

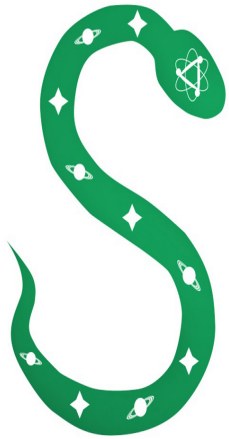


NATIONAL FORUM FOR STEAM IN HIGHER EDUCATION

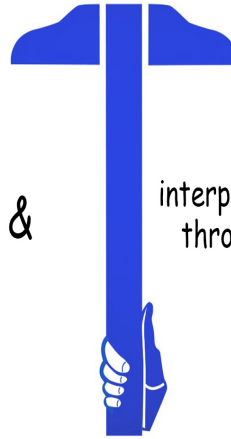
April 25-26, 2019 | The Heritage Manila

Theme: "Modelling TPACK in Philippine STEAM

(Science, Technology, Engineering, Agri-Fisheries, Mathematics) Education"



Science
the natural universe,
where everything
comes from



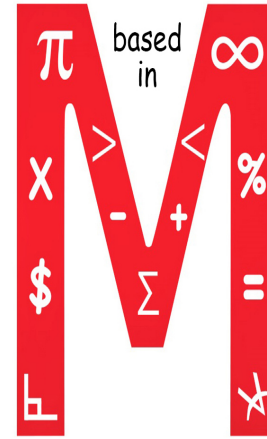
Technology
tools & innovative
devices, uses &
enhanced abilities



Engineering
purposeful innovation,
creation & analysis



Agri.
Arts
humanities,
ethics, ideals
& expression



Mathematics
fact organizing
base language

EDUCATION MODEL



Prof. MARICAR S. PRUDENTE, PhD
De La Salle University, Manila

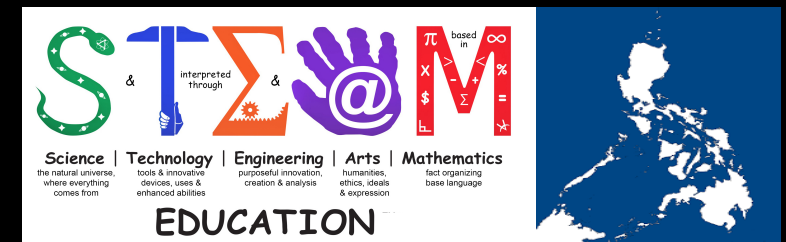


Science | **Technology** | **Engineering** | **Arts** | **Mathematics**
the natural universe, where everything comes from | tools & innovative devices, uses & enhanced abilities | purposeful innovation, creation & analysis | humanities, ethics, ideals & expression | fact organizing base language
EDUCATION



Teaching and Learning Domains

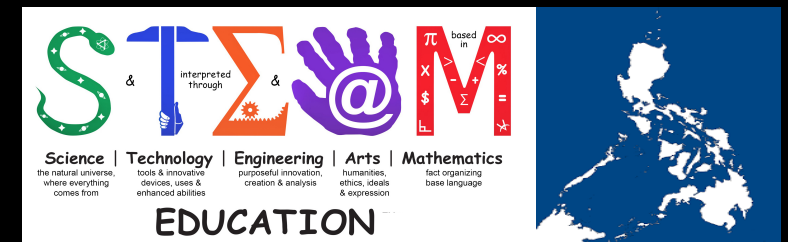
1. Technology Integration
2. Assessment
3. Technology Integration





Teaching and Learning Domains

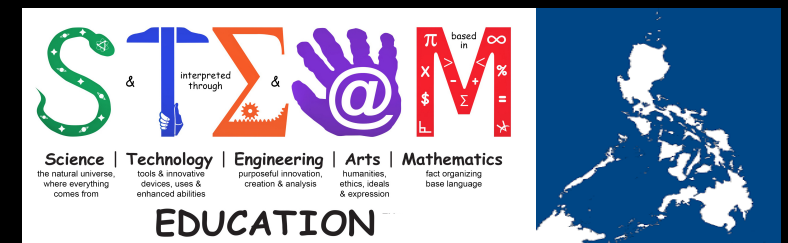
1. **Technology Integration**
2. **Assessment**
3. **Pedagogy**





Teaching and Learning Domains

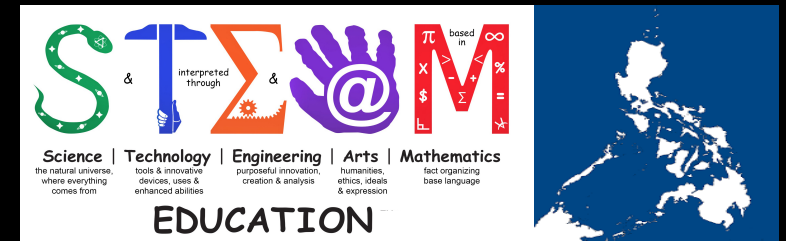
1. **Technology Integration**
2. **Assessment**
3. **Pedagogy**

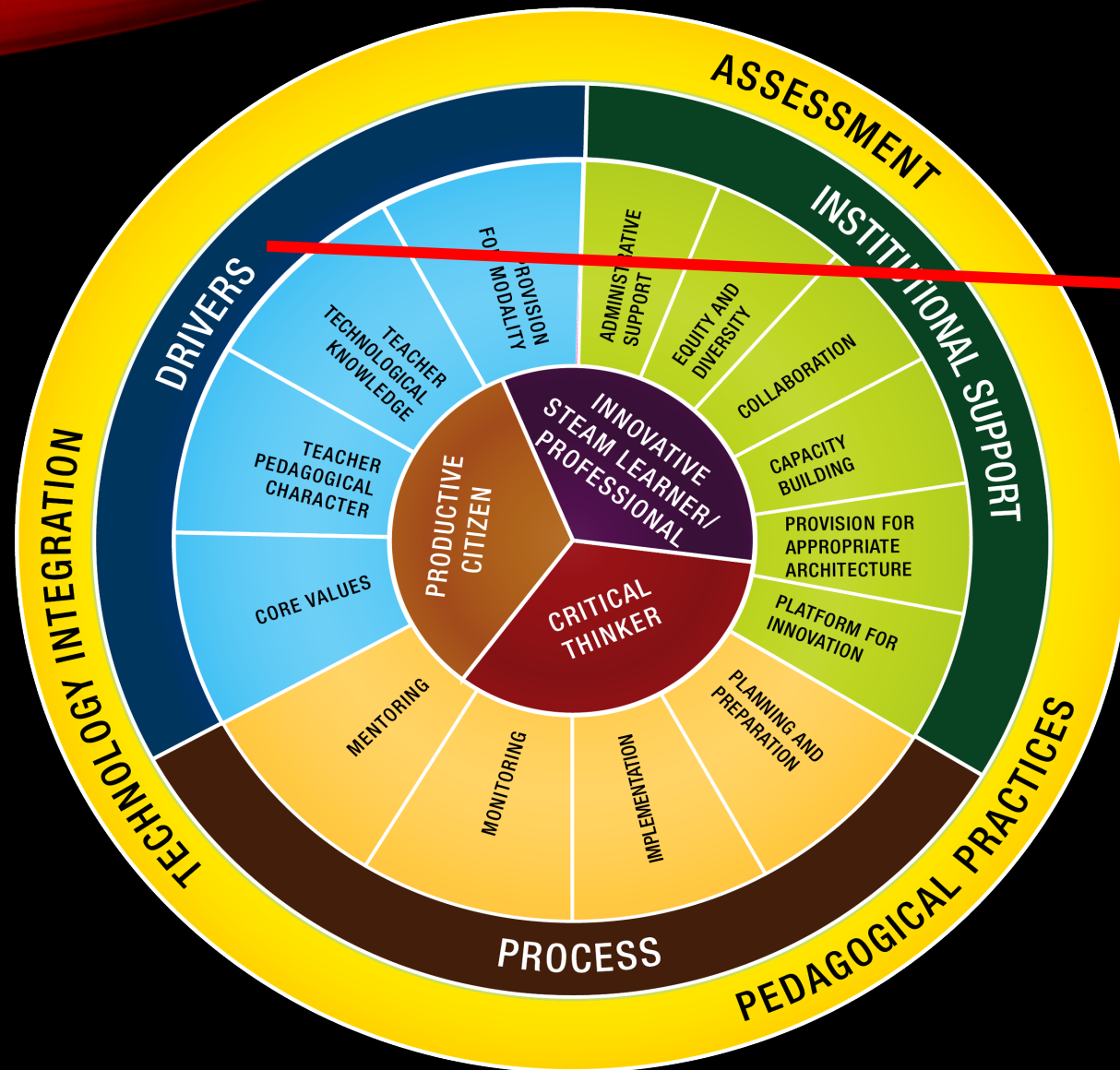




Variables

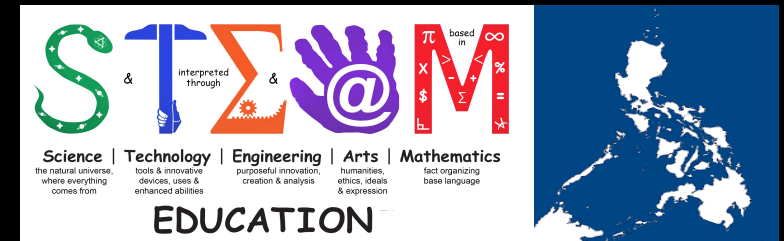
1. Outcomes
2. Drivers
3. Institutional Support
4. Processes





Variables

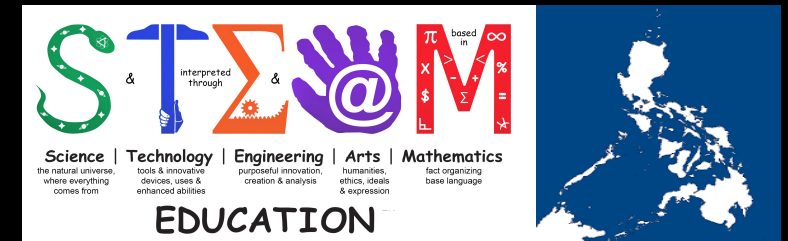
1. **Outcomes**
2. **Drivers**
3. **Institutional Support**
4. **Processes**





Variables

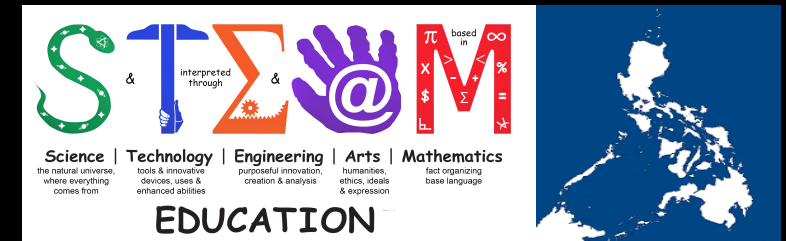
1. Outcomes
2. Drivers
3. Institutional Support
4. Processes





Variables

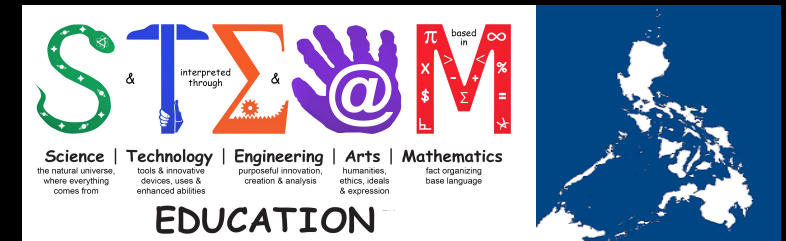
1. **Outcomes**
2. **Drivers**
3. **Institutional Support**
4. **Processes**





Outcomes

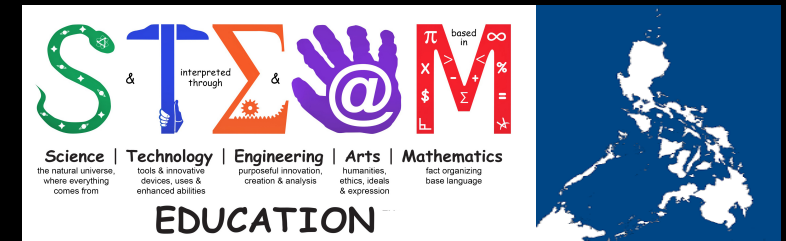
1. Innovative STEAM Learner of Professional
2. Critical Thinker
3. Productive Citizen





Outcomes

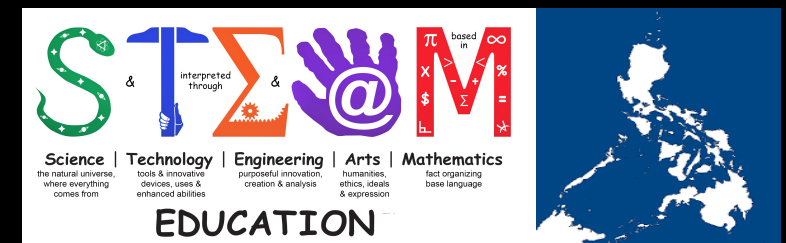
1. **Innovative STEAM Learner of Professional**
2. **Critical Thinker**
3. **Productive Citizen**





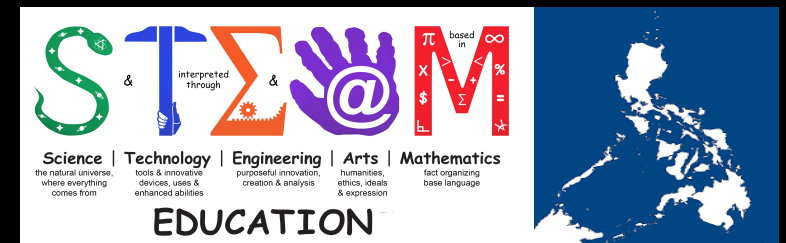
Outcomes

1. Innovative STEAM Learner of Professional
2. Critical Thinker
3. Productive Citizen

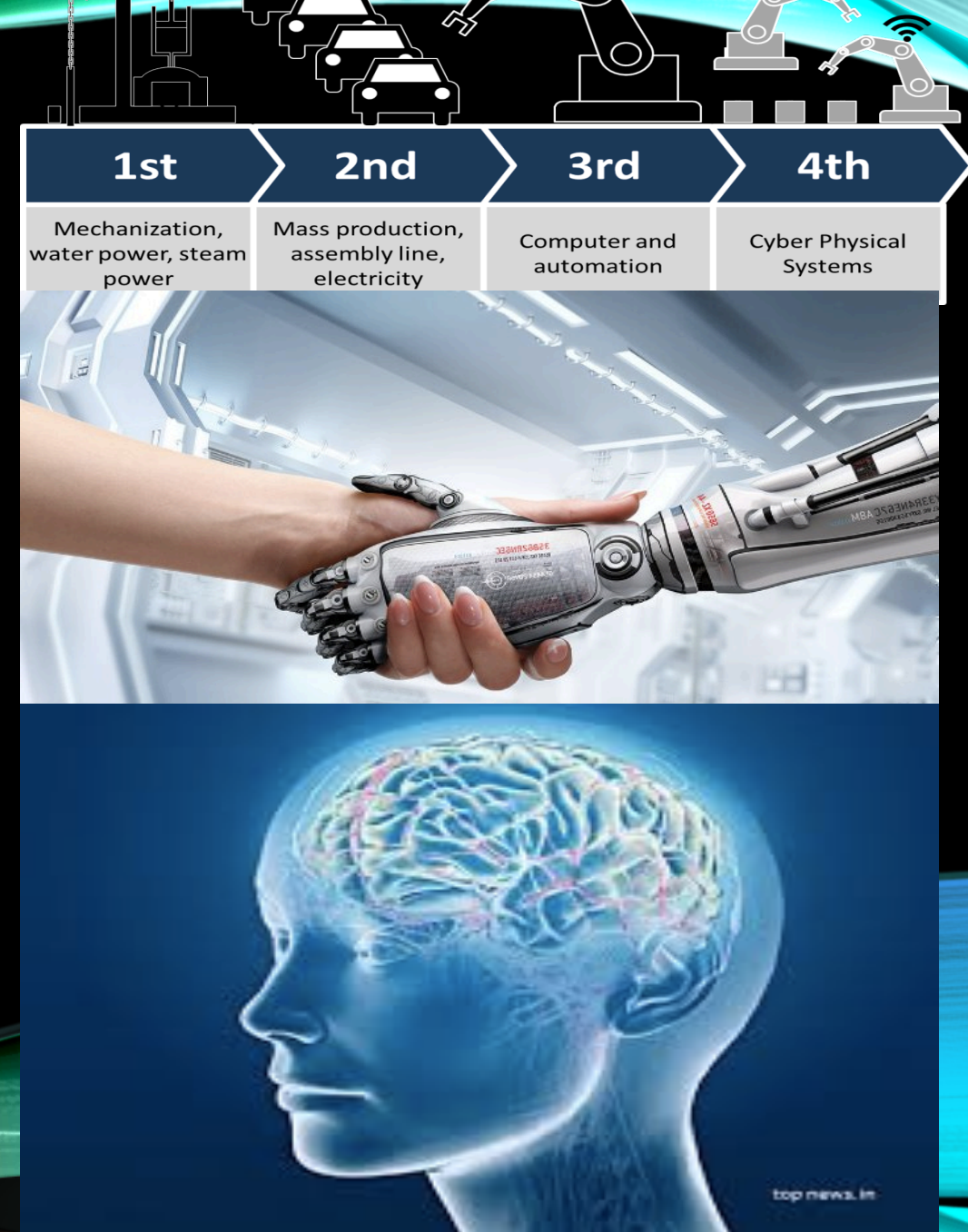




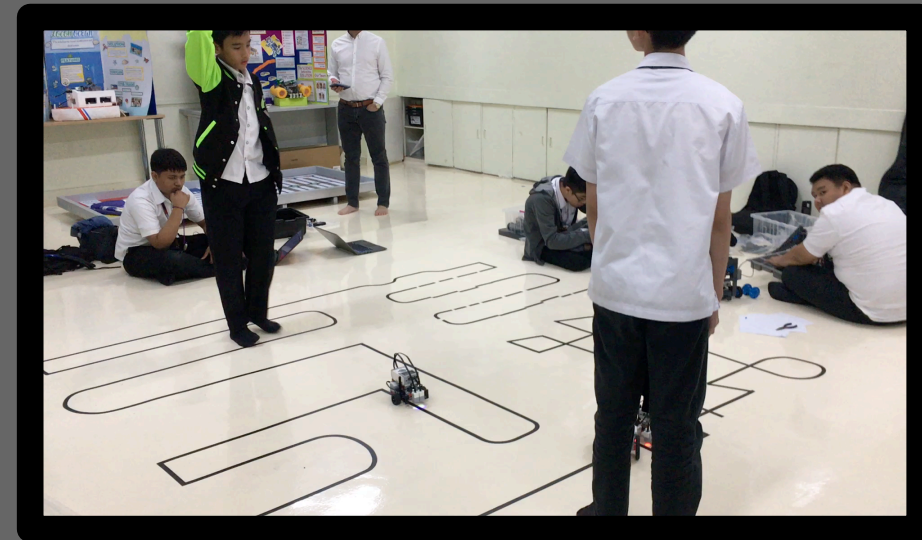
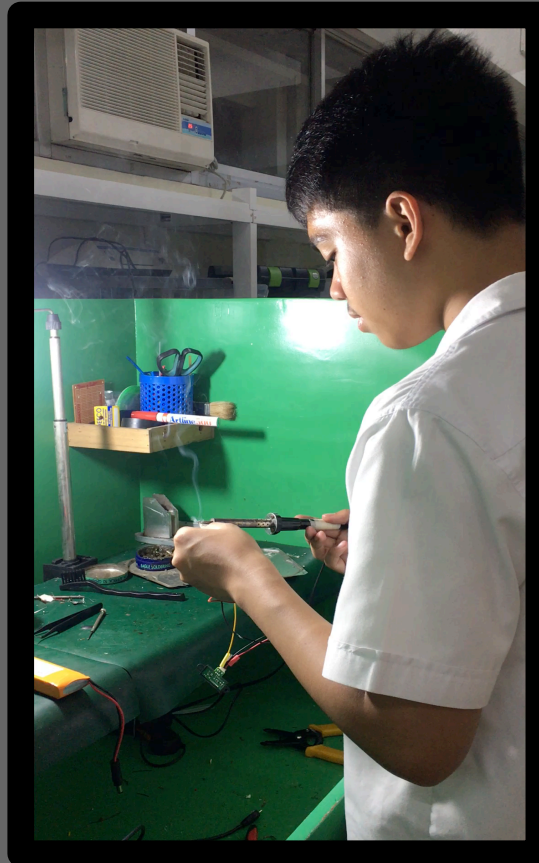
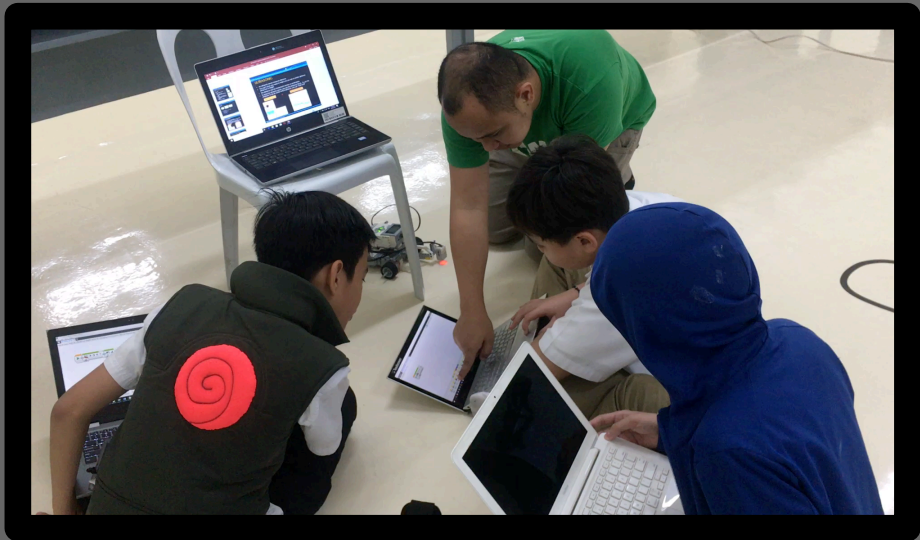
Circular Nature
-emphasizes balance and
equality among the
variables



The fourth industrial revolution is the current and developing environment in which disruptive technologies and trends such as the Internet of Things (IoT), robotics, virtual reality (VR) and artificial intelligence (AI) are changing the way we live and work.



The main goal of the **DLSZ Robotics Program** is to enhance the students' creativity and imagination in designing solutions to real world problems in science using **robots**.



E.L.A. Bot

EXPANDING LAND AREA ROBOT

FEATURES

space saver

increase food production

cleans the air

automated watering system

powered through solar panels

auto-rotation

expands land area about 2x



HOW CAN WE HELP IN THE OIL SPILL CLEAN UP EFFORT?





Let us do our share
to help achieve

THE GLOBAL GOALS
For Sustainable Development

14 LIFE BELOW
WATER



Created by

Carlos Jacob Chiong
Jacob Isaac Ruiz
Bianca Ysabel Roxas

De La Salle Santiago Zobel
PHILIPPINES

DECEMBER 2018

ADSORBOT was created
as a response to the call to use
science and technology for
cleaning up oil spills at sea.

EVOLUTION

The initial prototype, **ADSORBOT v1.0**, was launched in October 2018 which has a single water pump and one hair cartridge that helped adsorb oil. It has received the recognition of being the **GOLD WINNER** in the recent World Robot Games, Innovative Category.



ADSORBOT V1.0
GOLD WINNER
WORLD ROBOT GAMES 2018

ADSORBOT v 2.0 has more features that enable it to adsorb more oil with its multiple water pumps and multiple hair or loofah cartridges. It also has solar features and a distance sensor to help it navigate thru a contained oil spill area during daytime and nighttime.



ADSORBOT V2.0

SAVE OUR SEAS
with

ADSORBOT
v 2.0

Adsorbing Oil Robot



Official Entry to the
International Robotics Olympiad 2018
Philippines

AN OILY MESS

Did you know some of the effects of oil spills?

Fish kills take place once there is an oil spill.



Birds on shorelines lose their ability to repel water.



Oil can kill or impede the growth of corals.



How can we help in the OIL SPILL CLEAN UP EFFORT?

Oil spills are one of the causes of pollution in our oceans. These can be due to accidents involving oil tankers, barges or shipping vessels.

The Guimaras oil spill in 2006 was considered as the Philippine's "worst environmental disaster"¹

GUIMARAS OIL SPILL EFFECTS^{1,2} BY THE NUMBERS

- 220 km coastline
- 16 sqm of coral reef
- 551 ha of mangroves
- 824 ha of fishponds
- 1,150 ha of marine reserves
- 37,686 people affected
- 1,300 people with oil-spill diseases

¹ (Newsbreak, 2007), "9/11 One Year After". Retrieved from www.rappler.com.
² (Dela Cruz, 2014). "Do's and don'ts when oil spill affects your area". Retrieved from www.rappler.com.

ADSORBOT

An ADSORBING OIL ROBOT that is **compact.**

ADSORBOT can be deployed within a containment boom which has isolated the oil spill.

eco-friendly.

ADSORBOT uses natural, adsorbent materials, namely human hair and loofah that can adsorb the oil.

technologically sound.

ADSORBOT makes use of an ATX2 Microcontroller, a distance sensor, DC motors, solar features and multiple water pumps to help in the cleanup process.

scalable

ADSORBOT can be deployed in multiple numbers depending on the extent of the oil spill.



The DESIGN INSPIRATION

CATAMARAN

A stable boat that has parallel hulls



+

HAIR

Adsorbent material that is natural, abundant and free



LOOFAH

Adsorbent material made of dried fibers used like a bath sponge



The SCIENCE behind the SOLUTION



Adsorption

Molecules of gas, liquid or solid become attached to a solid surface



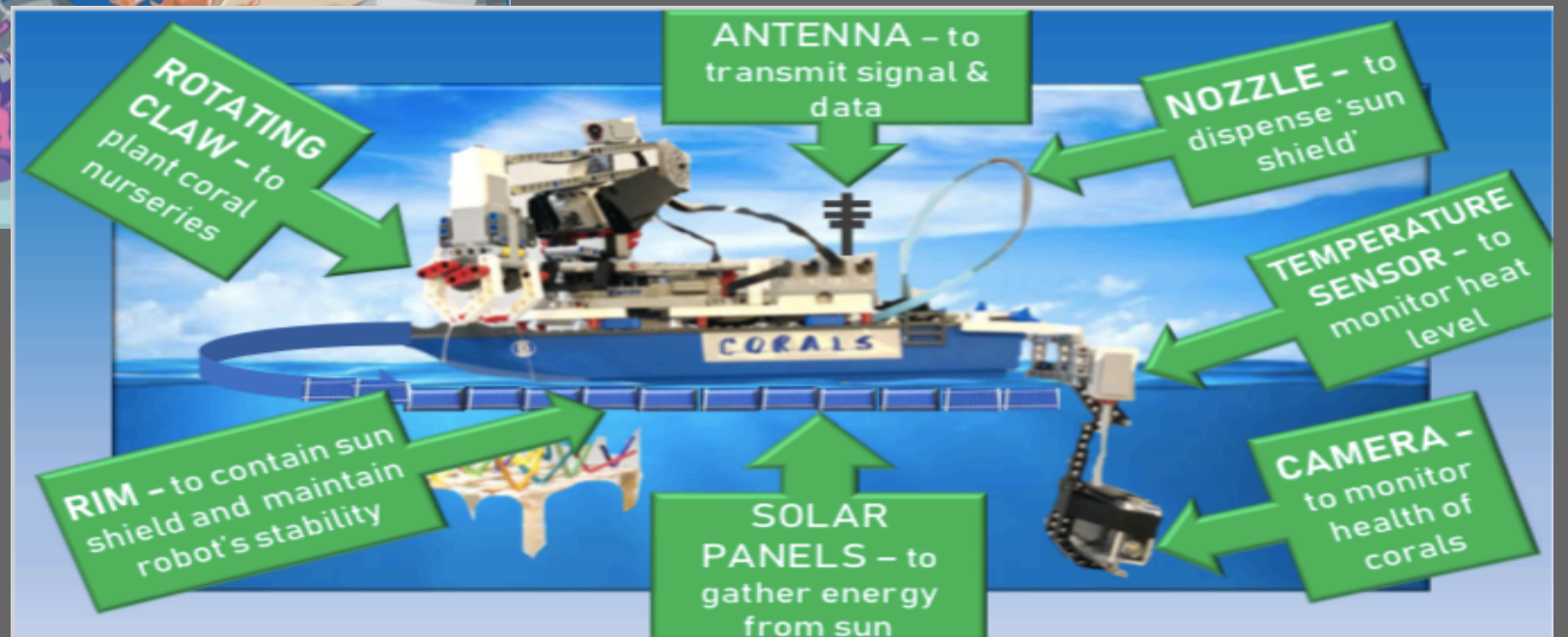
Absorption

Solid soaking up a liquid or gas into its substance

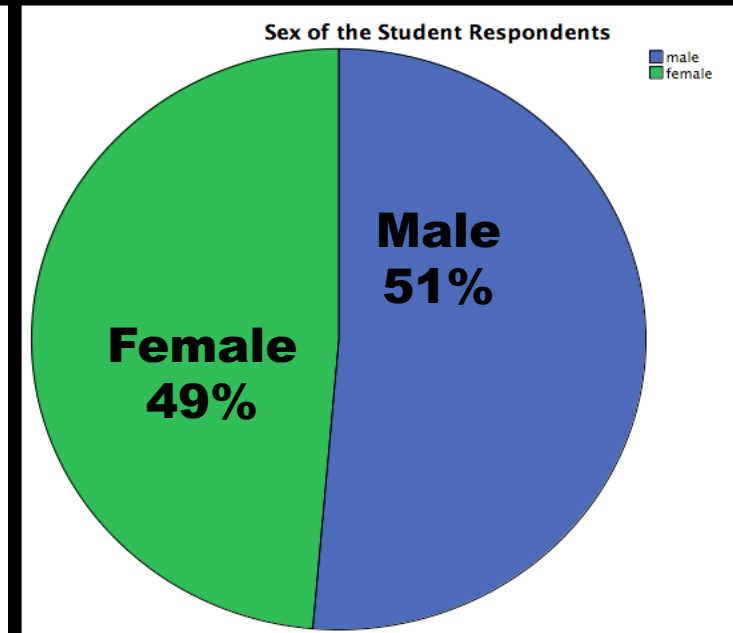
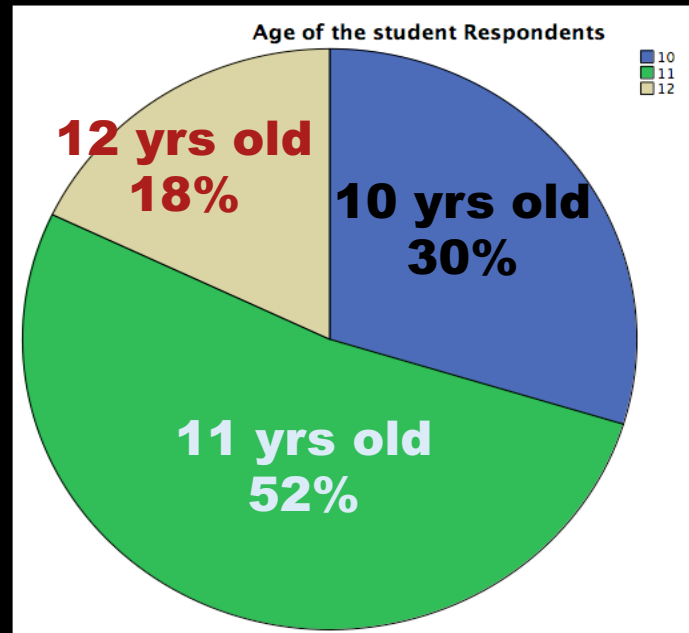
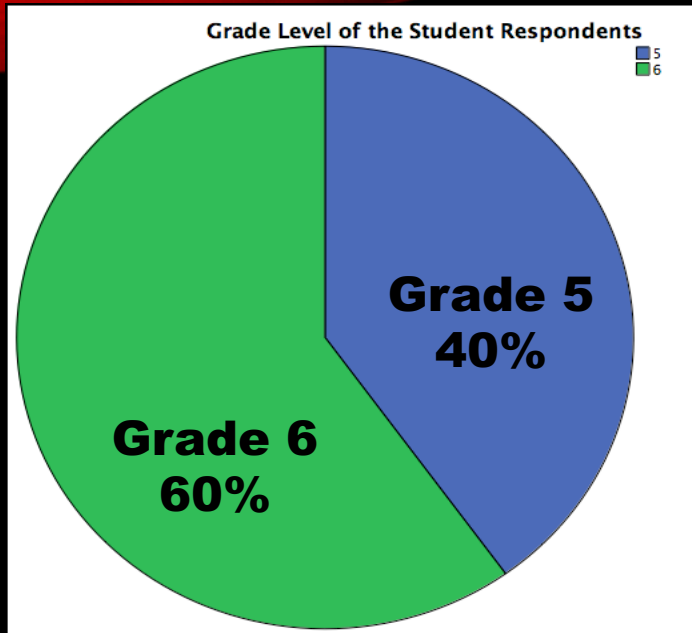
How it Works

Oil contaminated water will be collected thru the water pump and it will flow to the cartridges that have either hair or loofah which will **separate** the oil from the water.

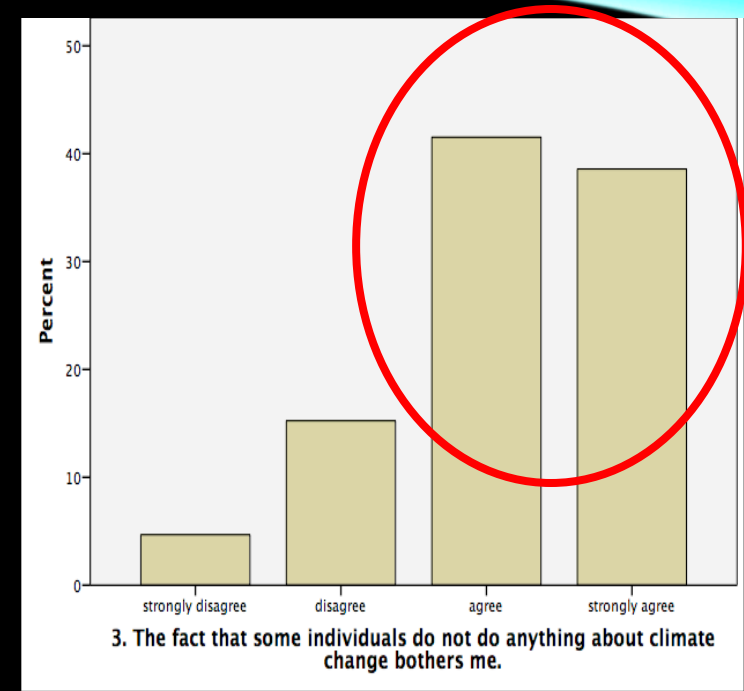
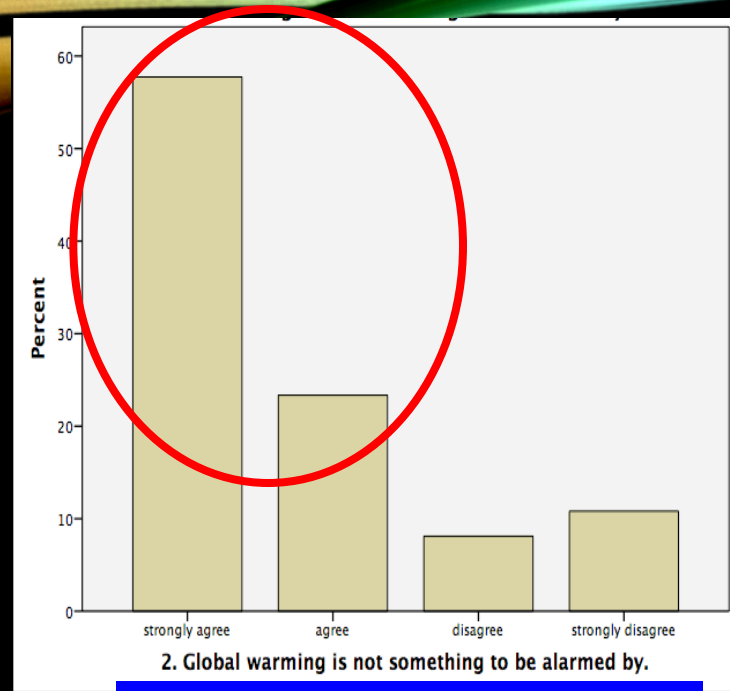
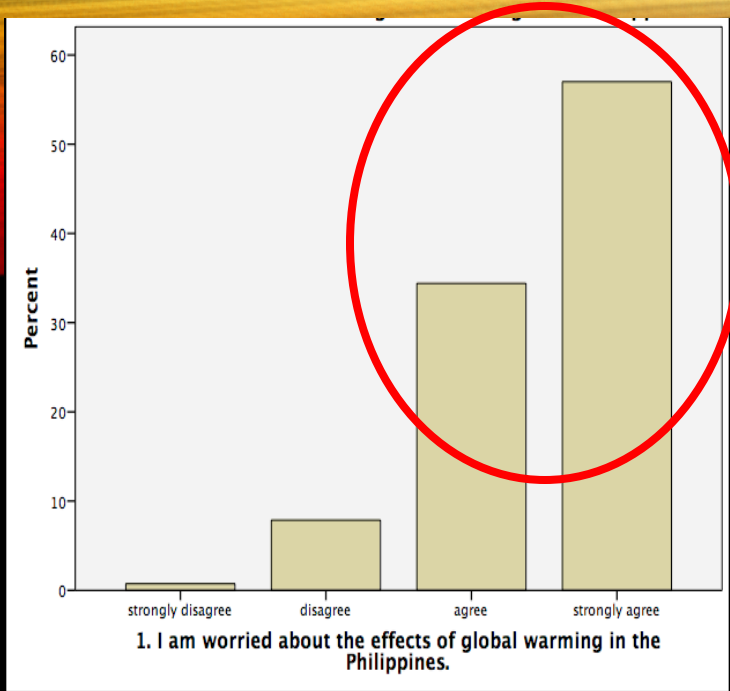
Conservation & Research to Aid Life in the Seas [Project C.O.R.A.L.S.]



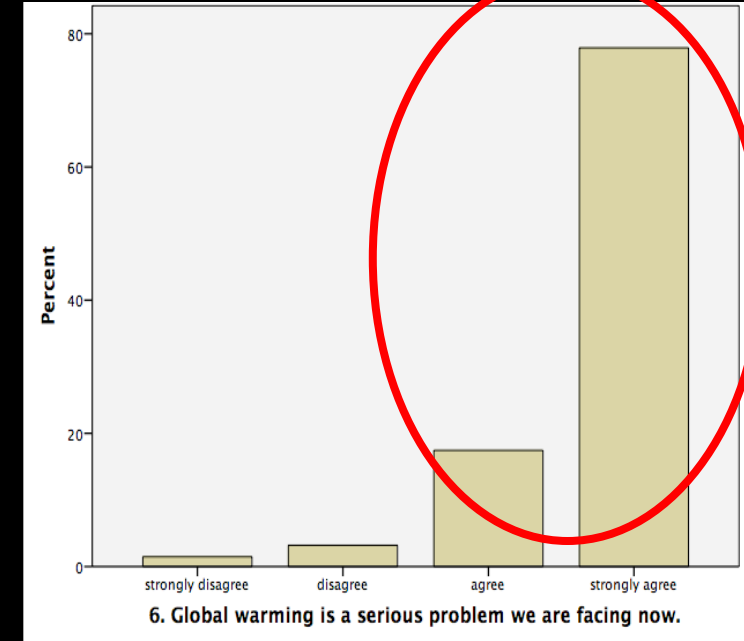
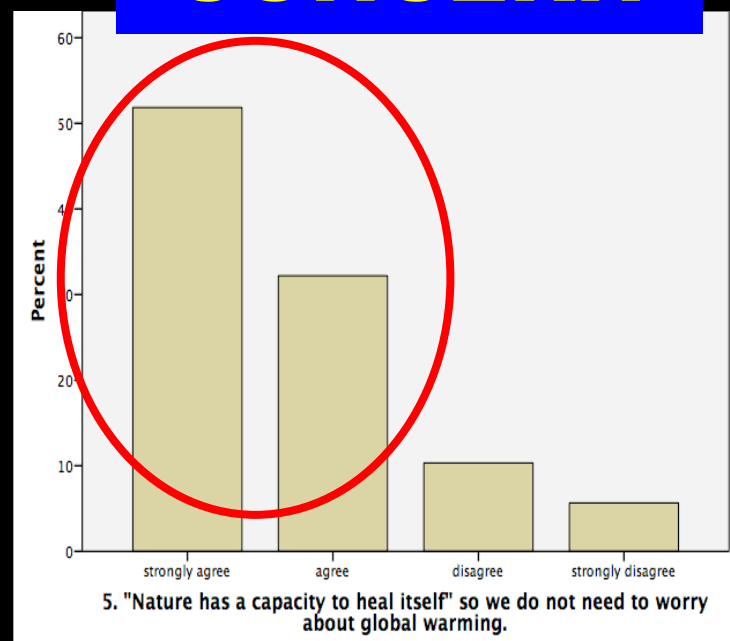
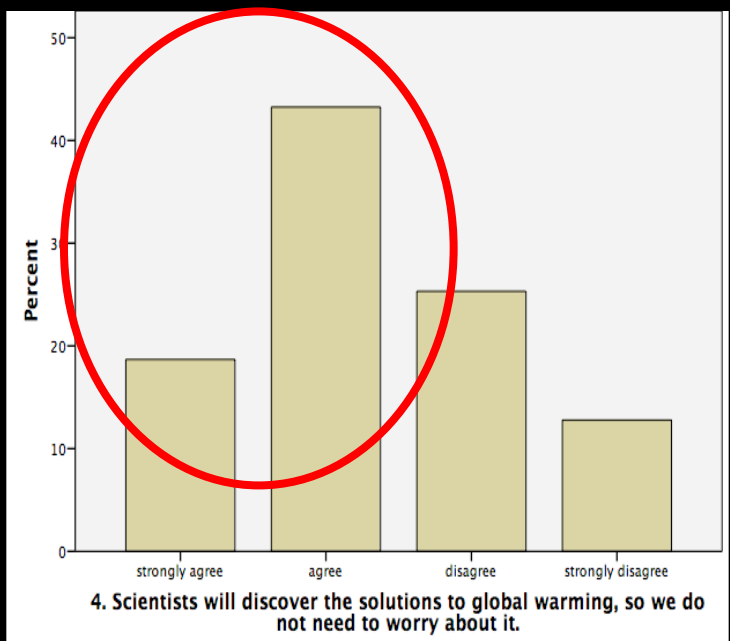
SURVEY ON STUDENTS' ATTITUDE TOWARDS CLIMATE CHANGE

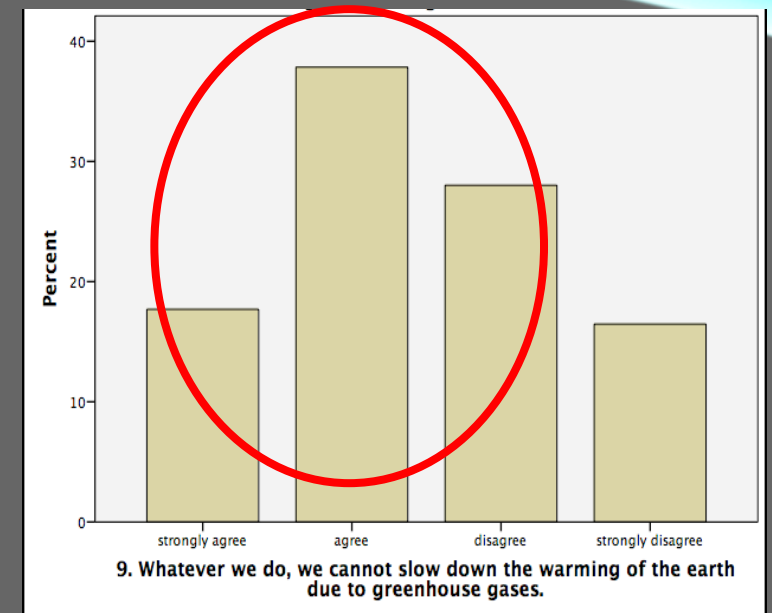
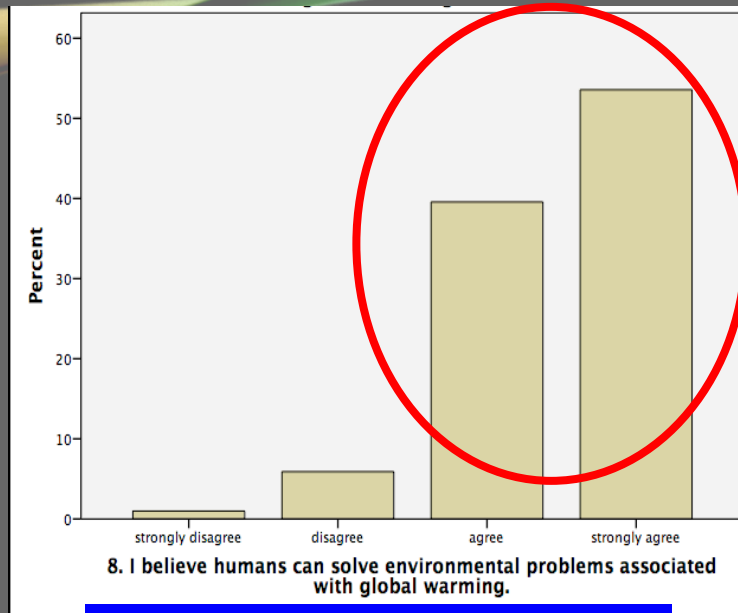
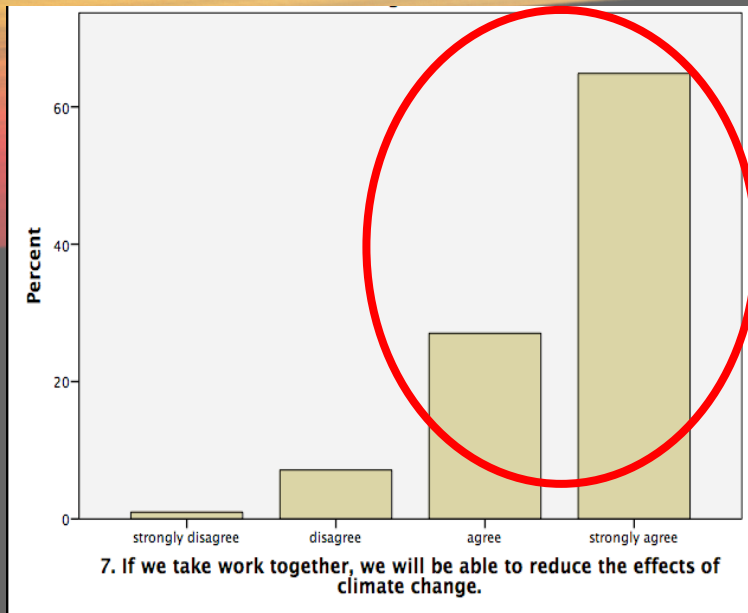


Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.697	.708	24

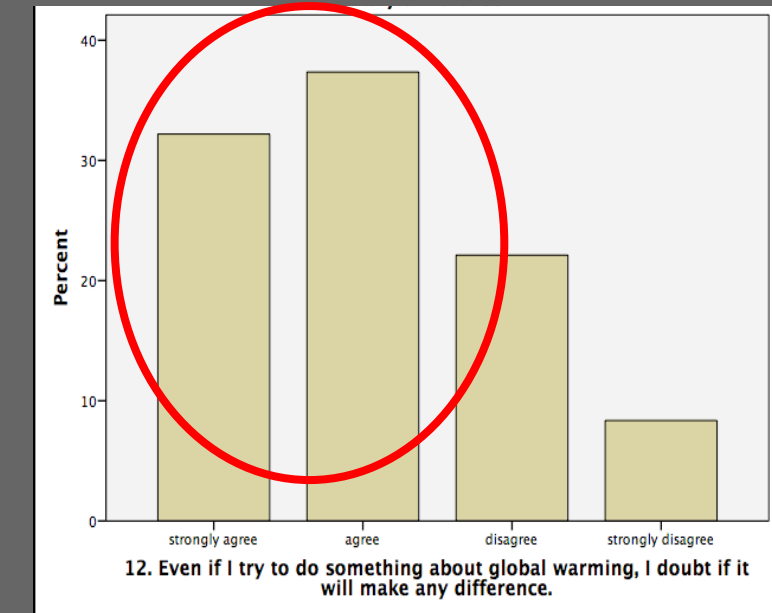
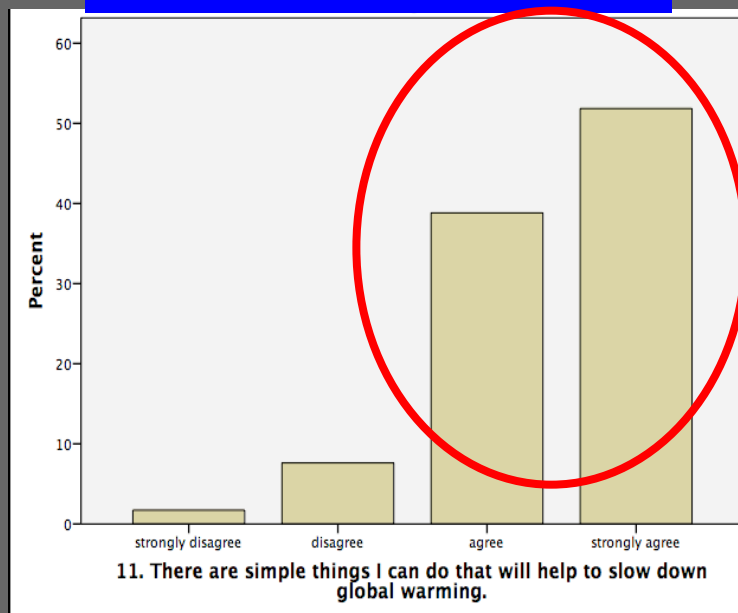
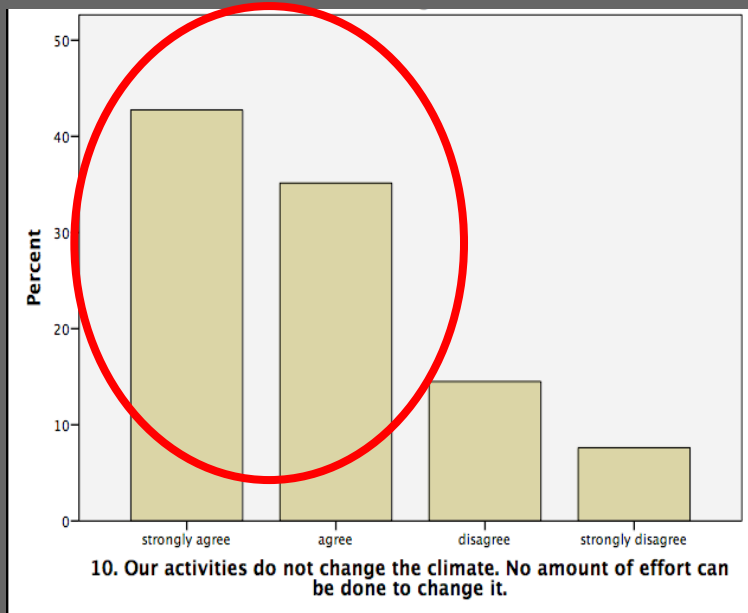


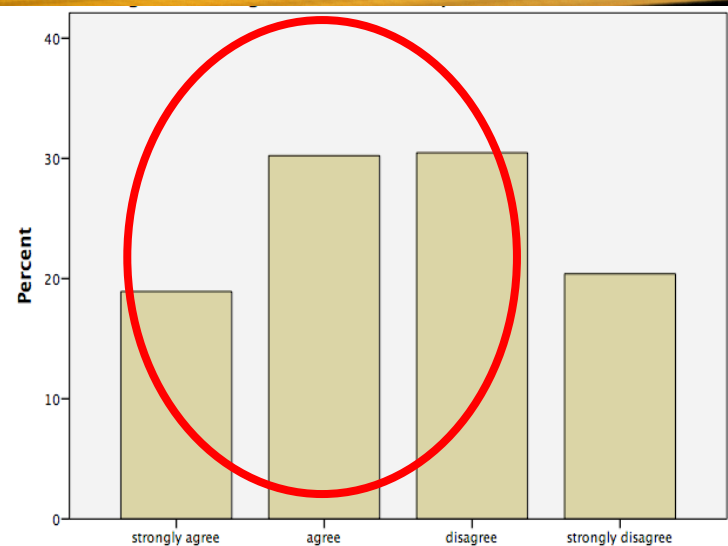
CONCERN



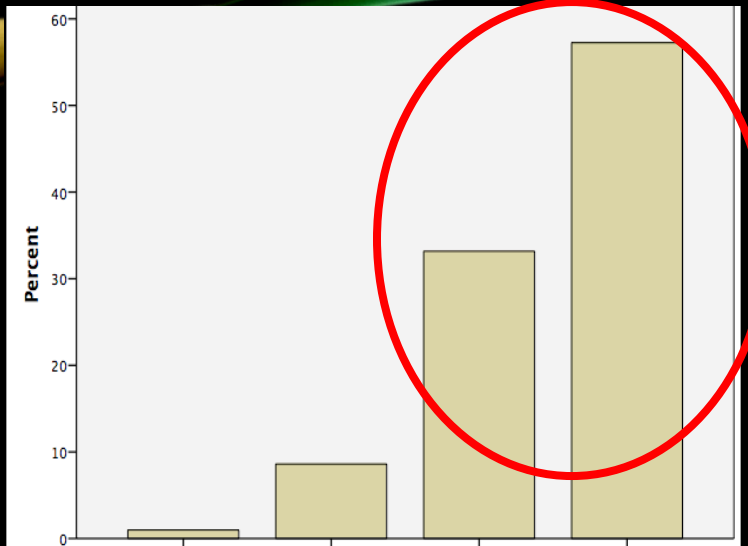


OPTIMISM

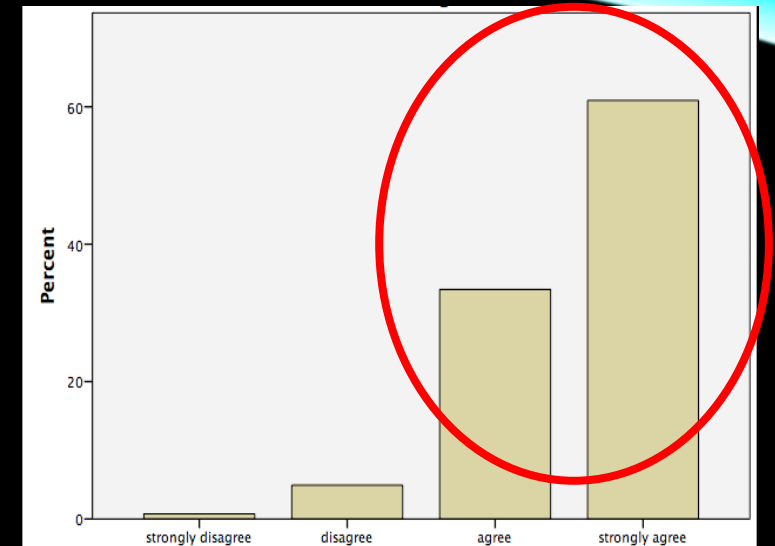




13. Richer countries like the US should take more responsibility to reduce greenhouse gas emissions than poorer countries.

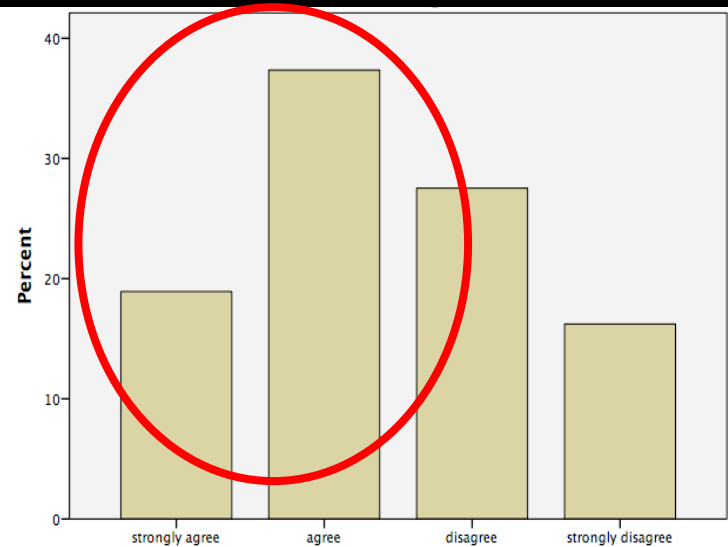


14. Immediate action is necessary to slow down global warming.

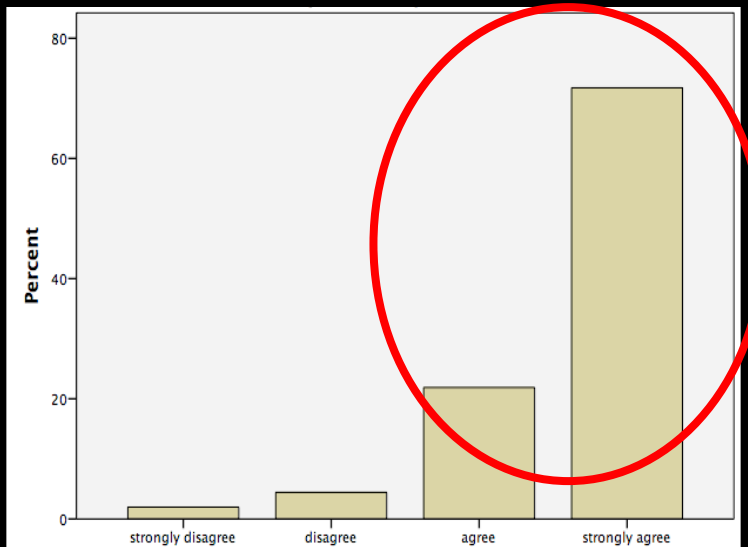


15. Everyone must be involved to find ways to decrease the impacts of climate change

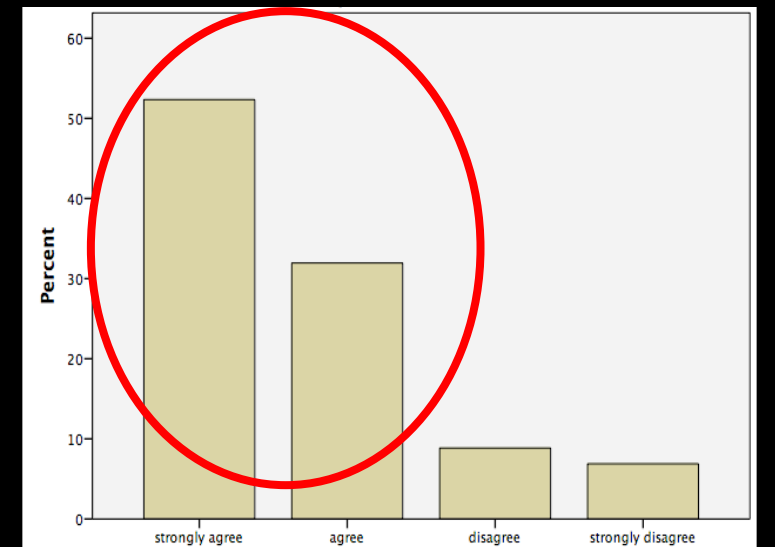
SENSE OF RESPONSIBILITY



16. Big companies should be the ones to take responsibility in preventing global warming



17. The effects of global warming will continue to get worse if we do not take any action to prevent it.



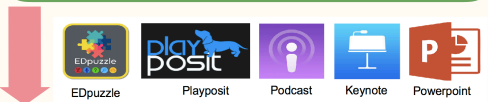
18. We should just leave the solution to the problem to scientists and politicians.

NextGen Blended Learning Flow

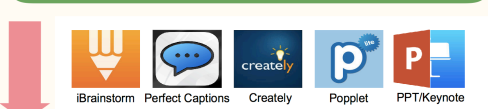
ACTIVE A

Learner:

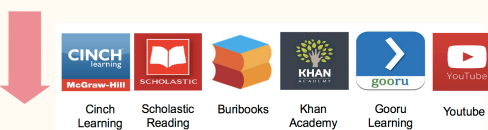
encounters EQ/ analyzes problematic situation or conflicting ideas



- gives answer/s (initial) based on prior knowledge
- suggests temporary solution that may not be based on facts



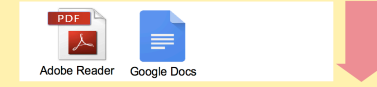
uses Web 2.0, LMS, Social Media & Apps, finds provisional answers/truths or facts/possible answers to EQs, problems & issues



CONSTRUCTIVE M

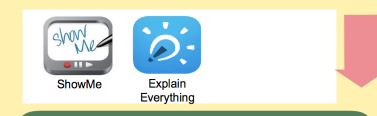
Learner:

corrects misconceptions, assumptions/hypotheses

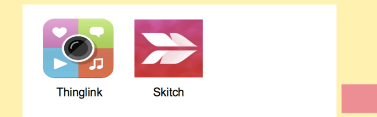


forms generalizations or conclusions

gives final answer/s to EQ's, problems & issues with supporting evidences

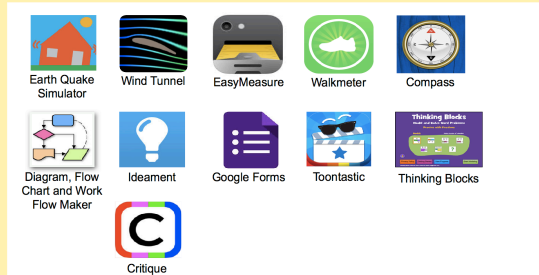
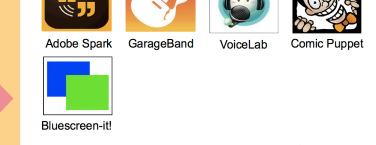
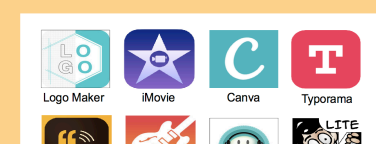
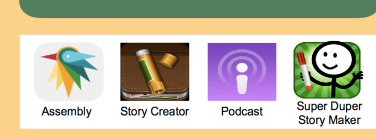


correlates EU with real life situations



AUTHENTIC T

Learner **creates** outputs that solve real-world problems and issues and **shares** outputs using wikis, blogs, LMS and social media



Learner **works with** peers and experts



Learner **checks** on his/her own progress and accomplishment of learning goals

COLLABORATIVE

GOAL-DIRECTED

Introduction

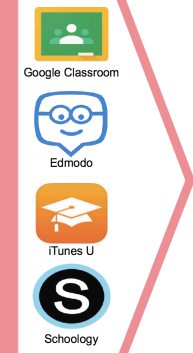
SAMR

Interaction

AMR

MR

Integration



Learner Develops Competencies in a Transformative Learning Environment

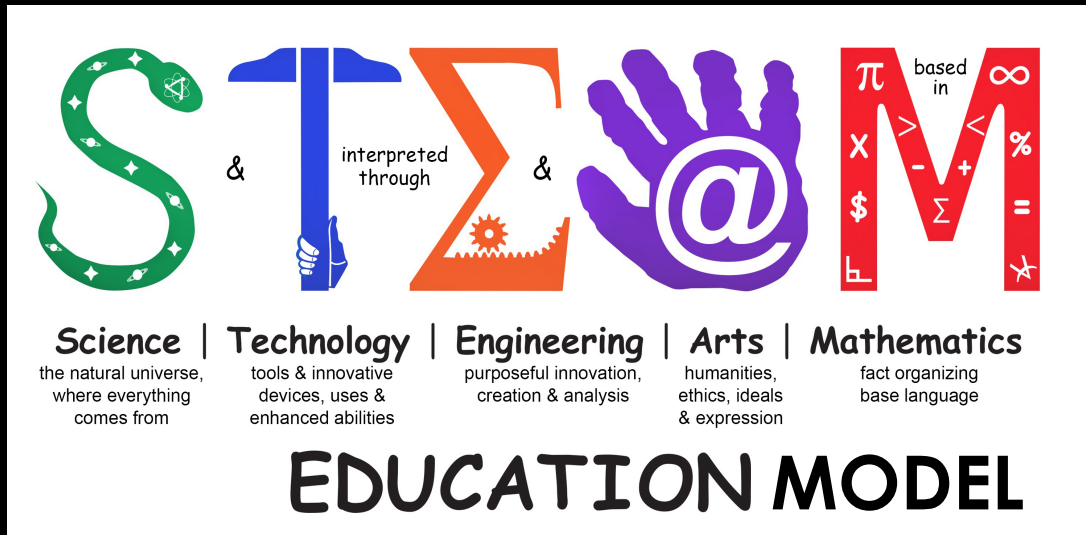


NATIONAL FORUM FOR STEAM IN HIGHER EDUCATION

April 25-26, 2019 | The Heritage Manila

Theme: "Modelling TPACK in Philippine STEAM

(Science, Technology, Engineering, Agri-Fisheries, Mathematics) Education"



Thank you for your kind attention!

