Daniel Noh

While my primary interest is in the research of pedagogical innovation, I am first, and foremost, a designer and maker. This document contains select projects I have produced and worked on within the educational domain.

Selected Works for the Teachers College
M.A. Design and Development of Digital games

Career World Explorer

Pittsburgh, PA

Professor: Amy Ogan
Partners: Steven Moore, Noor Hammad

Career World Explorer is an interactive game for students in eighth grade to gain exposure to niche career paths across different disciplines. Traditional career day events are limited to generic and well known careers, use the instructor or school's immediate personal connections as speakers for the students, and rely on text-based assessments. Career World Explorer uses role-playing mechanics, scaffolding through in-game mentorship and exposure to careers via "career worlds" to inspire and engage our target age group to see themselves in positions outside of the well-trodden paths of doctors, engineers and lawyers. We conducted multiple interviews with three eighth grade teachers to refine our educational goals, assessments and storyboard design. Our final prototype builds upon their feedback and the lessons learned from our iterative process.

Middle school students aren't properly exposed to a variety of career opportunities they could pursue in their bright futures. Traditional exposure to careers at this level is generally limited to 1) career day, 2) guidance counselors, and 3) non-interactive and nondescript job inventory assessments. These existing methods suffer from selection bias and only expose students to a handful of high-level career paths they could pursue. Research has identified middle school as a time when students can benefit the most from career exploration1. This is particularly important for 8th grade, before they enter high school, where they'll select electives that align with their interests and future career paths. Students may not take courses that could set them up for success in their future careers, due to a lack of exposure and knowledge regarding what the career/field entails.

Much of the project focuses on both avenues of motivation (intrinsic motivators, extrinsic motivators). Intrinsic motivation becomes apparent both when the learner enjoys playing games and if the learner desires to discover potential careers. Users motivated intrinsically are able to utilize the game to their own terms. Moreover, with proper facilitation, this game may also become a great substitute to "career days", as remote learning and interaction becomes more and more prominent due to the pandemic.

CAREER WORLD EXPLORER

...a career finding game for the junior explorer.

PROBLEMS + NEEDS

- Traditional exposure to careers is generally limited to:
  - [1] career day
  - [2] guidance counselors
  - [3] non-interactive and nondescript job inventory assessments
- Lack of instructor knowledge on the nuances of different careers, limited guest speakers in the class (career day), and a lack of guidance counselors for students to discuss their futures with.
- The national average for the ratio of counselors to students is 1:491

SOLUTION OVERVIEW

FOCUS ON NICHE CAREERS

- Explore a greater breadth of careers to expose the students to career paths they can see themselves in.

SIMPLE RPG GAME

- By creating a simple rpg game, with a character creation feature, the students are able to put themselves in the shoes of the in-game character. The gamification of this system would also motivate the students to spend more time and explore more possibilities.

A BALANCED SOLUTION

- Other systems are too entertainment focused (e.g. Job Simulator) or text/quiz heavy (e.g. VJS Junior). Career World Explorer affords a balanced environment, affording both engagement and education.

MAJOR FEATURES

STUDENT REPRESENTATION AND PERSONALIZATION

- Represent students of all genders, ethnicities, and disabilities through character creation and NPCs.

SCAFFOLDING *THROUGH IN-GAME MENTOR*

MOTIVATION *THROUGH NARRATIVE AND BADGES*

ENGAGEMENT *THROUGH STORYTELLING AND TASKS*

LEARNING OBJECTIVES

EXPOSE
students about the variety of career paths in the world

CONNECT
what they're learning in classes to potential careers

ENABLE
the students to project themselves into any of the career paths

EVALUATION PLAN

[1] **Heuristic evaluation** with teachers

[2] Week long evaluation and assessments

[3] **Pre and Post test** to measure disposition

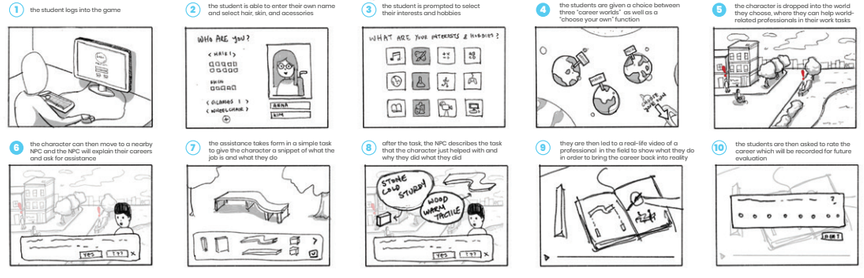
[4] Students explore three to five careers using our system

[5] At the end of the week, students must **write an essay about their favorite career and what they learned about it** from conducting research after using the system

LESSONS LEARNED

- Previous systems focus too much on educating students about career planning rather than career inspiration
- Participating in career path exploration can lead to higher academic motivation, grades, employability skills, career self-efficacy and college aspirations for students.
- We provide a low-cost and scalable way to bring engaging career exploration to students on most digital devices

STORYBOARD AND PROTOTYPE



Carrick ECS

Pittsburgh, PA

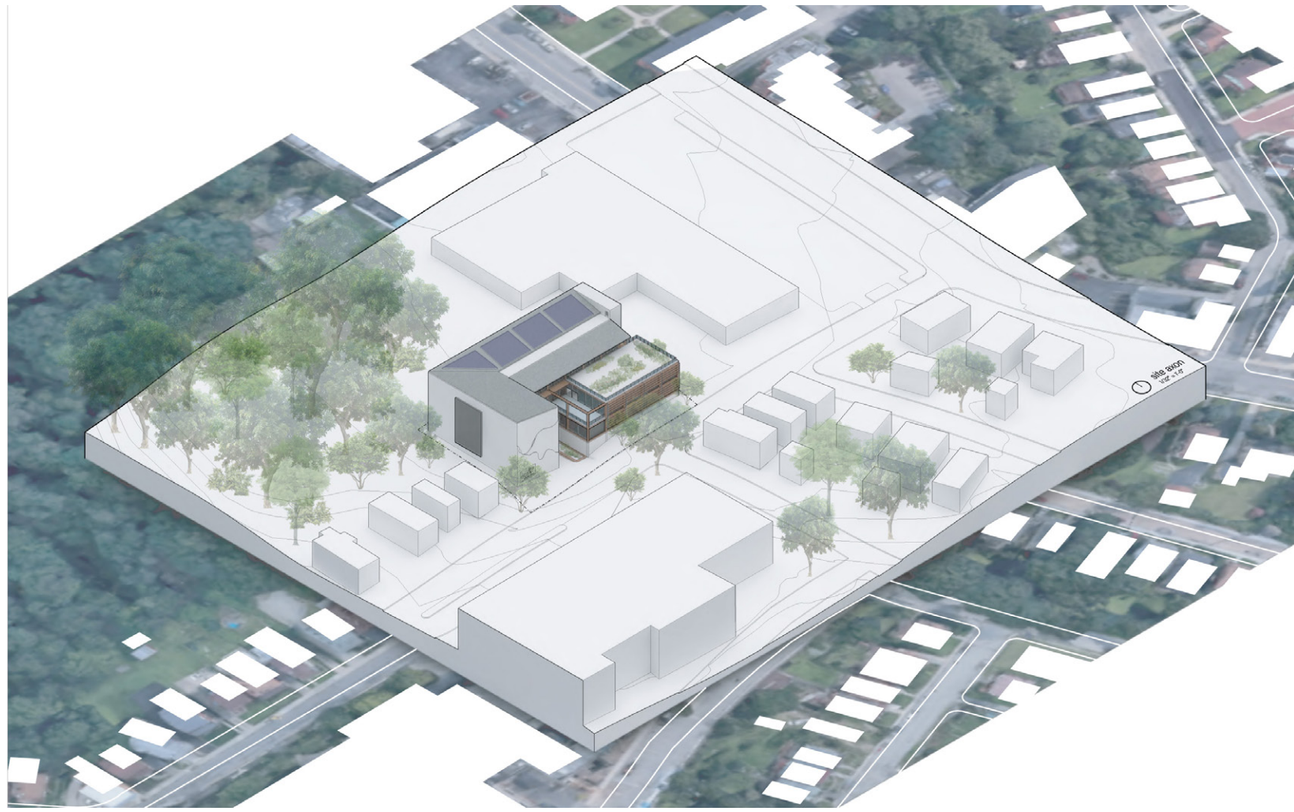
Professor: Steve Lee
Adjunct Professor: Lori Fitzgerald

The focus for the design of this Environmental Charter School was to introduce new learning spaces that are uncommon in schools and rethinking the idea of classrooms. Rather than keeping education confined within four rectilinear walls, this design focused on the spaces outside the classrooms. The building itself also considered various environmental objectives such as solar shading, natural stack ventilation, and water retention to increase the efficacy of the architecture and help economically.

As you enter the middle school, you pass a patch of greenery that exemplifies the school's vision of environmental awareness and are greeted by receptionist. From this location, the circulation bifurcates into two different paths; the left side with a lobby that leads to a staircase for students and faculty and the other side a hallway that leads to different functional spaces in the facility for staff. The hallway also directs the public into the cafetorium for public gatherings and events outside of school hours. This bifurcation allows for safety and security which is achieved through the separation of potential public access from the private student learning environment.

For the students, each programmatic element branches off of a central, extensive social staircase that bisects the site. The social staircase provides an open space where students can socialize and learn in a collaborative environment. Under the staircase exists a branch-like framing system that houses collaboration spaces for smaller group activities or individual work. On the exterior facade, following down the central staircase, is an exposed water retention system which directs rainwater from a green roof to a blue roof to a rain garden. This exposed system allows for visual learners to appreciate and learn about various environmental networks.

Each floor landing of the staircase leads to major programmatic spaces: the second floor landing allows access to the support tower, the third floor landing directs people into the thinklab, and the fourth floor landing opens out onto the green roof. This system allows each grade level to interact with each other through an interweaving circulation, which is important for social education. To engender inclusivity, the landings were extended to enable handicapped students to utilize the staircase as a social space along with fellow students.

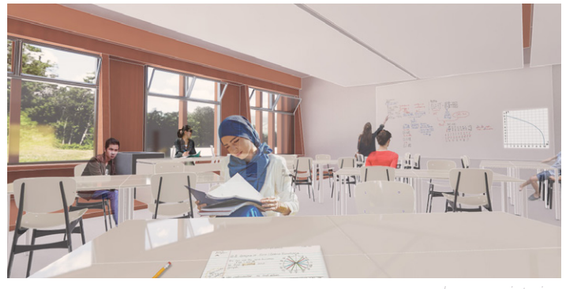


digital site model

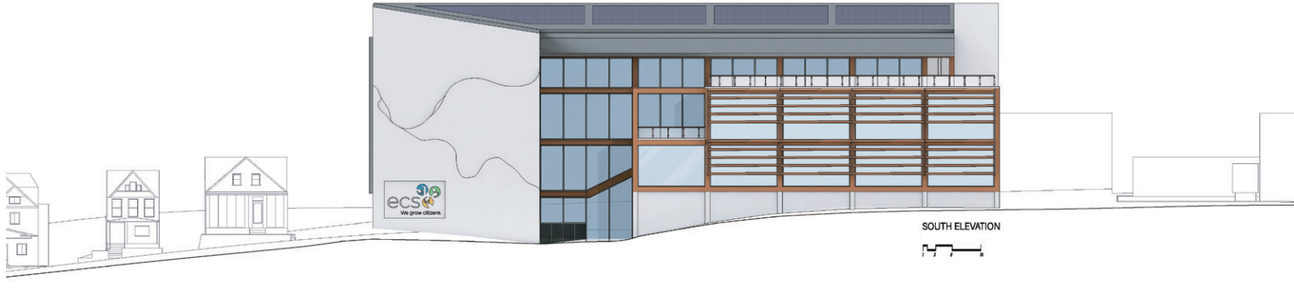
entry sequence

study nooks under central stairs

central staircase and classrooms



classroom interior



STACK VENTILATION

PASSIVE VENTILATION SYSTEM THAT USES AIR PRESSURE TO PULL AIR OUT FROM CLASSROOMS THROUGH CHASES

BIOPHILIC EDUCATION

CLASSROOM POSITIONING PROVIDES DIRECT VISUAL ACCESS TO THE FOREST BEHIND THE SCHOOL TO CONNECT THE STUDENTS WITH THE ENVIRONMENT

NATURAL VENTILATION

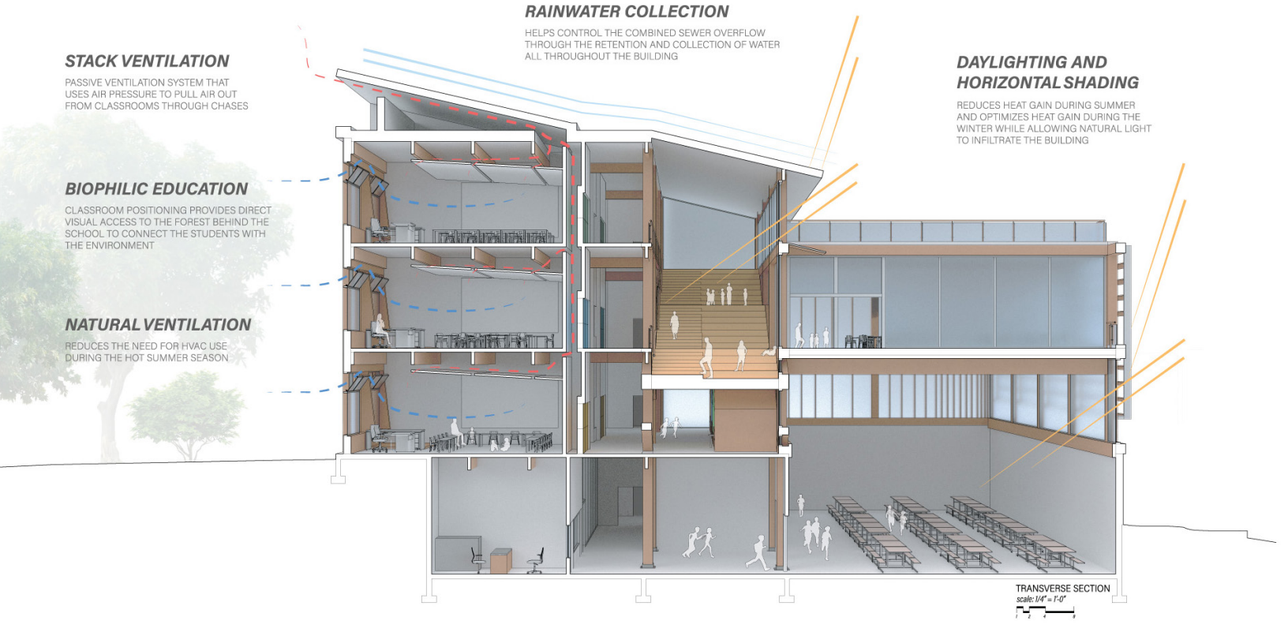
REDUCES THE NEED FOR HVAC USE DURING THE HOT SUMMER SEASON

RAINWATER COLLECTION

HELPS CONTROL THE COMBINED SEWER OVERFLOW THROUGH THE RETENTION AND COLLECTION OF WATER ALL THROUGHOUT THE BUILDING

DAYLIGHTING AND HORIZONTAL SHADING

REDUCES HEAT GAIN DURING SUMMER AND OPTIMIZES HEAT GAIN DURING THE WINTER WHILE ALLOWING NATURAL LIGHT TO INFILTRATE THE BUILDING



H2OME

Pittsburgh, PA

Professor: Marti Louw
Partners: Selena Zhen, Don Lee

H2OME is an interactive booklet for children to learn about water in the Anthropocene beyond a school environment. To educate our users about the water system, our group designed a multi-page activity booklet, H2OME, aimed at children from grades three to five. The activity booklet consists of five activities, each one focusing on a different component of the water system.

The learning goals of the activity booklet are:

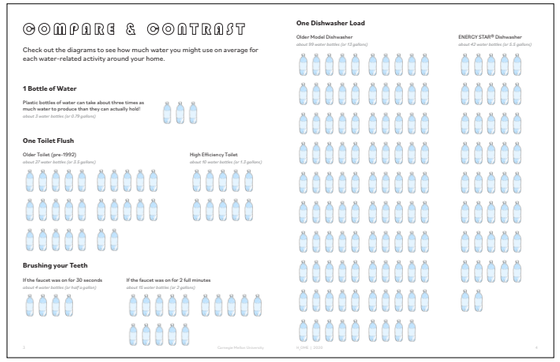
1. To help visitors develop an understanding and awareness of domestic water use, amounts of water in every activities, green infrastructures, and water sources across Pittsburgh.

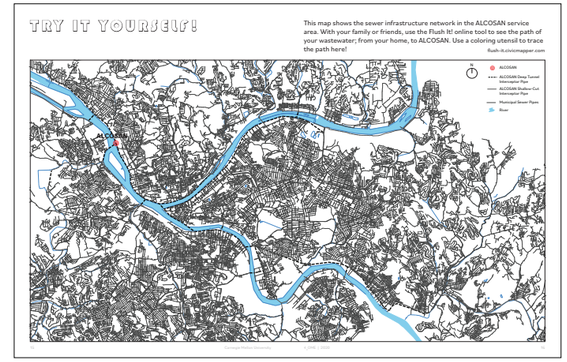
2. To generate confidence in their water knowledge, such as identifying water sources, water contaminants, water infrastructures, and green infrastructures.

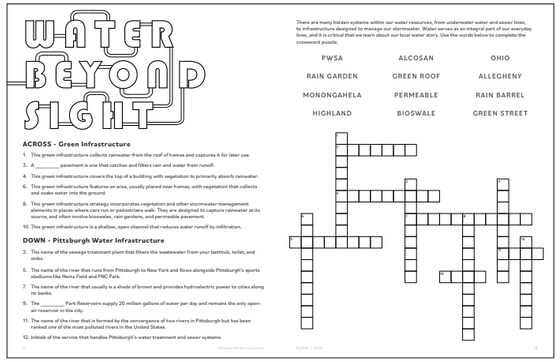
3. To enable changes in users' cognitions in ways such that they are more aware of their water usage and are motivated to apply their new knowledge in ways that promote better water quality.

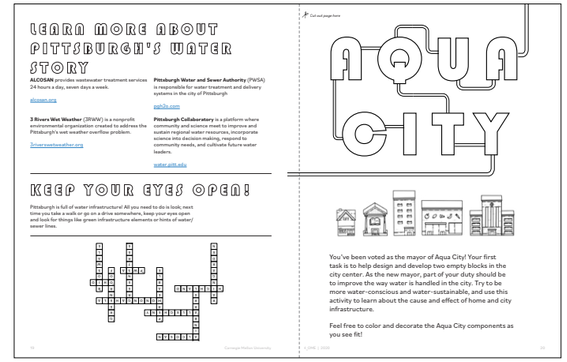
While designing H2OME, we used the CUSP Theory of Action for guidance. First, this booklet frames relevance because it depicts domestic water use in users' homes and focuses on Pittsburgh's water sources. Second, this booklet encourages participation because the activities are not only interactive, but also conversation starters. Third, this booklet is interconnected because it demonstrates how domestic water use (system 1) is closely linked to water misuse (system 2).

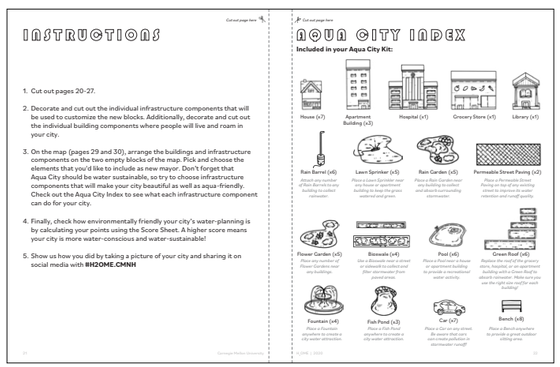
We took various features of classic activity books, such as coloring, crossword puzzles, and mazes and created our own version, taking education and design into consideration. The elements within the booklet were hand drawn in a still that would be appealing for our chosen age group in order to grasp and maintain the attention of the users, while keeping our goal for educating the user on Pittsburgh's water system and how the user can affect it. In the end, we came up with 5 different activities, a simple addition and multiplication based activity, a maze, an "I spy" activity, a crossword puzzle, and a cut out "design for yourself" activity.

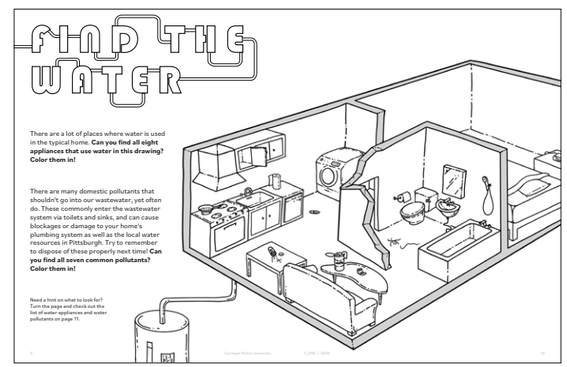












Carnegie Museum Internship

Pittsburgh, PA *Advisor: Asia Ward (CMNH Program Manager)*

My internship at the Carnegie Museum of Natural History continued upon my H2OME project. The internship started with preliminary research about water in the Anthropocene and how I could relay my findings in an engaging and interactive medium. Although this was my first time creating time-based media, I was able to utilize my previous experiences with illustration and creating visual narratives to finish this project.

The first video and blog post were about "fatbergs" and how human interaction with the inputs of the sewage system affects both other people and the environment.

The second video and blog post were about the water sanitation system and how water is treated and brought back to people and the environment.
Both videos contain simple science experiments that young learners could try at home.

The first experiment is a simple test to see how and why toilet paper disintegrates, reinforcing the notion that, what people put into the water cycle affects it.

The second experiment is a more advanced experiment on how a water treatment plant works through flocculation. All that is required is dirty water from a local natural water source, and alum from a grocery store.

Fatbergs [Feeding the Monster in the Sewer]:
Youtube Link
Article Link

Flocculation [From the Allegheny to the Kitchen Sink]:
Youtube Link
Article Link