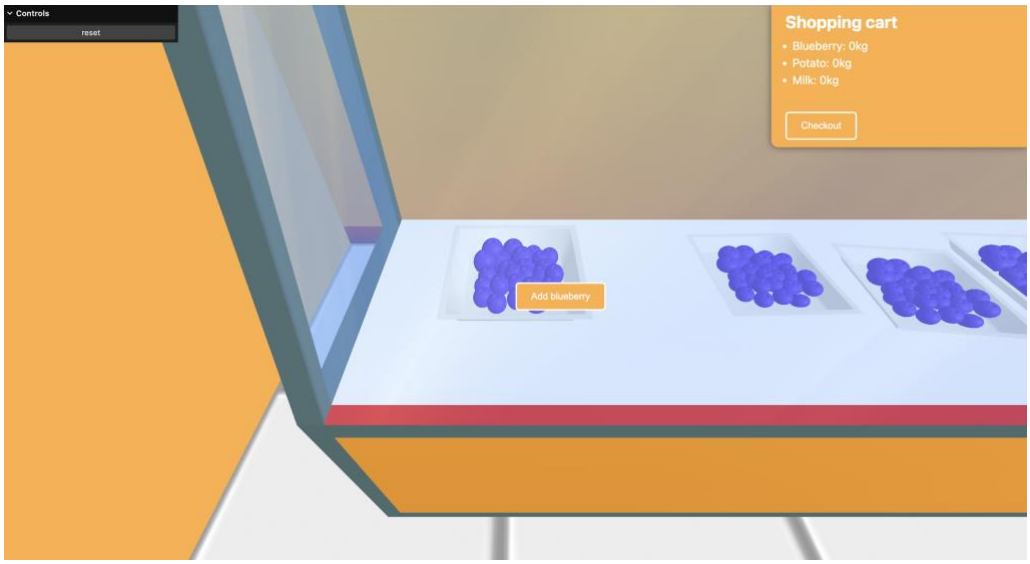
How it works:
We first modeled the environment which is inspired by traditional 3D design. This model was then imported three.js and then using Java Script we added sounds and a landing page. Users can click and add products to a shopping cart. Upon checkout they can see the amount of carbon emissions used to purchase using data we sourced online.

Images

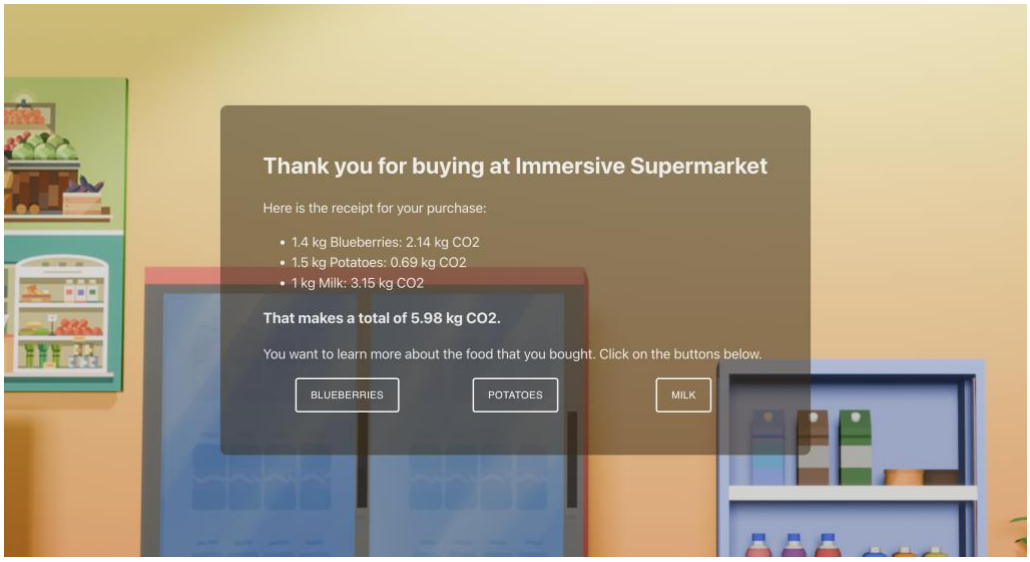


Landing page

Store overview



Produces



Checkout

Data visualizations

Data visualization of Blueberries consumption

Descriptive One-Pager by Group 2

Title: Threads Of Consumerism

1. General Information

1.1 Primary Area of Activity

Environmental Art Installation: The primary area of activity for "Threads of Consumption" is environmental art. This project uses artistic expression to address the urgent issue of plastic pollution and consumerism. By transforming mundane receipts into a visually and
emotionally impactful installation, the project aims to raise awareness and provoke reflection on individual consumption habits and their environmental impact.

1.2 Secondary Area of Activity

Data Analysis: Collecting and analyzing data on plastic usage from supermarket receipts to quantify the environmental cost of plastic packaging. This data is crucial in creating an informative and impactful installation.

Sound Design: Creating an immersive soundscape that enhances the sensory experience of the installation, guiding viewers through the themes of consumerism and environmental degradation.

Interactive Art: Designing an installation that encourages audience interaction, allowing viewers to physically navigate through the receipts and engage with the information presented.

1.3 Project Description

"Threads of Consumption" is an evocative art installation that confronts the pervasive issues of consumerism and plastic pollution originating from supermarket packaging. Composed of 55 receipts suspended on delicate strings within a small gazebo space, this installation forms a labyrinthine network symbolizing the intricate and often unseen connections between everyday consumer habits and environmental degradation. Each receipt highlights the environmental cost of plastic, with additional charges and special tags marking high plastic content items. The installation invites viewers to reflect on their role within this cycle and the broader impact of their consumption patterns on the planet.

2. Profiles

Participant 1: Ducky - Data Analysis & Receipt Mapping

Ducky will handle the collection and analysis of data from the receipts. This includes calculating the environmental costs and categorizing receipts based on plastic content. Additionally, Ducky will organize the receipts for display in the installation.

Participant 2: Haz - Data Analysis Assistance

Haz will assist Ducky in the data analysis process, focusing on identifying patterns and trends in consumer behavior. Haz will also help visualize the data for presentation within the installation, as well as create an accurate coding to help us with massive data Information.

Participant 3: Ewa - Installation Setup
Ewa will oversee the physical setup of the installation. This includes arranging the receipts in the gazebo space, ensuring the structure is secure, and coordinating with Sofia on the artistic elements. As well as help with documentation and creation of visionary moodboard for the installation itself.

Participant 4: Sofia - Installation Setup
Sofia will collaborate with Ewa on the physical arrangement of the installation. She will focus on the aesthetic aspects, such as lighting and tagging receipts with high plastic content, ensuring they stand out to viewers.

Participant 5: Ema - Sound Design
Ema will create the soundscape for the installation. This will involve selecting and editing sounds that complement the visual elements and enhance the thematic experience of the installation. Obtained from local market, and sound archive.

Participant 6: Lily - Documentation and Presentation
Lily will document the entire project, from setup to visitor interaction. She will create a comprehensive presentation that explains the concept, process, and impact of the installation. This includes capturing photos, videos, and compiling data findings.

3. Criteria for Evaluation
Criterion 1: Concept
Main Artistic Idea: The main idea is to use supermarket receipts as a symbol of consumerism and plastic pollution. The installation visually represents the hidden environmental costs of plastic packaging and encourages viewers to reflect on their consumption habits.

Innovation and Relevance: This project innovatively combines data analysis with visual art to highlight environmental issues. Its relevance lies in addressing the critical global challenge of plastic pollution through an engaging and thought-provoking medium.

Aims and Objectives:
Aims: Raise awareness about plastic pollution and consumerism.
Objectives: Transform receipts into a powerful visual statement, provide data-driven insights, and engage viewers in reflecting on their consumption habits.
Expected Outcomes: Increased awareness among viewers, stimulated discussions on sustainable practices, and a deeper understanding of the environmental costs of consumerism.
Interactive Element: Viewers physically navigate through the hanging receipts, encountering highlighted items and environmental costs. This interaction makes the information personal and impactful.

Criterion 2: Audience Engagement
Core Audiences:
Internal: Team members, art enthusiasts, environmental activists.
External: General public, supermarket shoppers, policy makers.
Role and Involvement: Viewers will engage with the installation by walking through the gazebo, observing the receipts, and reflecting on the information presented.
Experience Offered: A multisensory experience that combines visual art, data analysis, and sound design to convey a powerful message about consumerism and plastic pollution.

Criterion 3: Project Management
Start Date: 27/05/2024 – End Date: 30/05/2024

- Step 1 (27/05)
  Description: Idea and brainstorming, getting to know each other and our strengths. Agreeing on one theme of concept- in that case the supermarket.
- Step 2 (28/05)
- Description: Collection of data from nearby supermarkets. The brainstorm, and concept-oriented focus group.
- Step 3 (29/05)
  Description: Decision upon the concept itself, division of work as well as work on the main project itself. Creating first prototypes and testing the options.
- Step 4 (30/05)
  Description: Last changes and installation of the art itself.

Images

Descriptive One-Pager by Group 3

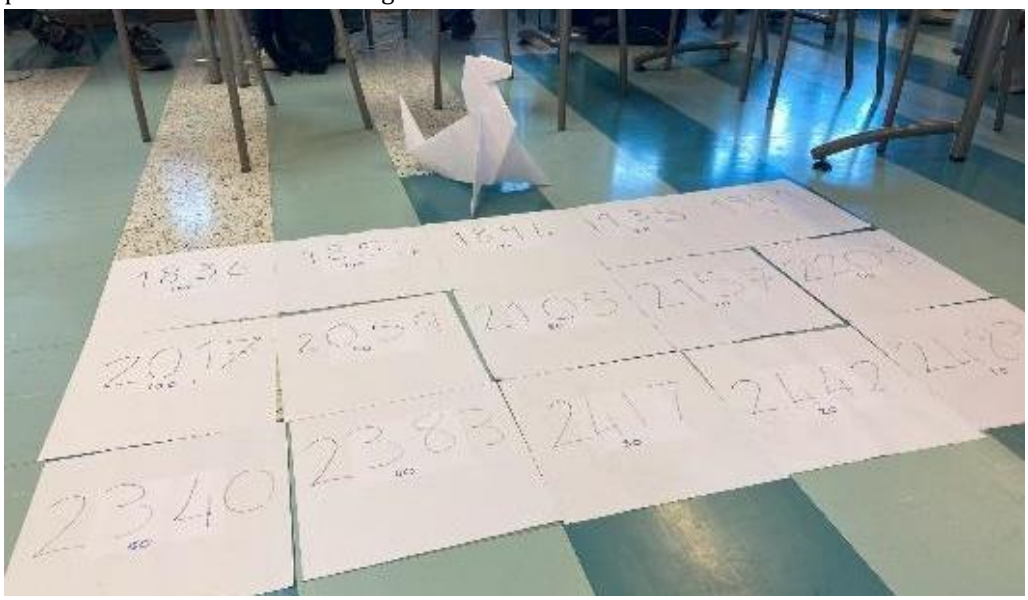
Title: Data in Move
This project was part of the “Seeing the Green – Data Storytelling for Sustainable Development”-camp in Finland 2024, which was organized by GEM. The general theme of the camp was data visualization. In our team “Data in Move” we explored how a data set of Lake Näsijärvi could be visualized. The data set reached from 1836 to 2019 and included data about the ice on the lake, for example on which day of the year the lake defrosted and on which day it froze again. On the first day, we brainstormed in pairs of two and discussed our ideas together.

After some more ideation and discussions with the team we settled on two ideas: one stop motion video and one paper performance. The paper performance showed the

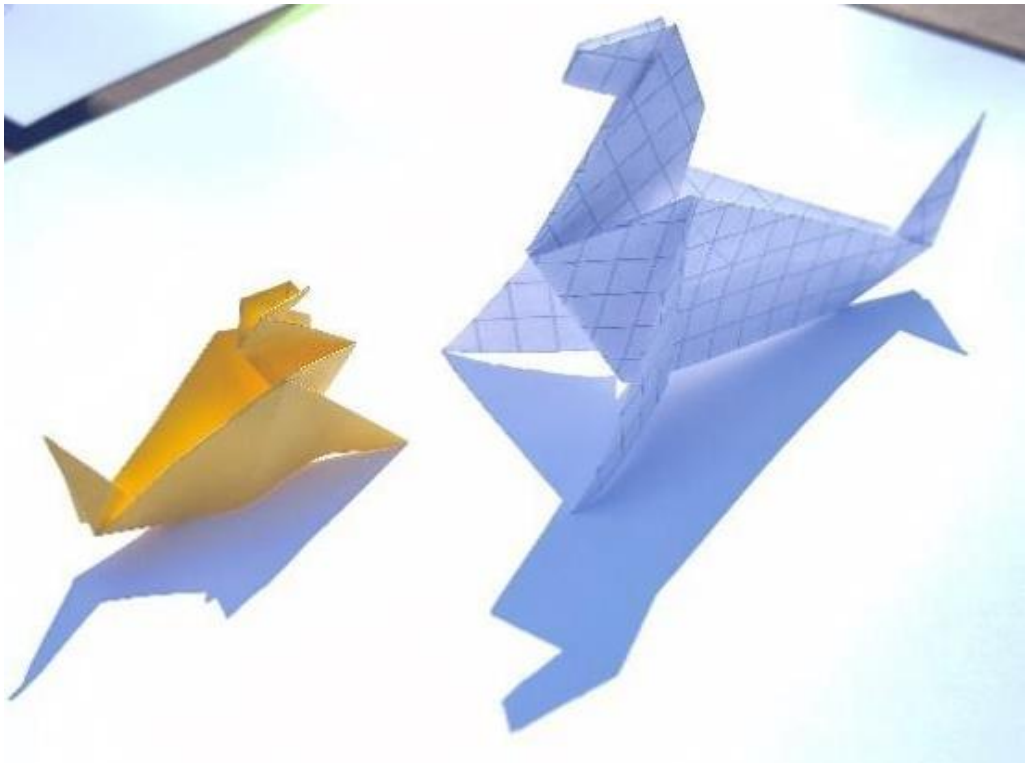
increase of days of the year where the lake was frozen, each paper representing ten days. Additionally, we included facts about the years in Tampere, specifically facts regarding industrialisation. We also made some projections for the future. Based on the existing data of the past, we calculated that by 2525 the lake will be frozen for zero days.

To film the stop motion animation, we used a tray filled with real ice, resembling the frozen lake. Out of paper we folded some origami seals, houses and factories, the surroundings of the lake were made from natural materials such as moss and pinecones. The video is showing two different version of the future, one negative and one positive. Seals don't usually live at lake Näsijärvi, but naturally the increase of frozen days it not only affecting this specific lake, so we took inspiration from the seals of Saimaa, which need snow and ice to build shelters to reproduce themselves.

Unfortunately, the movie itself was lost and students graduated so we are not able to present it. But here are some images from the results.



Paper performance spread on floor of room



Two origamis – the main Caracter's of the stop motion movie

Production of the short stop-motion movie

Descriptive One-Pager by Group 4

Title: Data Fiction

Students: Jascha, Kuba, Michalina, Miranda, Smaragda, Giorgo & Maja
Tutors: Nicole, Angelica

Our workshop began with an introduction to Data Fiction and Data Storytelling, emphasizing how data can be creatively transformed into compelling narratives. Followed by a discussion on sustainable food and healthy nutrition, each member researched a specific topic of interest focussing on the positive effects it has or could have on our future. We looked into topics such as genetically modified food, the impact of food on the human body, food labeling and local food, the amount of water used for food production, healthy foods with least environmental impact, and a self-sustaining life in the future.

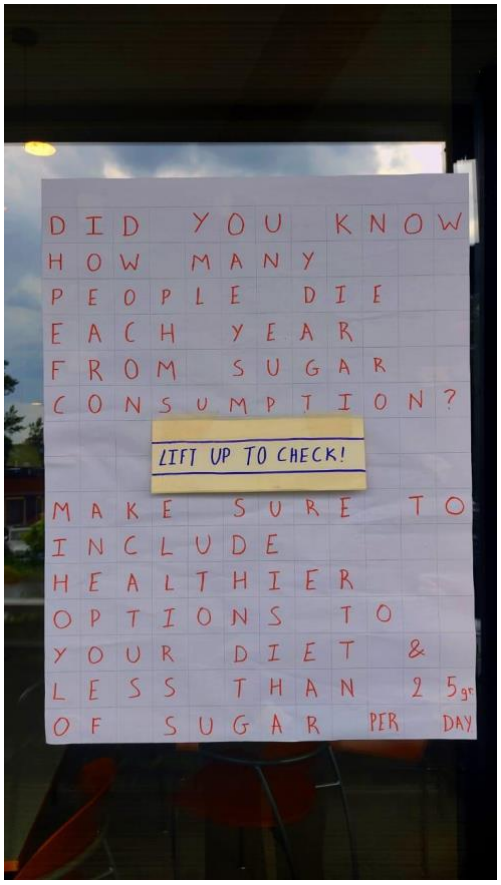
Based on a deep dive and presentation of our data research findings, we brainstormed and envisioned our lives in 2050 through a dream meditation. Afterwards the ideation phase started where we decided between politics, kids, researchers and teachers and choosing our own generation as the main target group. To convey our messages effectively making complex issues accessible and engaging we chose different media formats to be developed.

The Data Fiction team presents an innovative, interactive walk-through experience focused on sustainable food production and consumption, particularly addressing the environmental impact and health concerns associated with water usage, sugar and GMO intake, and food labeling and consumer awareness. A picturesque location for the presentation where a rocky hillside meets a lake, symbolizing the crucial relationship between water and food production underscores our message about the water-intensive nature of certain foods and the importance of sustainable consumption. Participants can walk through various stations, each providing insights and interactive activities related to the themes, allowing attendees to engage with the information in a hands-on manner, making the data more tangible and memorable. Our interactive sugary waterslay walkthrough starts off with a TikTok account @Water_slay7 where all of our attendees can look at our reels regarding news from 2050, GMO and more. In-between there is an app prototype stop, a guessing game of how much sugar certain products contain, a computer game about water consumption and an actual weight comparison of how much 1500? liters feel. The walk through ends with a music video for an AI generated pop song with the same theme, filmed and edited in Tampere.

Social Media/Film, Narratives, Songs, Sound: Jascha, Miranda, Kuba & Michalina
Sugary products guessing experience: Smaragda
App prototyping: Maja
Water-Shower game: Giorgo

2 min pitch: The Data Fiction team (all names :) presents an innovative, interactive walk-through experience focused on sustainable food production and consumption, addressing the environmental impact and health concerns related to water usage, sugar, GMOs, and food labeling. The picturesque setting where a rocky hillside meets a lake symbolizes the crucial relationship between water and food production, underscores the message about the water-intensive nature of certain foods and the importance of sustainable consumption. Starting at Sauna 3 at 1:30 pm you can mostly individually engage with various stations. Each offers insights and interactive activities, making the data tangible and memorable. Our walk-through exhibition includes an TikTok account (@water_slay7) featuring trending reels about 2050 news and GMOs, an app prototype for sugar intake, a guessing game on sugar content, a computer game on water consumption, and a weight comparison demonstration. Our experience concludes with a music video, an AI-generated pop song on the same theme, filmed and edited in Tampere.

Images



Descriptive One-Pager by Group 5

VR Story development | Green Data Storytelling Tampere

- Tampere known for textile industry
- Emotional approach for VR story
- Maybe point of view of a tree, which is cutting down
- Concentrate on a small, interesting story - not too complex
- Selling wood in Finland is one of the most incomes
- Visualizing the change of a forest
    - Inspiration “Let Nature Heal” (NL, 2023), winning film Sehsuechte Festival
    - A forest completely burned down and transforming into a dystopic kind of desert
    - https://vimeo.com/829906824

Using a map, events happening, god mode, zoom up, different focus, zoom into different places and focus on different topics like cutting forest, rising of the sea

- Non-linear narrative
- Kind of news report
- How many stories? From global to local and detailed stories
- Seeing the change of the world in God view like the world would be, if we are not changing our behaviour
- Jumping into the stories, two version of the small places and how they changed over time

Stories and topics:

- Trees → drying out, cutting down, biodiversity decreasing, sickness because of CO2 rising in the atmosphere
    - What did a tree experience in his life of 100 years
    - A tree tells a story
    - About his issues and problems and how they changed over the years
    - Different trees, different areas in the world or in a country
    - Different point of views
    - Personification of the trees
- End of the story something like "Nature will heal but human not"
- Water → maybe the influence for trees and forest, like forest fire. But also see pollution could also be a topic, depends on the focus we set up
- Maybe using the 4 elements fire, water, earth, wind
- Timeline problem: if we have 3 perspectives/trees and 2 scenarios à so all in all 6 stories we have to tell (maybe too much?)
- Negative or positive perspective?
- How can we tell the story: Before and after? Different situation in time?

3 Perspectives, examples

- Cutting trees
- Cutting down trees à showing the sadness of an empty place
- Depressing moment and animation: https://www.youtube.com/watch?v=lEOTeLrqAXs
- Maybe playing with sound, being in intact nature, tree is talking. Sound gets louder from industry machines. Hard cut à depressing moment of emptiness and darkness
- Drying out/Forest Fire
- Slow process, getting weaker and weaker
- Contrast with the source of water
- Playing with the feeling of rain
- Loosing leaves, seeing how other trees getting dryer and dryer
- Then later tree gets burned
- Biodiversity/sickness through air pollution

Facts and content

- Most important tree types: Pine, spruce, birch, aspen and alder → maybe we can find some data about those types and write a story about it
- Finland is experiencing a major loss of nature due to the continuous deforestation of biodiverse forests. Every year, Finland loses one percent of its most biodiverse forests.
- In Uusimaa (southern Finland), a 36-hectare area was deforested in 2018, causing many animals and plants to lose their habitat. This area was previously one of the most biodiverse forests in Finland. Around 15-16% of the deforestation affects biodiverse forests like the one in Uusimaa.
- LOGGING IN FINLAND 2021:
    - 76.3 million m3 was logged, of which
    - 36.7 million m3 goes to the pulp and paper industry
    - 29.0 million m3 goes to sawmills
    - 6.5 million m3 goes to bioenergy for small houses (private homes)
    - 3.8 million m3 goes to heat and power plants

    - https://www.birdlife.org/news/2022/09/05/of-clearcuts-and-birds-part2-finland/
- In 2010, **Finland** had **17.3 Mha** of natural forest, extending over **68%** of its land area. In **2023**, it lost **141 kha** of natural forest.
- From **2001** to **2023**, **Finland** lost **4.62 Mha** of tree cover, equivalent to a **21%** decrease in tree cover since **2000**.
- https://www.globalforestwatch.org/dashboards/country/FIN/?category=undefined
- New Greenpeace Finland analysis of the supply chain of major Finnish forest company Metsä Group confirms that a fraction of its wood products came from the degradation of Finnish forests. In 2021, Metsä Forest delivered a total of 35.3 million cubic meters (32.7 million cubic meters in 2020) of wood to clients and consumers all across Europe and beyond. (Greenpeace paper)
- Eurostat found Sweden and Finland to have the largest forest areas in the EU.
- But a study uncovered only 8,8% of Sweden's entire forest land is formally protected, whereas slightly over 6% of forest land is under strict protection in Finland according to the Ministry of Agriculture and Forestry of Finland. (Greenpeace paper)
- In Finland, forest sinks decline as felling continues. Especially the age class structure of the forests is deteriorating. While older forests have more vegetation, younger forests are less biodiverse, store less carbon, and are more vulnerable to the effects of climate change. As a result of the felling of older forests, for the first time, the land use sector turned from a carbon sink into a net source of emissions in 2021. (Greenpeace paper)
- "Even-aged, or rotation forest management (RFM), has been the most commonly applied forest management strategy in Europe. In Finland, for example, this type of forestry has been practiced since the early 1950s, with a strong tendency to favor conifers. The loss of biodiversity due to such monocultural forestry practice is obvious. However, it is also a climate problem: when a forest is clear-cut the sink is lost and the carbon released back into the atmosphere." (Greenpeace paper).

Research resources

- EFFIS European Forest Fire Information System
    - https://forest-fire.emergency.copernicus.eu/
- European Atlas of Forest Tree Types
    - https://forest.jrc.ec.europa.eu/en/european-atlas/
- GeoTIFF (e.g. showing landscape data for our map or combining map with other footage in artistic way and with emotional audio story of a tree)
    - visible through QGIS: https://www.qgis.org/en/site/
    - Data sources: https://forest.jrc.ec.europa.eu/en/european-atlas/atlas-data-and-metadata/
- Finnish Environment Institute
    - https://www.syke.fi/en-US
    - Downloadable spatial datasets: https://www.syke.fi/en-US/Open_information/Spatial_datasets/Downloadable_spatial_dataset
- Global Forest Watch
    - https://www.globalforestwatch.org/dashboards/country/FIN/?category=undefined
    - In 2010, Finland had 17.3 Mha of natural forest, extending over 68% of its land area. In 2023, it lost 141 kha of natural forest.
    - From 2001 to 2023, Finland lost 4.62 Mha of tree cover, equivalent to a 21% decrease in tree cover since 2000.

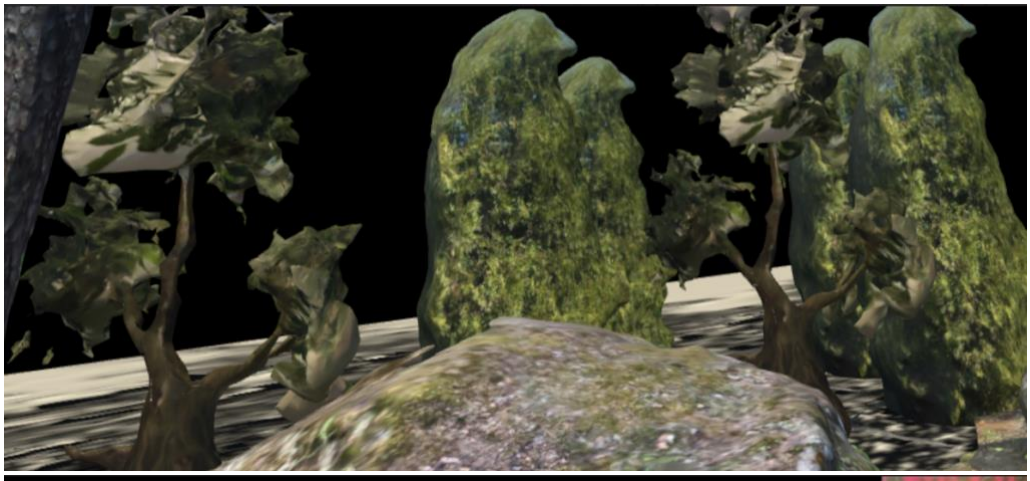
- Finish Forest Industry
    - Production Volumes since 1960: https://www.metsateollisuus.fi/newsroom/forest-industry-production-volumes-since-1960
    - Export Volumes since 1960: https://www.metsateollisuus.fi/newsroom/forest-industry-export-volumes-since-1960
- Background of Finnish forestry
    - also with pictures of cutted forests
    - https://www.birdlife.org/news/2022/09/05/of-clearcuts-and-birds-part2-finland/

SCRIPT and facts we can add into the environment

When we turn our backs on nature, we invite severe repercussions. Ignoring deforestation means disregarding the escalating loss of biodiversity, the amplification of climate change, and the displacement of indigenous communities. By uncovering the often unseen drivers behind forest loss and degradation, we aim to foster a deeper understanding of this urgent problem and inspire collective action to protect and restore our planet's vital forest ecosystems. The time to act is now, for neglecting nature today ensures we pay a heavy price tomorrow**.**

More than 75% of the Finnish landscape is covered by forests. But only 6% is protected. In 2023 Finland lost over 141 kha.

Images from VR app



Feedback and recommendations

Evaluation Methods

The evaluation of the achieved results in camp's working groups is of crucial importance when assessing the overall success of camp, but also in more detailed accounts, when analysing the functionality of chosen working methods, tools and pedagogical approaches. In order to gain deeper insights in the working dynamics, it is necessary to question the results from many points of view, using different methodologies, starting from different presuppositions.

After the camp all tutors, conceptual leaders of the working groups collected their impressions and experiences in leading diverse student groups dedicated to fulfilling previously established plans. The initial challenge was to prepare the workshop tasks taking into account extremely different backgrounds of respective students. For that purpose, preliminary online workshops were organized, but live onsite situations pose different challenges, so a flexible, yet fairly precise approach is needed.

Methodologies for Evaluation, proven fruitful and informative in the 2023 summer camp were chosen again, and slightly modulated better to adapt to a new teaching environment and set of tasks. We conducted pre- and post-Camp surveys. First ones to get acquainted with already existing skills and plan the very program of the workshop accordingly. Post-camp surveys serve primarily to reflect upon used methodologies and approaches, evaluate achieved outputs and suggest improvements in the next round.

After the summer camp, tutors wrote short assessments, highlighting the working group dynamics, its working procedures and outcomes, as well as challenges and operative problems. However, this didn't come as a surprise since previous experiences showed that live onsite interaction and collaboration cannot fully follow prearranged working protocols. Being aware of this discrepancy only nudged tutors to better preparations and more flexibility in devising concrete tasks. Overall quality of the prepared workshops was reflected upon with particular emphasis on aspects that could improve in future instances.

Course Evaluation

Success of the course was evaluated by having both students answer a survey after the workshop was concluded. This evaluation is useful for planning future workshops.
Link to survey results

Student survey results
The survey was completed by 18 students from 31 and it consisted of 20 questions.

Students seemed to be satisfied with learning experience with a median answer of 4 (0-5 scale). Students' expectations were also met well, for example: *"I expected to learn about different data presentation options, and I did. In addition, just as I learned about various methods of data presentation, I also learned many things related to ecology, caring for the planet, and wise use of natural resources."*

Students also liked working in a friendly and supportive atmosphere.
"*I really loved the experience of meeting & working with different people with different artistic backgrounds & working together to a common experience*."

Tutors survey results
Tutors feedback was collected in a brainstorming session right at the end of the camp. Guiding questions were following:

- What went well?
- What did not go well? What could have been optimised?
- What ideas do I have?
- Takeaways for the next workshop?

Tutors were happy about how students worked and the results of projects were very satisfactory. *"Very diligent results"* and *"Outcomes are fascinating compared to time invested in the production"* were some comments about results from tutors.

One thing that was seen as a topic of improvement was making sure that online preparation course and workshop content are aligned. Some comments about this were: "*There was only little connection between pre-course and onsite course"* and*"prep Workshop too techy".*

The tutors' reflection on the whole process corroborates the functionality of previously set goals, i. e. the importance of setting **clear, achievable learning objectives**, balancing **theory with practical application**, incorporating **real-world data**, and fostering a **collaborative environment**. Tutors were guided to evaluate the projects based on criteria like the clarity of objectives, effectiveness of chosen tools, level of student engagement, and the quality and originality of the final projects. Their insights can be summarized according to the task groups and a full set of questions and answers can be found in the appendix.

Outcomes and recommendations

The learning camp proved to be a successful exercise in data visualization, but even more important, in developing collaborative practices among students with very different prior knowledge and experience. Combination of research, design in VR surroundings, use of everyday, natural and man-made objects for the creation of fairly sophisticated data representations was found enticing by students. Notwithstanding minor operative obstacles in the beginning (multiple objections pointed toward the need for as precise as possible specification of the tasks at the very beginning), all the tasks were fulfilled successfully, as envisioned by plan.

As was the case the year before, coordination of such different approaches, tools and goals, among students who differ significantly was expected, and was met successfully with careful preparations and high-level sensibility and flexibility from the tutors' side. All workshops went by the plan, without serious hindrances in collaborative procedures or output production. Given the nature of resources used for some of the outcomes (particularly 3D sculpture), the creativity and innovation were on the very high level, usually hard to attain in regular pedagogical conditions, i.e. classrooms.

Following outcomes may be discerned

Broadened Environmental Awareness: Students reported raised awareness about the importance of curricular material dedicated to environmental issues, content- and methodology wise.

Cultural Competence Enhancement: Working with colleagues from various cultural backgrounds proved again to be challenging and particularly motivating, since it imposed the need to find creative solutions in overcoming some of the communication problems. Acquiring knowledge about different approaches in different cultural surroundings only widened students' capacities for further collaborations.

Further Need for Interdisciplinary Collaboration: The nature and complexity of the problems GEM aims to address can be accessed only through collaborative work of experts from many fields, quite often ones who do not have prior experience of mutual collaboration (such as 3D designers and storytellers, or programmers and cinematographers). This summer camp proved that such an endeavour is feasible, not only on the organizational level, which is itself a fair achievement, but on the educational level as well. Film students do not often get a chance to collaborate with experts in data visualization, so such opportunities, hard to achieve in traditional classroom settings, prove that camps like this provide extraordinary conditions for personal and professional growth.

APPENDIX

Course description for students

GEM – Green Education in Media / Course 2024

Course Theme: Seeing the Green - Data Storytelling for Sustainable Development

As part of the GEM Erasmus+ Cooperation Partnership Project

This course aims to provide the student with essentials on information visualisation and how different visualisation techniques can be used to deliver narratives in an effective and easily understandable way.

01.05. – 25.05.2024	**Preparatory Sessions with weekly online workshops**
Meeting-Link: https://filmuniversitaet-de.zoom-x.de/j/61648516721	
Estimated total workload for the precourse: 1 ECTS	
Thursday 02.05. | 15:00 – 17:30 CET	Workshop 1: Introduction of the project and each other / Terminology / Showcases / Tools
Monday 06.05. | 15:00 - 17:30 CET	Workshop 2: Introduction to information visualisation
Tuesday 14.05. | 15:00 - 17:30 CET	Workshop 3: Interactive visualisations
Wednesday 22.05. | 15:00 - 17:30 CET	Workshop 4: Advanced, Experimental and Accessible visualisations: XR etc.
26.5. – 31.5.2024 "Seeing the Green" Data Storytelling Camp, Tampere (Finland) Estimated Workload: 2 ECTS	
26.05. Arrival | 17:00	Get Together, Intro & Team Building Sessions
27.05. | 9:00 – 18:00	Inspirational nature walks, project work (challenge introduction), welcome evening.
28.05. | 9:00 – 18:00	Co-Creation, ideation, sketching, exploring the design options of concepts.
29.05. | 9:00 – 18:00	Development of prototypes

30.05. | 9:00 – 18:00 | 19:00 –	Presentation preparation and presentations of camp results Farewell evening
31.05. |10:00 – …	Departure

ECTS: The amount of ECTS granted for this course is subject to the individual implementation of the partner universities.

Data Narration as Macroscopes of Planetary-Scale Computation

The 21st century is marked by a paradox: the global sensing systems that enable us to recognize the climate catastrophe are the same systems that contribute to global warming. Planetary-scale computation both raises awareness and exacerbates the problem. The narration and aestheticization of data—whether as graphics, sounds, text, or moving images—sit at the intersection of the world's datafication and humanity's understanding of the process. Data representations possess the power to convey narratives that are otherwise unimaginable.

Microscopes allow us to visualise processes too minute to be observed, while telescopes capture distant galaxies far beyond human reach. In this context, data representations can serve as macroscopes, illuminating complex, global, and otherwise unrepresentable aspects of our world.

The 2024 edition of "Green Education in Media" will emphasise the food and land usage of the future. In this realm, scientific data offers insights into the future, made possible by the planetary-scale computation of global sensing systems, insights that would otherwise remain elusive. Narrating such data is a pivotal skill in the data-driven landscape of the 21st century. This skill is the central theme of "Data Storytelling for Sustainable Development."

Overview of module

In this module, 9 partner organisations including around 40 students and 20 lecturers will collaborate to tell visual stories on environmental data. We will explore the opportunities of data storytelling and information visualisation to create a more sustainable future, on the backdrop of Finnish nature and scenery in a multicultural setting. Through a well-balanced division between free time and studying, we aim to create an exciting intercultural learning experience for all participants of the workshop!

Our major topic will focus on Data Storytelling (e.g. *interactive data storytelling and visualisations, infographics, and visualising information in virtual and augmented reality***.)**
The subtopic will be agriculture and nutrition of the future. Various datasets are available on this topic.
As a result of this module, visions of ideal places are researched, envisioned and described. Our focus will be on solutions, but there is also plenty of space for theorising and conceptualising.

In the **first two preparatory workshops** (02.05/ 09.05.) participants will learn about essentials of information visualisations.
The **following two prep workshops** (14.05./ 22.05.) will explore more advanced visualisation techniques. We will also study how interactive visualisations can be tools of exploration for the one who is using the visualisation.

In the **Information Visualization Camp (25.05. – 31.05.)** local groups from Croatia, Germany, Greece, Finland, Malta and Poland will get together in a one-week camp near Tampere. There we will have nature experiences and explorations and enjoy traditional Finnish sauna and swimming by the Pyhäjärvi lake. Furthermore, partakers will form groups of 4 people to collaborate and do a deep dive into the world of information visualisation.

All participants in this module will get a briefing before the preparatory workshops are started.

About the location (https://varala.fi/en/)

Varala is a leading sports education institute, a training facility and a versatile centre for sports, leisure and recreational activities. Varala Sports Institute is an official education provider in the field of physical education and sports with an authorization to provide education and award qualifications granted by the Finnish Ministry of Education and Culture.

One of the pioneers of Finnish sports institutes, Varala, founded in Tampere in 1909, is a significant part of the history of sports in Finland. The oldest sports institute in Finland was originally established to promote physical education for women working in local factories through gymnastics. We at Varala want to be involved in creating a future where everyone can enjoy exercise or sports, achieve their goals and feel good, regardless of their age and background, both in their free time, at work and on the playing field. Varala was founded by energetic and courageous women who were ahead of their time. They firmly believed that one day the importance of physical activity would be understood and recognized.

Today, Varala continues to lead the way as a high performance training center for sports. Varala also offers excellent leisure & camp offerings, well-being, meetings & wellness days for companies and groups, as well as sports and coaching activities.

Address: Varalankatu 36, Tampere, Finland.

Platform and Support

- 1-2 mentors are assigned for each team of up to 4 students
- Work on online whiteboards and video meeting tools during prep workshops
- Communication platform tbd
- Dedicated learning & research materials will be available online
- Prep workshops and camp sessions will be facilitated by an international teaching team

Competencies taught in the Course

- Knowledge
  - Foundations of data visualisation (Gestalt Theory, Perception)
  - Mapping data to graphics
  - Using standard tools for data visualisation
  - Knowledge about possibilities of data visualisation in moving images
  - Different approaches to data visualisation: Human Computer Interaction, Information Design, Artistic approaches
  - Data visualisation in XR (tentative)
- Skills
  - Critical reflection of data visualisation
  - Customised data visualisations with coding frameworks (advanced skill for people with prior experience)
  - Rapid content & interface prototyping
  - Concept and project planning for (interactive) projects
  - Pitching and reviewing a concept
  - Exploring the creative potential of information visualisation technologies
  - Future Skills;
  - Social Competencies
  - Building a transcultural team

- Working in an interdisciplinary team
- Creative processes and decision making
- Self-reliance and empowerment
- Self-organisation within teams
- Futures Literacy

Tentative tasks of teams during course

- International Teambuilding and Leadership
- Research and ideate based on a briefing
- Concept Development

About GEM

GEM - Green Education in Media is an Erasmus+ Cooperation Partnership between nine

international partners (2022 - 2025):

- Film University Babelsberg KONRAD WOLF, Germany (Project Lead) ● Tampere University, Finland
- Tampere University of Applied Sciences, Finland
- National and Kapodistrian University of Athens, Greece
- University of Malta, Malta
- Academy of Dramatic Art, University of Zagreb, Croatia
- Jagiellonian University in Kraków, Poland
- Lodz Film School, Poland
- Institute for Art and Innovation, Germany

Together they are working on:

- Environment and fight against climate change
- Supporting digital and green capabilities of the higher education sector ● Green skills
- Creating new, innovative or joint curricula or courses
- Digital content, technologies and practices

Co-funded by the European Union

The creation of these resources has been(partially) funded by the ERASMUS+ grant program of the European Union under grant no. 2022-1-DE01-KA220-HED-000088645.

Individual experience reports by tutors

Group 1: "Interactive Data Visualization"

Tutors: Markku Turunen, Kimmo Ronkainen

Concept Development:

- Outline the key learning objectives for interactive data visualizations.
- Identify the software and tools to be used (e.g., Tableau, D3.js).
- Develop a step-by-step guide for students to create interactive visualizations.
- Incorporate real-world data sets for hands-on practice.
- Plan for incorporating user experience and interface design principles.

Competencies Criteria:

- Clarity and relevance of learning objectives.
- Practical applicability of the chosen tools and software.
- Level of student engagement and interactivity.
- Quality and usability of the produced visualizations.
- Integration of user feedback into the visualization process.

Experience Report (Reflection)

Students started to explore different datasets and compare their own individual skill sets since they had a broad range of backgrounds. Students seemed to like the idea of calculating carbon footprint from everyday shopping of food items and came up with the idea of a webpage with 3d graphics of supermarkets. Data visualisation would happen after the shopper has selected all their items and price would come out as carbon footprint instead of Euros.

- Explored various interactive tools and software for visualising complex data sets.
- Engaged in hands-on activities to create dynamic data visualisations that respond to user input.
- Collaborated on a project to visualise the impact of sustainable agriculture practices.
- Discussed the importance of user engagement and accessibility in data visualisation.
- Received feedback from peers and tutors to refine and improve their interactive visualisations.

Group-Specific Insights:

- Group had a great skill set from different backgrounds to support creating this webpage with 3d graphics and data visualisations.
    - Web development
    - 3d art
    - Sound design
    - Project management
    - Data visualisations
- Group members used tools they have used in their own studies or projects, like Blender for creating 3d graphics. Not all software tools were listed/gathered since students were working on own laptops and then bringing end results to web developer who integrated these to the webpage.
- Group worked in “small teams” of 1-2 people. Teams had goals for each day, like get specific 3d models, sound or music or data visualisation done. After each task was done, they returned their “product” to a web developer who was working to bring each element to their environment. Goal was that there would be a working prototype after the second day and then it would be just improving it with this until time ran out.

Learning Objectives:
Learning goals were to get students familiarised with different data visualisation tools and methods and to get them to think how their own backgrounds support creating those. Students learn how to identify different data sets and which methods are good at visualising different types of datasets.

Tools and Methods:
Students created web pages using html and javascript. 3d visualisations were done using A-frame. Data visualisations were made using various tools including Tableau and Chart.js. Some were interactive within the webpage and some were pre-recorded videos from outside tools like Tableau.

Webpage was selected as medium since it is the most common method to share information and JavaScript allows adding interactivity to visualisations without need to install software to users' computers. Team used several different data visualisation tools so they could explore pro's and con's on several different methods.

Student Engagement and Interaction:
Discuss any collaborative efforts, peer feedback sessions, or group projects.

Project group made a timeline for the whole project and created a daily schedule of what was going to be finished for each day. For each day, everyone had individual tasks based on their skills.

Final Projects/Outcomes:
Project outcome was a webpage with 3d graphics of supermarkets with some shelves of products. Users are able to "fly" in store and select different products to the shopping cart and when the user selects to check out, they will get a recipe with carbon footprint and links to additional data visualisations for each product.

Feedback and Learning Outcomes:
Students learned how to work together in a group with people from different backgrounds and skill sets. They learned to plan and coordinate their work for common goal. Students learned different data visualisation methods and what needs to be taken into consideration when using those.

Conclusion
Students were really fast to form an idea of what they wanted to do, since after the first hour, they had formed an idea of what they wanted to visualise and what technical methods they would use to get it done. Group divided work based on each student's backgrounds and tutors were there to just give suggestions and help with some problems since some data visualisation tools were new to students but they wanted to try them out. For tutors this group was really easy to supervise since students' choices were perfect fit for the whole group's backgrounds. Students were able to finish everything they had planned and it was both visually well done and had many different data visualisations implemented.

Group 2: "Artistic Data Visualization"

Tutors: Kim Albrecht

Concept Development

1) **Define the Intersection of Art and Data Visualization**
   Establish an understanding of how artistic expression and data representation converge.
2) **Explore Artistic Techniques and Data Sets**
   Investigate various artistic methods and diverse data sources.
3) **Create a Framework for Experimentation**
   Provide students with opportunities to experiment with different media (e.g., digital, print, installation).
4) **Plan for Showcasing Student Work**
   Organize a creative format for presenting the students' projects (e.g., exhibition or online gallery).

Competencies Criteria

1) **Innovation and Creativity in the Use of Data**
   Encourage original and inventive applications of data in art.
2) **Artistic Merit and Aesthetic Quality**
   Focus on the visual appeal and artistic value of the visualizations.
3) **Understanding Data as a Medium**
   Comprehend how data can be used as a tool for artistic expression.
4) **Develop Skills in Conceptual Thinking and Narratives**
   Enhance abilities to create meaningful stories and concepts through data.
5) **Learn Data Mapping Techniques**
   Acquire skills to transform data into various representations.
6) **Technical Execution and Presentation Quality**
   Emphasize precision in the creation and display of projects.
7) **Engagement with Broader Themes**
   Connect projects to larger contexts like climate change, agriculture, culture, society, and technology.

Experience Report (Reflection)

During the workshop, students delved into the intersection of art and data, concentrating on the aesthetic representation of consumption data via grocery receipts. They ingeniously collected data by requesting receipts from various grocery stores—a creative approach that exceeded expectations in effectiveness, despite the inherent difficulty of the task they set for themselves.

Project Development

1) **Collaborative Effort**
   a) The students chose to work as a single large group, fostering unity but also encountering challenges in task allocation and workflow management.
2) **Challenges Faced**
   a) Difficulty in dividing tasks among group members due to the group's size and varied skill sets.
   b) Irritations arose from the struggle to progress at key points in the project.
3) **Explored Concepts and Techniques**
   a) Machine learning techniques.
   b) 3D data mapping.
   c) Aesthetic data representations.
   d) Data installations.
   e) Data sonification.
4) **Critique Sessions**
   a) Participated in multiple discussions to refine the conceptual and visual aspects of their work.

5) **Learning Outcomes**
   a) Gained knowledge of various artistic techniques and mediums used in data visualization.
   b) Developed skills in conceptual thinking, narratives, and aesthetic representations of data.
   c) Learned data mapping techniques to transform data into visual and auditory representations.

Final Project

The culmination of their efforts was the transformation of a pavilion into a 3D data sculpture. They mapped the grocery receipts onto the structure, effectively visualizing the ecological footprint of consumption. Complementing the visual installation, they created a data sonification that played within the space, adding an auditory dimension to their representation. Given the project's short timeframe, the result was absolutely stunning—demonstrating technical execution and presentation quality.

Reflections on Competencies Criteria

1) **Innovation and Creativity**
   The students showcased originality in using everyday items (grocery receipts) to represent complex ecological data.
2) **Artistic Merit and Aesthetic Quality**
   The 3D sculpture and accompanying soundscape were visually and audibly engaging.
3) **Understanding Data as a Medium**
   Successfully treated data not just as information but as a material for artistic expression.
4) **Conceptual Thinking and Narratives**
   Crafted a narrative around consumption and its environmental impact.
5) **Data Mapping Techniques**
   Employed 3D mapping and sonification to transform data into immersive experiences.
6) **Technical Execution**
   Overcame technical challenges to produce a high-quality installation.
7) **Engagement with Broader Themes**
   Addressed themes of consumption, ecological footprint, and sustainability.

Challenges and Considerations

The students encountered several difficulties:

1) **Complex Task**
   Undertook an ambitious project that required significant coordination and effort.
2) **Varied Skills and Perspectives**
   Differences in experience levels made task delegation challenging.
3) **Time Constraints**
   Limited time added pressure to complete the project effectively.
4) **Novel Environment**
   Working in an unfamiliar setting required adaptability.
5) **Lack of Predefined Boundaries**
   The freedom of artistic expression necessitated self-directed decision-making, which was initially daunting.

Feedback and Future Improvements

Considering these challenges, it may be beneficial to address the following in future workshops:

1) **Provide More Boundaries**
   Introduce predefined data sets or topics to give students a starting point.
2) **Smaller Group Work**

Organize students into smaller teams to facilitate better collaboration and task management.

3) **Guidance on Task Allocation**
   Offer strategies for dividing work based on individual strengths and interests.
4) **Balance Freedom with Structure**
   Maintain artistic freedom while providing enough structure to guide the creative process.

Conclusion

The students' project was a remarkable success that aligned well with the initial concept development and met the competencies criteria. Despite the obstacles, they demonstrated creativity, technical skill, and a deep understanding of how art and data can intersect to address meaningful themes. Their work not only showcased their abilities but also contributed valuable insights into the educational approach for future workshops.

Group 3: "Data in Move!"

Tutors: Tuomo Joronen (TAMK)

Concept Development:

1) The objectives for integrating data visualization with movement and physical performance focused on introducing movement as the element of highest level of visual interest.
2) The tools and platforms for creating kinetic or animated data visualizations were not to be limited by certain platforms or particular pieces of software. However for Data in Move some assistance on software was prepared. These included Blender and After Effects.
3) Curriculum for the workshop included sessions in which students would be introduced to examples of data visualized with animated elements. A lecture to create understanding of movement as a visual element is included. A sample set of Data is introduced to the student group.
4) A Joint feedback session with the other student teams is organized.

Competencies Criteria:

1) Using movement as an essential part of combining data with storytelling.
2) Creativity in the data storytelling.
3) Understandings nature of movement.
4) Clarity and impact of the data-driven narratives.
5) Audience engagement and response to the narrative.

Experience Report (Reflection)

In the beginning of the workshop, as the student group was introduced to the sample data set by the tutor, (the freezing and melting dates from a local Näsijärvi-lake from 1870 to current date.) they found it interesting. The students were later introduced to the workshop's theme of "Agriculture and Nutrition of the Future" but the students chose to remain in the theme of ice.

The next day, the presentation to the nature of movement, the mechanical, natural and stylized movement among other aspects of data visualization were introduced. Fitting into the theme of data visualization and also to introduce a generally more positive and constructive perspective into the current status of the world, Swedish academic Hans Roesling's world population data set demonstration was studied. Noteworthy on Hans Roesling's work is also his iconic use of physical objects in his presentation, thus making his presentation more memorable and easy to follow.

The students had two topics of interest within the workshop, first to demonstrate the amount of change in the climate in Tampere and to incorporate photography into it. As there was a clear conflict with the chosen data set and the workshop the data was bound together with other on-going events in the history of Tampere. These

included the industrial rise of Tampere and the hunger years of Finland. And as the topics and interest were quite divided the end result was to include a physical presentation by students and to create a stop-motion animation to demonstrate the changes in the environment. For this stop-motion the tutor's laptop and software called DragonFrame was used. For the melting ice, a tray with water in it was frozen overnight in the Varala kitchen.
In the process of creating the animation a lot of the challenges of how to film and how to time the movement were covered and this was a clear learning experience. Methods of creating a timelapse and an animation were combined. On top of the melting ice, the animated clip also included an urban environment and an animal species, seal.
In the final session students presented the data by using text on paper and talking about the status of data on timeline. In the presentation future prognosis for the changes of ice-covered period in Tampere Finland and what effect that would have were made. This was done pretty much in Hans Roesling style. Along this the animation was presented. The end result was quite unexpected, thus clearly being a creative rendition of the presented data. In their feedback the students enjoyed creating a stop-motion video and introduction to a new simple but very powerful piece of software - DragonFrame.

Suggestions of improvement
In hindsight it might have been useful to keep the students more in the chosen topics. Then on the other hand the exceptionally warm weather and the theme of ice in the Näsijärvi lake was quite spot on.
From tutors point of view the story narrative was a bit too straightforward and it took some liberties in making the speculative future prognosis and maybe these should have been challenged more, as after it was about Data visualisation.
As stop-motion was a bit unexpected form of animation used by the group it would have been useful to take some equipment from TAMK, ie. lights and camera. That would have made the process more straightforward without too much hassle.

Group 4: "Data Fiction"

Tutors: Nicole Loeser (IFAI), Angelica Böhm (FBKW)

Concept Development:

1) Presentation of Camilla Food Plan (initiated by A.Böhm) incl. ***Explanation of Transmedia Storytelling and Data Fiction*** & invitation to online exhibition presentation of developed media formats during Tampere workshop (to all students)
2) ***Intro round*** of group members (students from Greece, Germany, Poland, Finland):
   a) *Presentation of skills:* Drawing, Digital Art, Photography, Animation, Sound Design, Film Production, Graphic Design, Creative Writing, Social Media and
   b) *Interests:* Multi-perspective Storytelling, Interactive Data Visualisation, Food production and Nutrituion with least environmental impact, Longivity, GMO Food healthy or unhealthy?, Self-Sustaining Life in the Future, Food quality (processed food vs. eco-food - nutrition comparism?), Fast growing food for improved production cycles, Nutritions for a healthy life on this planet - Planetary Food Diet
3) ***Deep Dive:*** a) *Data Research* regarding to individual questions/topics of interest, b) *Writing a summary* on a poster, c) *Presentations of research findings* incl. *listening exercise to reflect on positive science messaging* that can guide people to live healthier and more sustainable
4) **Meditation based on AFFL method:** a) Visioning of a 2050 moment incl. place, food production, eating behaviour, atmosphere, attitude to food, b) **Note-keeping and drawing of this future scene**, c) **Presentation and iistening exercise** where each reflected on resonating aspects
5) **Individual student's choice of thematic areas** for creating data-driven stories based on research findings
6) **Group decision on visitor experience walk-through exhibition** with several different interaction formats

7) **Prototping and Developing of multimedia formats and interactive activities:** Films, Songs, Scientific Explanation Videos, Mobile app prototype for sugar intake, science quiz on sugar content of certain products and sugar deaths, game on water usage for sugar production, blending factual data with fictional narratives (partly group and individual work
8) **Presentation** of Social Media channel (TikTok @water_slay7),and site-specific exhibition with different stations (analog and digital) planned for water-side to better guide audience for small group experiences (up to 5 people)

Competencies Criteria:

1) Originality and creativity in blending data and fiction.
2) Understanding of art and scientific research and communication methods and define interdisciplinary/multimedia outcomes.
3) Accuracy and integrity in the use of factual data.
4) Depth and complexity of the fictional narratives.
5) Quality of storytelling and engagement with the audience.
6) Integration of multimedia elements to enhance the narrative.

Experience Report (Reflection)

- Combined elements of storytelling with data to create engaging narratives about food sustainability. incl. ideas to change behaviour and understanding of complex topics
- Developed fictional scenarios based on real agricultural data to highlight potential sustainable and climate-positive futures.
- Created short stories or scripts that weave together factual data with imaginative elements. Developed short TikTok videos to transmit scientific data in tangible way.
- Shared their data fiction pieces in social media and presented it in site-specific exhibition, fostering a discussion on sustainable food production and consumption, and water usage.

Students' Qualitative Reflection Summary

- Workshop process was great to structure deep dive, ideation, developing and prototyping phase
- Freedom to develop creative ideas and outputs
- Learning together in interdisciplinary and intercultural setting help to transfer knowledge and share skills in a very short way
- Interesting filmproduction exercise to build on research findings and data sets
- -Good balance between individual and group work

Group 5: "Virtual Reality"

Tutors: Björn Stockleben, Dimitris Charitos, Caterina Antonopoulou

Course Concept:

1) Presentation of examples of data visualizations in VR
2) Deriving common principles for VR data visualisation
3) Mutual introduction of inspirations from the "nature walk" and collection of key ideas
4) Parallel development of 3 concepts in pairs of two people, with individual coaching sessions with the tutors
5) Pitching and discussion, agree upon concept to be implemented
6) Selection of platform, tools and methods under guidance of the tutors. Distribution of team roles and responsibilities.
7) Content gathering, creation and integration into VR experience
8) Development of an outdoor exhibition concept for the project

Competencies Criteria:

- Design of Data mapping into 3D spaces
- Understanding of textures as data
- Basic understanding of geoTIFF as 2D data matrices
- Design of interaction and exploration concepts for VR
- Creation and integration of 3D scans of natural assets
- Interdisciplinary project work in VR

Experience Report (Reflection)

We presented data visualisations to the students. Key examples where "TerrAResponse", an AR application build on GIS-Data Visualisations, and an artistic immersive data experience that monitored the movement of visitors in a room and gave audiovisual feedback.

Exploring key principles was an interesting process. We reflected both on the examples we've shown at the beginning and the ideas of the students. From that we derived abstract paradigms, such as "texture is data", which lead the further design process. This process could be made more explicit, as it helps the students to understand the latent abstract concepts that underlie their ideas.
The students returned from the nature data walk with rich impressions. However, the impressions and data they gathered where undirected, i.e. they did not have a prior frame of VR data visualisation in their mind. Thus, deriving concepts for VR data visualisation in particular needed a further step of filtering and abstraction. Giving them a particular focus for their data walk exploration (such as "texture is data") would probably have boosted the specificity of ideas and saved time in the process.

The subsequent ideation in separate pairs was productive, as was the individual mentoring. It took about 2h and the pitch happened the next day. We pitched outside on a footbridge by the lake, which was a good setting. It forced the presenters to speak up and they were not tempted to use presentation technology.
As for the ideas, it appeared that the students had problems to become concrete. They introduced themes rather than concepts. For the idea pitch this was not that much of a problem, but the problem lingered on during the following hours. A reason is probably that the students could not (yet) think how it would actually look in VR as they had limited experiences and were not aware what the building blocks of a VR experience are. This calls for early prototyping. We provided a prototyping platform called ZAPWORKS, but given free choice of ideation tools, the students would not opt for that, even if we nudged them gently. A solution could be to make an explicit guided prototyping session as a short introductory workshop, to make them familiar with prototyping as a tool. Physical 3D prototyping would probably have been even better.

In a feedback session with the tutors, we again pinned down the most interesting elements of all concepts and tried to make a comprehensive concept out of it, which actually worked, but a lot of the character of the

experience emerged while building it. Some students were eager and ready to continue developing the idea, others would have rather preferred to go with their individual idea (which we of course would not want just to impose on the rest of the team) and start implementation.

Remarkable was the interaction concept the students found: The project was about showing the presence and two possible future visions of the forest in Finland. The viewer would see the forest of the presence. While they are exploring the forest, the landscape changes back to the dystopian future view. When they turn, also the rest of the landscape changes behind their back. After a while, it again changes behind their back to the utopian future view. So it always changes in the currently unseen part of the experience. This lead to the title "behind our backs", alluding to the fact that most of us aren't paying attention to what happens with the environment until they face a drastic change. The data visualisation part was a bit neglected at times by the students. In the end, they used 2D time-scale visualisations of how land-use in Finland changes over time and used that as texture for rock objects in the virtual environment, giving a intuitive feeling for the data changes over time.

For the building of the experience, we had five different task areas:
1. Building the experience in Unity
2. Gathering and preparing photo scans of natural assets
3. Gathering sound and mixing a soundscape
4. Research of related data sources
5. Preparation of presentation and documentation material

Each student participated in 1-2 task areas. Task 1 - Building the experience was a bottleneck. There were times when one person had to integrate content and the others could not do much in the meantime (apart from task 5). Also, the burden of implementing the interaction model was left to a single person. To a certain extent this cannot be avoided in XR development, even if we had set up a collaborative development environment (which would have been overkill for such a workshop). Perhaps, pre-designed templates could have helped to concentrate more on the content. Also, we could have used two more VR-capable computers. This was not perceived as a problem per se, but next time one should parallel activities better.

We asked the students to develop a concept for outdoor presentation. As we developed for PC VR, we definitely needed a power socket and as well it looked like it would rain. The students were eager to give up and plan an indoor presentation, but we did not let them. With some research, we found an outside pavilion with power and a roof, which was the perfect site for the presentation. Visitors could wear the VR head with their feet on the forest ground and the air of forest all around them, which intensified the immersive feeling of the experience. After the presentation all students agreed that it was a good idea to force them to do an outside presentation. A learning is that the mindset of doing as much outside as possible is difficult to achieve with the students, as working inside is seen as the default option. As stated earlier, the data aspect was at times neglected. It would have been easier if students had been already familiar with VR. However, the general idea of artistic ambient data visualisation was integrated well, with a little bit more explicit ideation the balance would have been alright.