



2nd
RESEARCH
&
IDEA

Chew Li Shen | Ngoh Jin Heng | Yong Quan Yue
Young Kai Qi | Meryl Lee

IDEA 1 : LIGHTS OUT

Goal Achieved : RESPONSIBLE CONSUMPTION AND PRODUCTION (12)

CLIMATE ACTION (13)

How Bad is Light Pollution?

With much of the Earth's population living under light-polluted skies, over lighting is an international concern. If you live in an urban or suburban area all you have to do to see this type of pollution is go outside at night and look up at the sky.

According to the 2016 groundbreaking "[World Atlas of Artificial Night Sky Brightness](#)," 80 percent of the world's population lives under skyglow. In the United States and Europe 99 percent of the public can't experience a natural night!



Before and during the 2003 Northeast blackout, a massive power outage that affected 55 million people. Photo by of Todd Carlson



Bird Migration Dramatically Altered by High-intensity Urban Light Installation

October 18, 2017



Nobel Prize Awarded for Discovery of Molecular Mechanisms Controlling the Circadian Rhythm

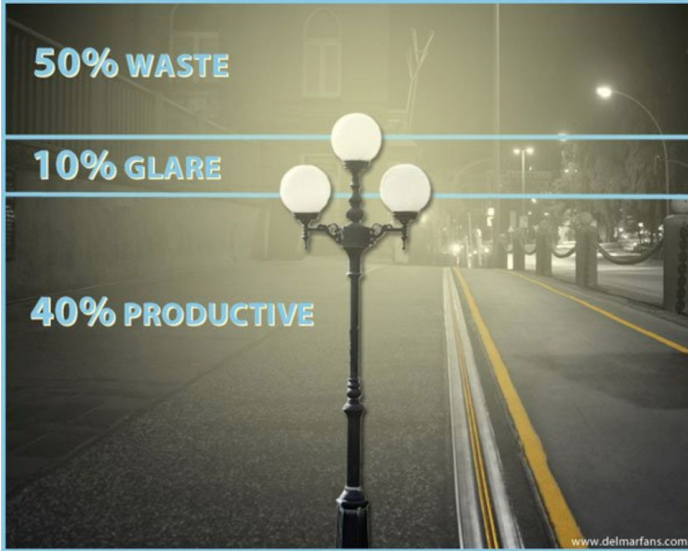
October 2, 2017



Source: <http://darksky.org/light-pollution/>

CAUSES OF LIGHT POLLUTION

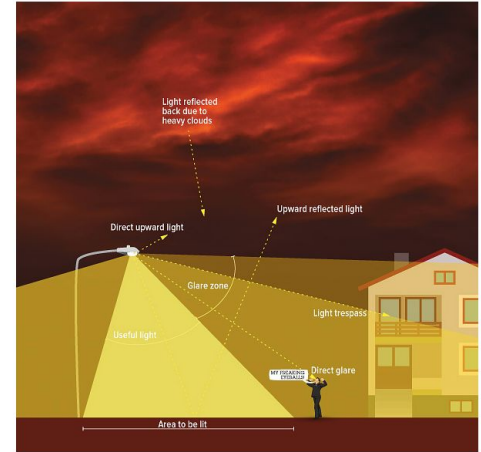
Luminous pollution is caused by using outdoor lights when and where they are not necessary. Poorly designed residential, commercial, and industrial outdoor lights also contribute significantly to light pollution. Unshielded light fixtures emit more than 50% of their light skyward or sideways. In many instances, only 40% of the light emitted actually illuminates the ground.



It is estimated that nearly 30% of outdoor lighting is wasted due to this poor design. In the United States alone, wasted lighting accounts for 1.7 million tons of carbon dioxide and \$2.2 billion in wasted electricity each year

Light pollution is a side effect of industrial civilization. Its sources include building exterior and interior lighting, advertising, commercial properties, offices, factories, streetlights, and illuminated sporting venues.

The fact is that much outdoor lighting used at night is inefficient, overly bright, poorly targeted, improperly shielded, and, in many cases, completely unnecessary. This light, and the electricity used to create it, is being wasted by spilling it into the sky, rather than focusing it on to the actual objects and areas that people want illuminated.



The infographic above illustrates the different components of light pollution and what “good” lighting looks like. (Image by Anezka Gocova, in “The Night Issue”, Alternatives Journal 39:5 (2013). Click to enlarge.

Source: <https://www.delmarfans.com/educate/basics/lighting-pollution/>

EFFECTS OF LIGHT POLLUTION

Luminous pollution has dire effects on our environment and resources of energy as well as wildlife ecology and astronomical research. Light pollution also affects the quality of life and safety of humans. Here are some of known side effects of light pollution.

Environment

The [International Dark-Sky Association](#) (IDA), a non-profit organization that raises awareness of light pollution, estimates that excessive nighttime lighting releases more than 12 million tons of carbon dioxide, the most serious greenhouse gas, into the atmosphere each year. It would take nearly 702 million trees to absorb the carbon dioxide produced by wasted light.

Light pollution may also contribute to other forms of pollution. According to a 2010 study by the National Oceanic and Atmospheric Association, photopollution increases air pollution by suppressing a naturally occurring radical that cleans the air at night. Nitrate radical, a form of nitrogen oxide, breaks down vehicle and factory emissions at night. The nightly process prevents the emissions from becoming smog, ozone pollution, or other harmful irritants. The process only takes place at night because sunlight destroys nitrate radical. However, artificial lights from buildings, cars, and streetlights, although 10,000 times dimmer than sunlight, also affect nitrate radical and slow down the cleansing process by 7%. Artificial light also increase the chemicals for ozone pollution by 5%.

Energy

Wasted light results in energy waste. A 2007 IDA study estimated that 30% of all light emitted by public outdoor light fixtures is wasted, which amounts to 22 Terawatt Hours (TWh)/year of wasted electrical energy. This is equivalent to the following:

About **3.6 million tons of coal** per year

About **12.9 million barrels of oil** per year

The total amount of wasted electrical energy each year is enough to illuminate over **11 million homes** and power over **777,000 cars**.

Wildlife

Luminous pollution affects the feeding, sleeping, mating, and migration cycles of all wildlife. Wildlife can also experience disorientation of time when there is too much artificial light at night.

Mammals - Mammals such as bats, raccoons, coyotes, deer, and moose can experience difficulty foraging for food at night due to over illumination. They risk exposure to natural predators and increased mortality due to night vision impairment. They also experience a decline in reproduction that leads to a shrinking population.

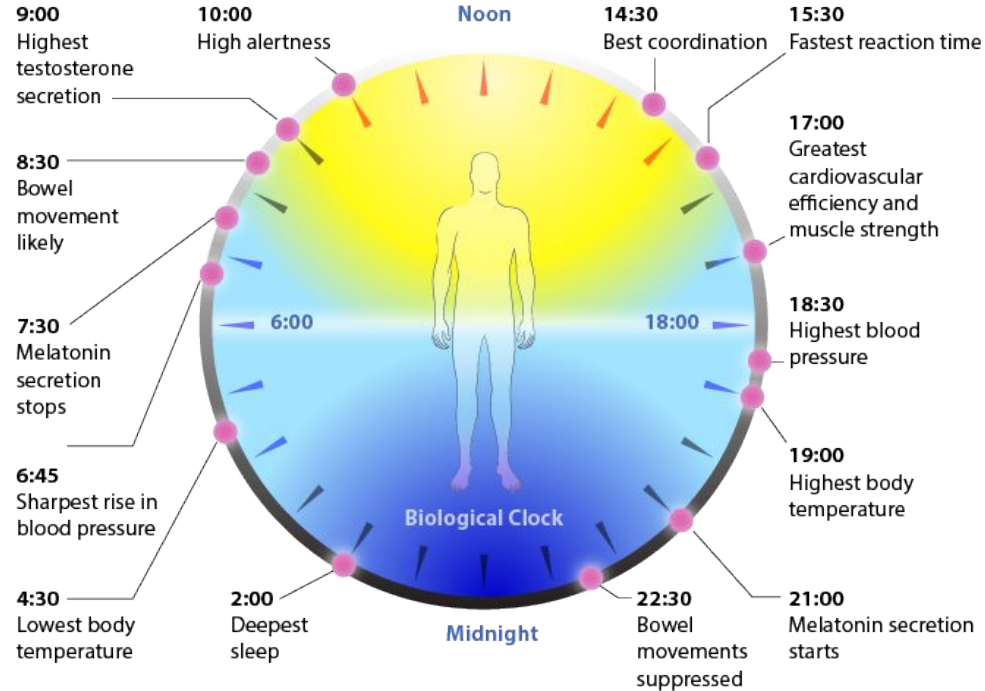
Birds - Birds such as owls and nighthawks use moonlight and starlight to hunt and migrate at night. Artificial lights sources can overwhelm natural light sources, causing birds to be drawn to or fixated on the artificial lights. This results in birds deviating from their intended migration route, flying until they experience exhaustion and collapse, and becoming prey to other animals. Marine birds such as albatrosses are known to collide with lighthouses, wind turbines, and drilling platforms at sea due to their bright lights. In North America alone, 100 million birds die annually in collisions with illuminated buildings and towers.

Amphibians - Sky glow affects amphibians such as frogs, toads, and salamanders in marshes and wetlands. The orange haze confuses and disorients them, which causes a decrease in feeding and mating. It also impairs natural instincts that protect amphibians against natural predators and the elements.

Reptiles - Reptiles such as sea turtles are greatly affected by light pollution. Female turtles nest on dark, remote beaches, but bright coastal lights prevent them from finding safe nesting areas for their eggs. This leads the female turtles depositing their eggs in an unsafe area or the ocean. Sea turtle hatchlings instinctively crawl toward the brightest part on the beach, which for many centuries was the moonlight and starlit ocean; however, excessive lighting on the beach or near the shore confuses the hatchlings and causes them wander away from the ocean. The hatchlings may be eaten by predators, run over by vehicles, drown in swimming pools, or die from dehydration or exhaustion. Artificial lights may also disorient other nocturnal reptiles.

Insects - Insects such as moths are naturally attracted to light and may use all their energy to stay near a source of light. This interferes with mating and migration as well as makes them vulnerable to natural predators, which reduces their population. This also affects all species that rely on insects for food or pollination.

Source: <https://www.delmarfans.com/educate/basics/lighting-pollution/>



Light pollution will affect our sleep

MESSAGE / AWARENESS

In Cities, Sighting starry sky was almost impossible. The amount of light pollutions during night will also affect our sleep.

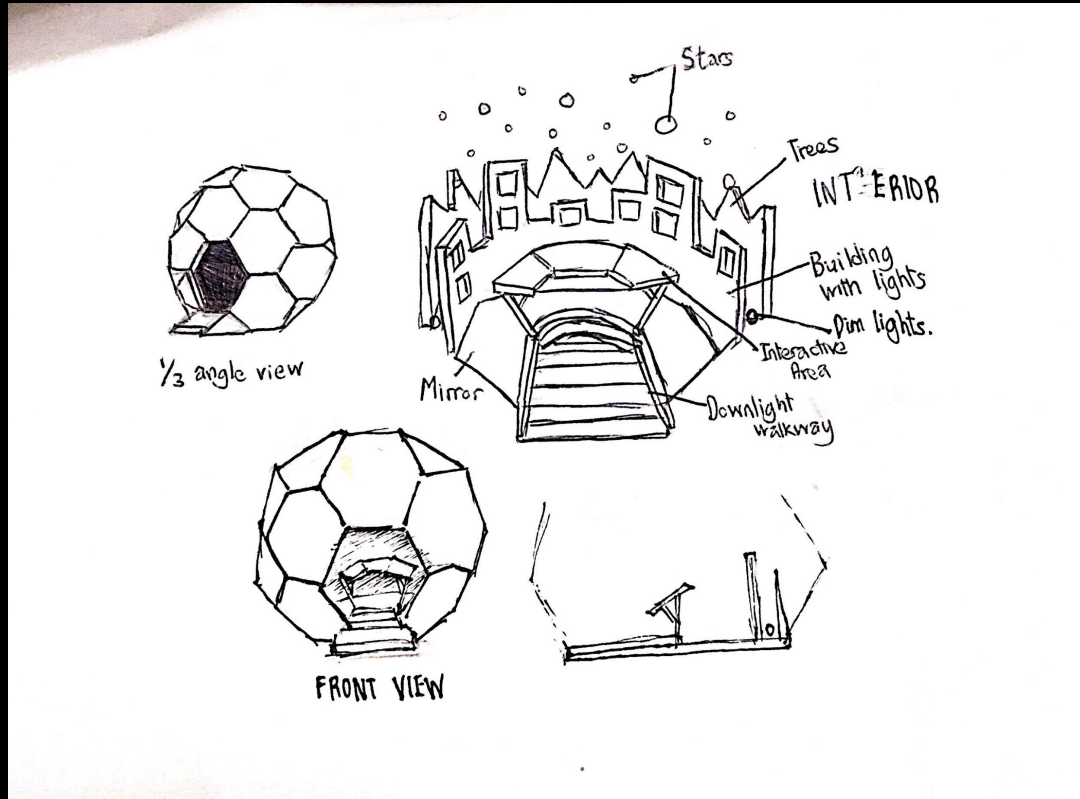
By switching off unused lights will drastically reduce light pollution & people be able to experience the beauty of the starry sky in your front door.



Inspiration (X-Men's Cerebro)

USER'S EXPERIENCE



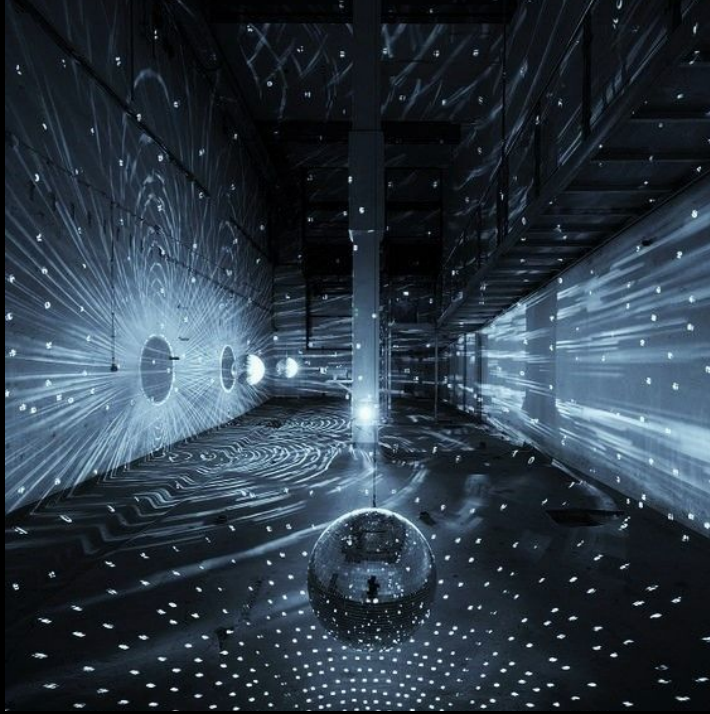
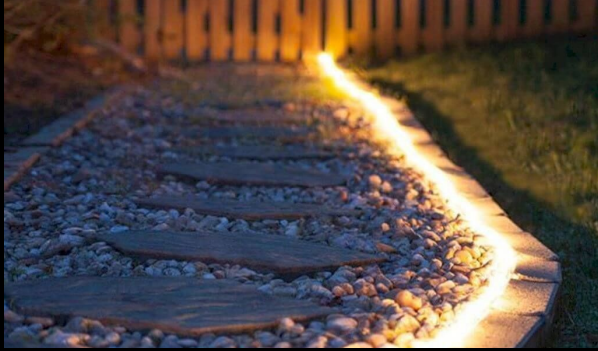


SKETCH & IDEA DEVELOPMENT

How it works?

1. Users will walk into the globe.(max 3-4 people/entry)
2. At first, there will be buildings with lights on, and cities sounds.
3. There will be a interactive area in the middle of the globe, users can interact by pressing buttons(windows) on the houses on the interactive board table.
4. By pressing the buttons, the lights on the buildings will slowly dim down, while the stars on the top will slowly appears.
5. The surrounding sound will be turning into more nature and peaceful sound.
6. At the end, users will experience the starry sky without the light pollution in a natural and peaceful surrounding.

REFERENCES



IDEA 2 & 2.1 : Under Water

Goal Achieved : Life Below Water (14)

Clean Water and Sanitation(6)

Ocean Pollution: The Dirty Facts

We're drowning marine ecosystems in trash, noise, oil, and carbon emissions.

January 22, 2018

Melissa Denchak



Source: <https://www.nrdc.org/stories/ocean-pollution-dirty-facts>

Over 80% of marine pollution comes from land-based activities.

From plastic bags to pesticides - most of the waste we produce on land eventually reaches the oceans, either through deliberate dumping or from run-off through drains and rivers. This includes:

Oil

Oil spills cause huge damage to the marine environment - but in fact are responsible for only around 12% of the oil entering the seas each year. According to a study by the US National Research Council, 36% comes down drains and rivers as waste and runoff from cities and industry.

Fertilizers

Fertilizer runoff from farms and lawns is a huge problem for coastal areas. The extra nutrients cause eutrophication - flourishing of algal blooms that deplete the water's dissolved oxygen and suffocate other marine life.

Eutrophication has created enormous dead zones in several parts of the world, including the Gulf of Mexico and the Baltic Sea.

Seas of garbage

Solid garbage also makes its way to the ocean. Plastic bags, balloons, glass bottles, shoes, packaging material – if not disposed of correctly, almost everything we throw away can reach the sea.

Plastic garbage, which decomposes very slowly, is often mistaken for food by marine animals. High concentrations of plastic material, particularly plastic bags, have been found blocking the breathing passages and stomachs of many marine species, including whales, dolphins, seals, puffins, and turtles. Plastic six-pack rings for drink bottles can also choke marine animals.

This garbage can also come back to shore, where it pollutes beaches and other coastal habitats.

Sewage disposal

In many parts of the world, sewage flows untreated, or under-treated, into the ocean. For example, 80% of urban sewage discharged into the Mediterranean Sea is untreated.

This sewage can also lead to eutrophication. In addition, it can cause human disease and lead to beach closures.

Toxic chemicals

Almost every marine organism, from the tiniest plankton to whales and polar bears, is contaminated with man-made chemicals, such as pesticides and chemicals used in common consumer products.

Source: http://wwf.panda.org/our_work/oceans/problems/pollution/

Effects of Ocean Pollution

1. Effect of Toxic Wastes on Marine Animals

Oil spill is dangerous to marine life in several ways. The oil spilled in the ocean could get on to the gills and feathers of marine animals, which makes it difficult for them to move or fly properly or feed their children. The long term effect on marine life can include cancer, failure in the reproductive system, behavioral changes, and even death.

2. Disruption to the Cycle of Coral Reefs

Oil spill floats on the surface of water and prevents sunlight from reaching to marine plants and affects in the process of photosynthesis. Skin irritation, eye irritation, lung and liver problems can impact marine life over long period of time.

3: Depletes Oxygen Content in Water

Most of the debris in the ocean does not decompose and remain in the ocean for years. It uses oxygen as it degrades. As a result of this, oxygen levels go down. When oxygen levels go down, the chances of survival of marine animals like whales, turtles, sharks, dolphins, penguins for long time also goes down.

4: Failure in the Reproductive System of Sea Animals

Industrial and agricultural wastes include various poisonous chemicals that are considered hazardous for marine life. Chemicals from pesticides can accumulate in the fatty tissue of animals, leading to failure in their reproductive system.

5: Effect on Food Chain

Chemicals used in industries and agriculture get washed into the rivers and from there are carried into the oceans. These chemicals do not get dissolved and sink at the bottom of the ocean. Small animals ingest these chemicals and are later eaten by large animals, which then affects the whole **food chain**.

6. Affects Human Health

Animals from impacted **food chain** are then eaten by humans which affects their health as toxins from these contaminated animals gets deposited in the tissues of people and can lead to cancer, birth defects or long term health problems.

Source: <https://www.conserve-energy-future.com/causes-and-effects-of-ocean-pollution.php>

MESSAGE / AWARENESS

The water pollution that cause by human activities, has brought bad effects towards the marine life.

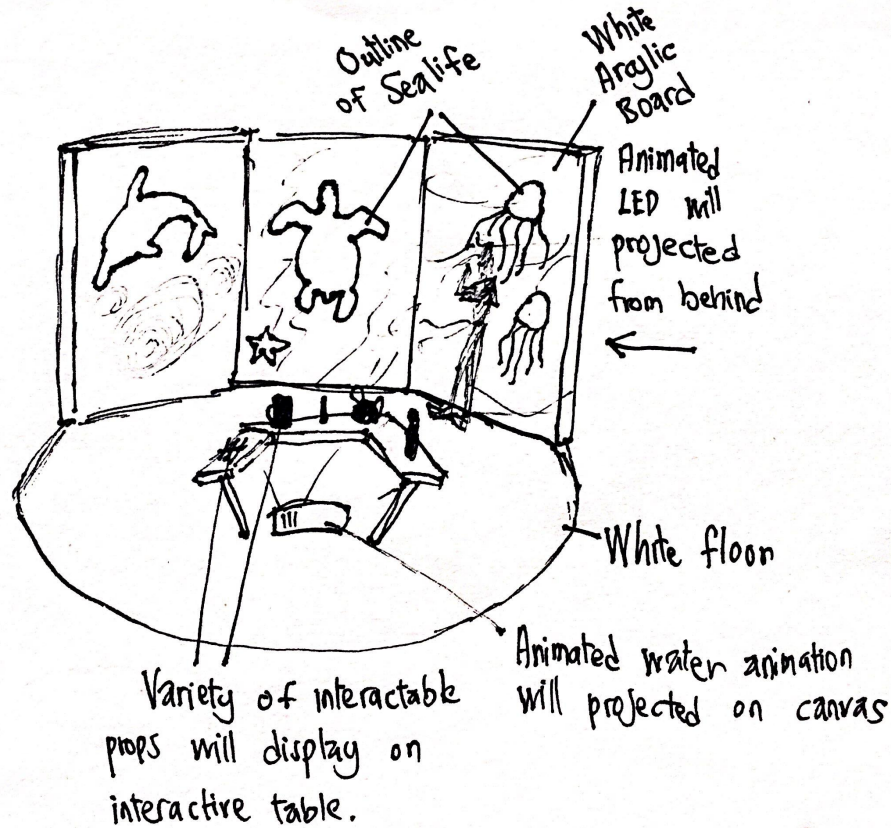
We should stop polluting the water with rubbish which can be harmful towards marine ecosystem.



REFERENCE

How it works?

1. There will be some white acrylic boards with drawings of the outline of sea animals on them, and a interactive table with some interactive props(ex. Plastic bag, rubbish) on it.
2. When user touches the props, a LED light will projected from behind of the acrylic boards.
3. On the boards, it will be showing the effects of the rubbish to the sea animals (ex. Showing plastic bags inside the stomach of the sea turtle).



SKETCH & IDEA DEVELOPMENT

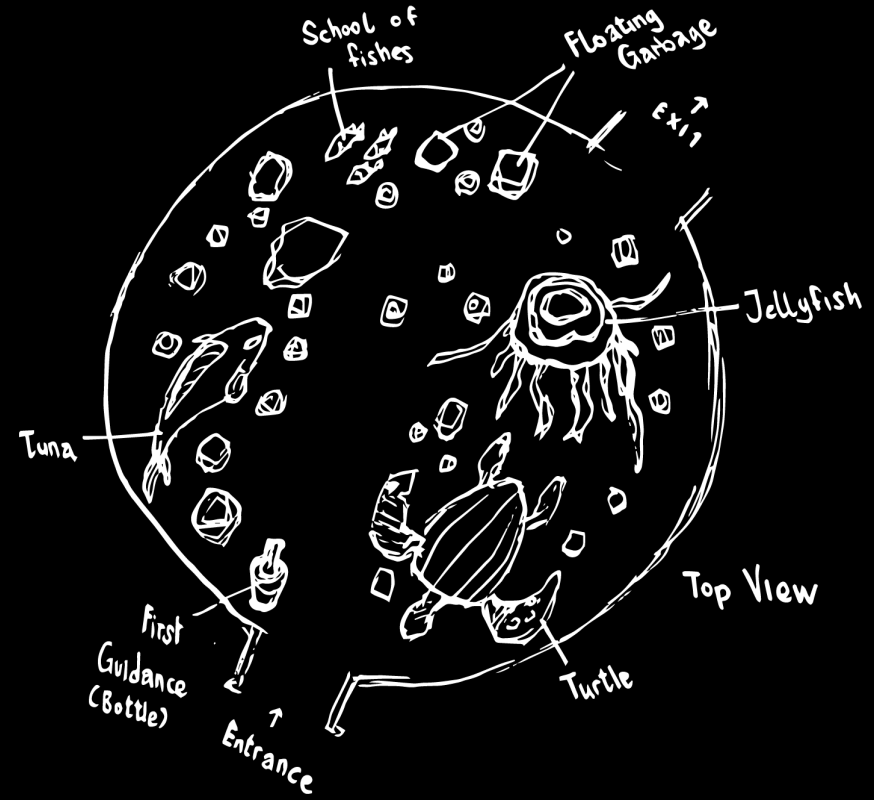
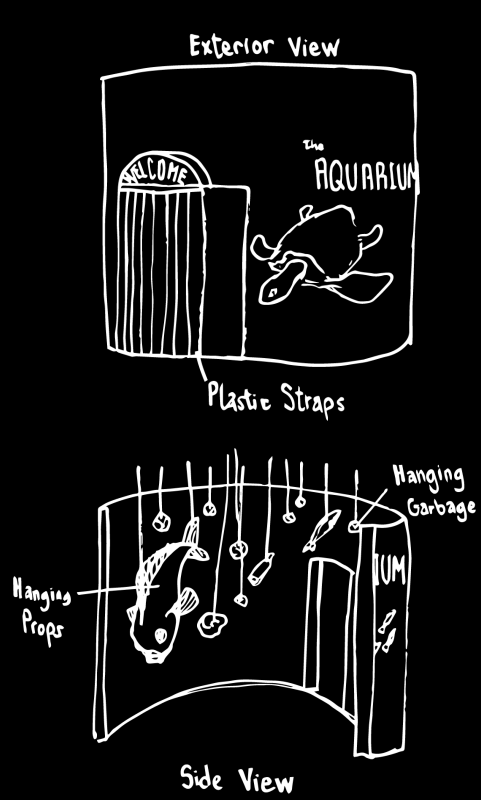
IDEA 3 : A Different Perspective

Goal Achieved : Life Below Water (14)

Clean Water and Sanitation(6)



INSPIRATIONAL BOARD



SKETCHES

How it works?

1. The users are requested to explore an aquarium room but when they enter the room it's full of rubbish.
 2. The users are then given a mission with voice over to find all the sea creatures (about 4-5) surrounded by rubbish like plastic bags, plastic bottles and more.
 3. When they find and touch a sea creature. The user will get information about the pollution situation.
 4. After completing the mission, users will get the message of humans polluting the sea and understand the harm towards the sea creatures.
-
-

IDEA 4 : FUN WAY TO EXERCISE

Goal Achieved : Good Health and Well-being(3)

The Real Reason We Don't Exercise

... and why you should get your body out of its comfort zone.

Posted Nov 10, 2014

f SHARE

TWEET

EMAIL

MORE



Source: Alliance/Shutterstock

A friend of mine came back from one of those crazy obstacle races and commented, "I'm finally used to walking around with my shoes, socks, and feet soaking wet and cold." He said that when he first started exercising outside he had no tolerance for cold, wet shoes and socks but now that he's had to run through swamps and mud

puddles, it's no big deal: He hardly notices.

This got me to wondering if the real reason we don't exercise is **our desire to avoid any experience of discomfort**. People often say they don't exercise because they have no time, but in the same breath talk about how much they want to get healthy, and how much they believe exercise is the path to

Source: <https://www.conserve-energy-future.com/causes-and-effects-of-ocean-pollution.php>

Using Games to Increase Exercise Motivation

Jeffrey Yim and T.C. Nicholas Graham
School of Computing
Queen's University
Kingston, ON, Canada K7L 3N6
{yim,graham}@cs.queensu.ca

ABSTRACT

In recent years, there has been significant work in integrating physical activity into video games. One goal of this work has been to help motivate sedentary people to be more physically active. Konami's Dance Dance Revolution and Nintendo's Wii Sports have shown that exercise games can be both fun and commercially successful.

To date, however, there has been little attempt to investigate what properties of exercise games will help motivate sedentary people to start and continue exercise programs. This paper reviews the literature on exercise motivation and derives from it requirements for computer-aided exercise games. The paper then introduces the new Life is a Village exercise game, and uses it to illustrate how these requirements can be met.

Categories and Subject Descriptors

H.5.2 [Information Interfaces and Presentation]: User Interfaces – evaluation/methodology, input devices and strategies, user-centered design.

General Terms

Human Factors.

Keywords

Computer-aided exercise, exertion interfaces, video game design, computer-supported cooperative work.

As evidenced by the commercial success of games such as Dance Dance Revolution (Konami Corporation) and Wii Sports [16], it is possible to create fun games that contain an exercise component. However, there has been as yet little attempt to understand the link between what motivates people to perform exercise and the design of exercise games. This raises the question of how to move towards a deeper understanding of what game features will contribute to or detract from players' motivation to perform exercise.

In the sports psychology field, there has been extensive work attempting to understand how to motivate people to start and maintain exercise programs. In this paper, we draw requirements from this exercise motivation literature, and show how these requirements can help in the design of exercise games. Key findings from this literature include the linkage of low compliance to exercise programs to poor self-efficacy, poor exercise self-image, and lack of peers to exercise with. Features from traditional games can help address these barriers to exercise, although naïve design can exacerbate these problems. In order to illustrate these requirements and the tradeoffs inherent in applying them, we introduce our Life is a Village computer-aided exercise game. Life is a Village contains several novel features, including an innovative approach to cooperative game play.

The paper is structured as follows. We first survey existing exercise games in order to show the broad range of game styles that have been produced to date, both in the commercial and academic fields. We then present requirements for exercise games, drawn from the exercise motivation literature. Finally, we

3. EXERCISE MOTIVATION

One of the underlying goals of games with kinetic interfaces is to help motivate people to do exercise. The promise is that if we combine the fun of video games with physical activity, people will be more likely to exercise. It is clear from the broad success of commercial games such as DDR and Wii Sports that this can be true for some games and some people.

However, there has to date been little attempt to analyze what makes a successful exercise game. Is it enough to simply bolt a kinetic interface onto current mass-market games? How should we design such games to help motivate people who are currently sedentary to try them out? What game features will help motivate people to continue an exercise program once begun?

Fortunately, there is a breadth of literature on exercise motivation. We have reviewed this literature, and have drawn from it

requirements for exercise games. To our knowledge, this is the first attempt to tie the exercise motivation literature to the design of exercise games. As will be shown in section four, we have

Source: <https://www.researchgate.net/publication/234818118> Using Games to Increase Exercise Motivation

13 Ways To Make Exercise Fun, Not A Chore

8. Play games.

Who says exercise has to be lifting weights or running on a treadmill? Consider fun alternatives such as Wii Sport and Wii Fit games. These are a great way to have fun and exercise, either alone or with friends. One minute you could be playing golf or fishing, the next, snowboarding or competing at Wimbledon.

Source: https://www.huffingtonpost.com/entry/13-ways-to-make-exercise-fun-not-a-chore_us_58bd456ce4b0fa65b844b5a9

The Fitness Benefits of Playing Tennis

So how do tennis and fitness go hand in hand? What are the benefits of a tennis workout? Tennis as a form of exercise can help you to do more than just burn calories...

Tennis helps to improve:

- **Aerobic and anaerobic fitness** - by [burning fat](#) and improving your cardiovascular fitness.
- **Speed** - through a series of side-to-side and up and back sprints to chase the ball.
- **Co-ordination** - since you have to move into position and then adjust your upper body to hit the ball successfully.
- **Flexibility** - due to the constant stretching and manoeuvring to return the ball toward your opponent.

The workout a game of tennis gives you results in explosive movements and stretching, providing your body with so many benefits it's easy to see why tennis is a good choice when working towards better fitness.

A tennis workout is good for you!

Whether you decide to play on a grass court, clay court, or no court at all, the effects of playing tennis for just three hours a week can significantly increase health and fitness levels according to physician Ralph Paffenbarger of Harvard University School of Public Health. (Paffenbarger studied over 10,000 people over a period of 20 years in his landmark 'College Alumni Health Study).

Tennis and Calories

Playing tennis burns more calories than:

- [Aerobics](#)
- Inline skating
- [Cycling](#)
- Rounders
- Netball

Playing tennis for fun can burn around 169 calories in 30 minutes for a woman, and 208 calories in 30 minutes for an average man.*

Tennis also outperforms golf, inline skating and most other sports in developing positive personality characteristics such as sportsmanship, according to Dr. Jim Gavin - author of The Exercise Habit.

*Averages based on a woman at 5'6" and 10st 7lb and man at 5'10" and 14st.

Source: <https://www.weightlossresources.co.uk/exercise/tennis-fitness-benefits.htm>

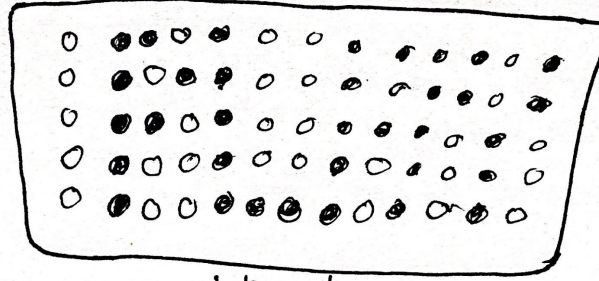
MESSAGE/AWARENESS

People nowadays are too lazy or think it's too inconvenient to exercise. This type of thinking can affect your health.

We should start doing exercise and move our body more.

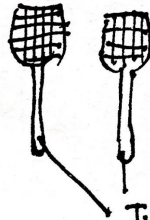


Inspiration



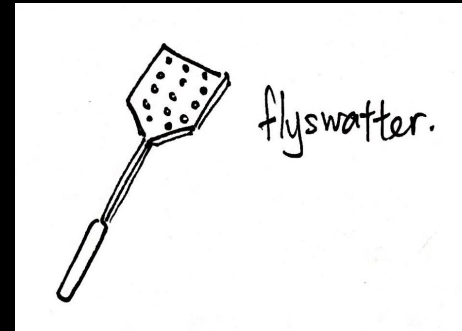
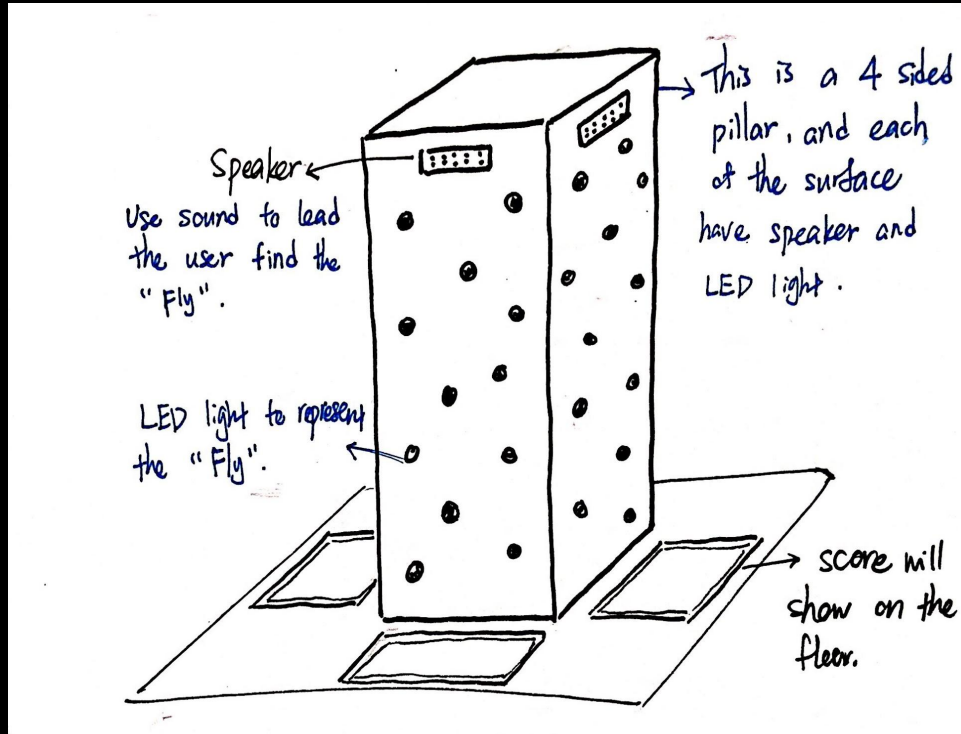
Encourage active
lifestyle
Bonding with family

Interactive LED
Bulb game



Two racket will
be provided for the game

SKETCH & IDEA DEVELOPMENT



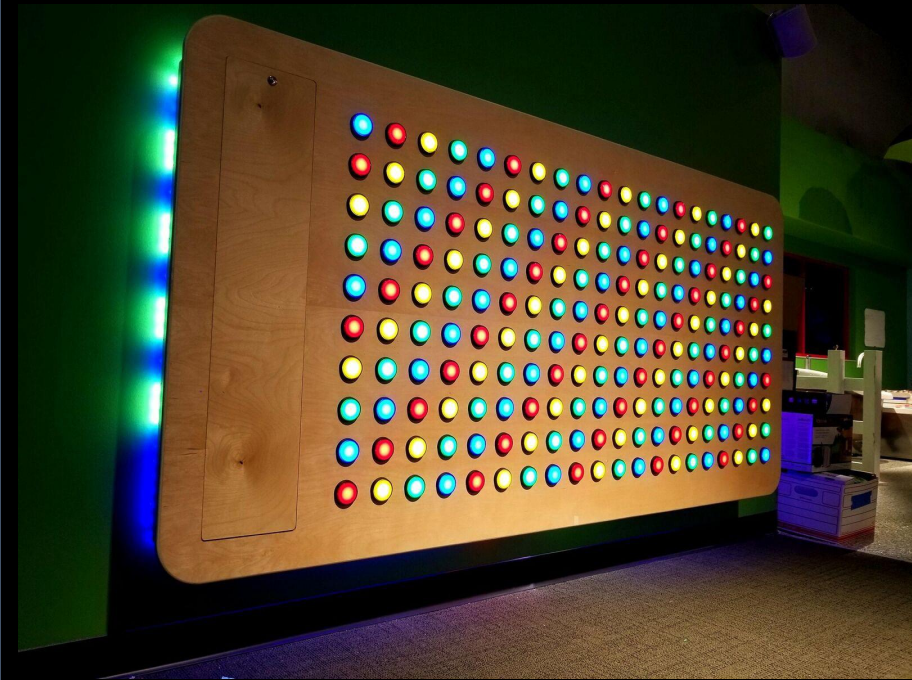
SKETCH & IDEA DEVELOPMENT

How it works?

1. There will be a huge 4 sided pillar with many LED bulbs on it.
2. There will be LED bulbs (1 or 2) lighting up for every 3 sec and then turned off.
3. Users will be given a racket (2 if 2 users are playing), and user will have to run around to chase after the lighted LED bulb and hit it with the racket in order to play the game.



REFERENCE



Source: <https://blog.adafruit.com/2018/03/05/200-button-wall-with-light-sound-and-interactive-effects-also-a-tour-of-the-project-interior-on-view-at-carnegiescictr/>
<https://labs.ideo.com/2009/08/19/glass-block-led-wall-display/>

REFERENCE