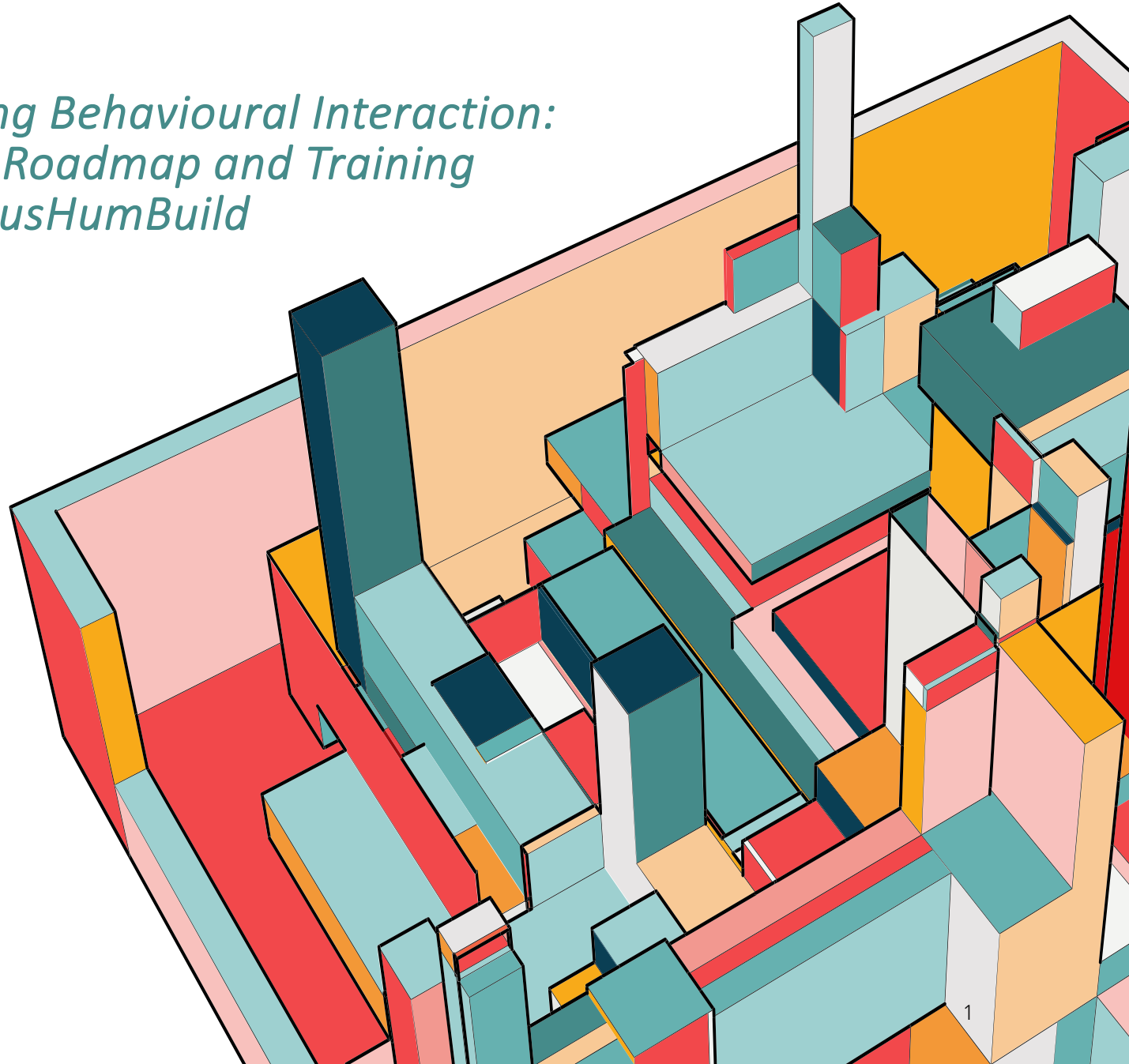
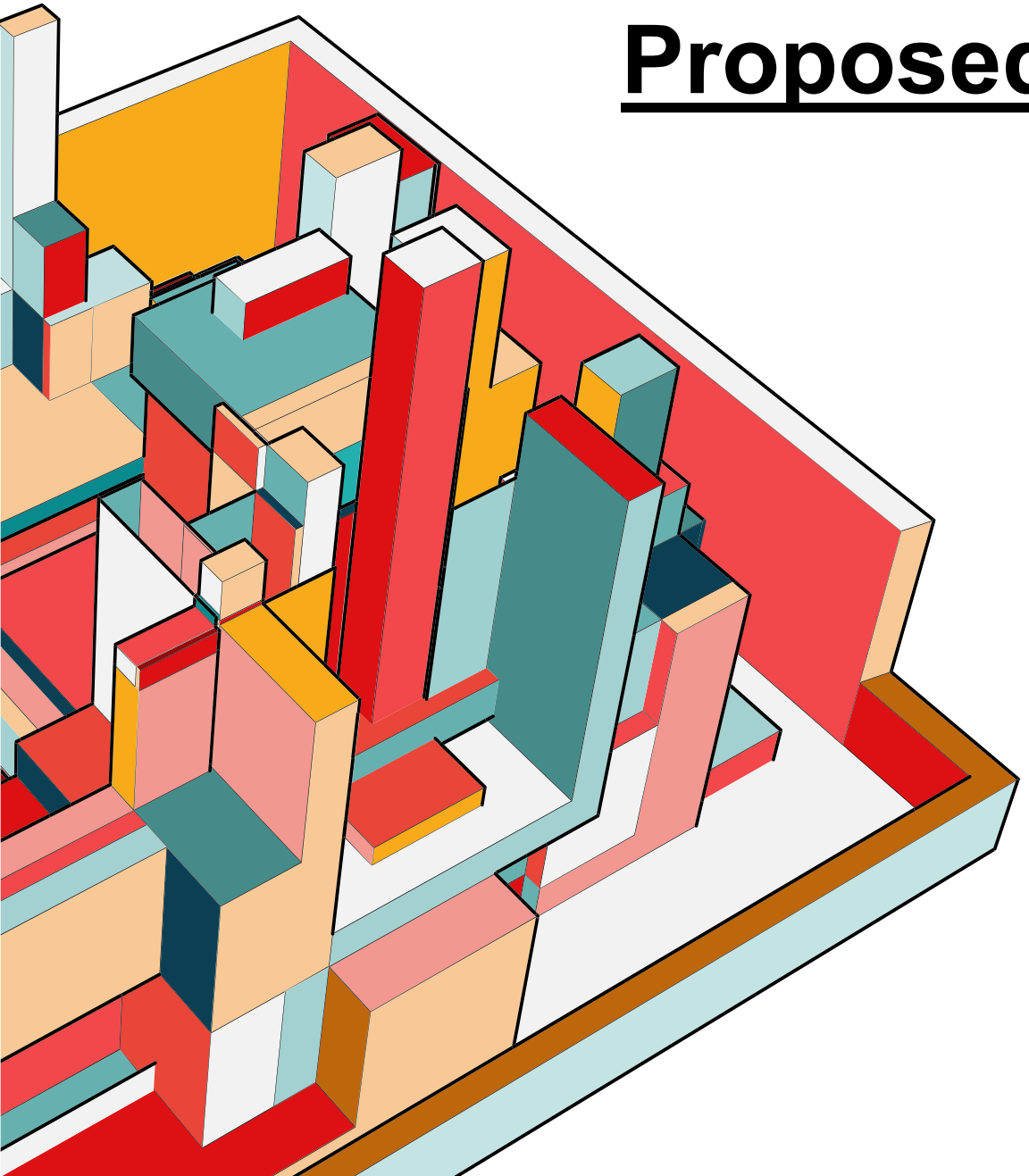
Sustainable Human to Building Behavioural Interaction: Awareness Development Roadmap and Training Programme: SusHumBuild

LSBU Principal Investigator : Prof. Issa Shaer

BUE Principal Investigator: Dr. Hesham Safwat



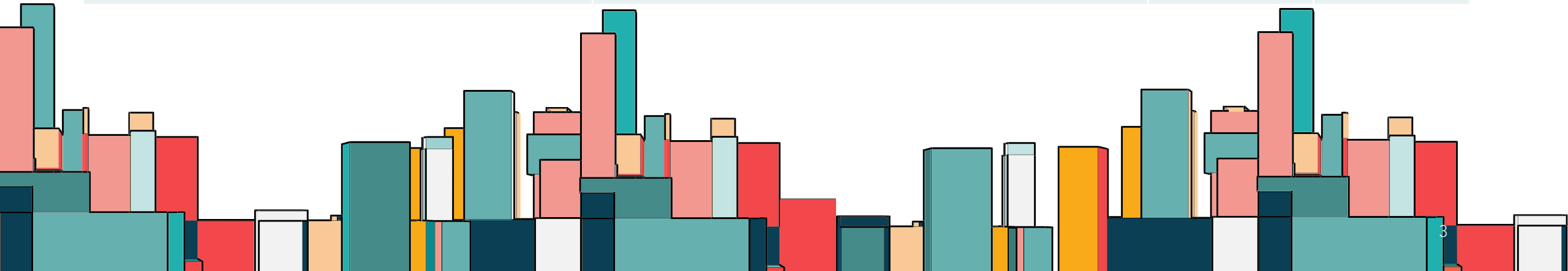


Proposed Team

University	Staff Team Members	Work Packages
LSBU	Prof. Issa Shaer Dr. Bertug Ozarisoy Dr. Mubarak Abdelrasoul Dr. Zhuihui Ye	WP2 WP3 WP4 WP5 WP6
BUE	Dr. Hesham Safwat Dr. Ahmed AlShami Prof Iman ElMahallawi Dr. Rania Roshdi Eng. Engy Samy Eng. Mahmoud Algharieb	WP1 WP4 WP5 WP6

PROJECT WORK PACKAGES

Work Package (WP)	Output/ Outcome	Assigned Team	Time M1-12
WP1: Research the current state of energy efficiency implementation in educational buildings for Egypt focusing on the user engagement with the energy using systems and understanding the energy use. This will include literature review, data collection and building performance evaluation survey.	OP: Report of the current user engagement. OC: Clarify the interplay between different factors affecting energy user behaviour in Egypt.	BUE	M 1-3
WP2: Appraise current energy saving methodologies for educational buildings in the UK and use dynamic thermal modelling and simulation to investigate different optimisation scenarios that are applicable to Egypt.	OP: Report of the latest advancement in energy saving within educational buildings. OC: Appraised up-to-date knowledge on the energy saving approaches in the UK for educational buildings.	LSBU	M 1-3



PROJECT WORK PACKAGES

Work Package (WP)	Output/ Outcome	Assigned Team	Time M1-12
WP3: • Facilitation site visits and knowledge transfer between LSBU BUE teams and relevant industry stakeholder. • Hands on site visit to the Centre for Efficient and Renewable Energy in Buildings at LSBU. • Charrat meetings relating to the operation of energy systems.	OP: Sharing the UK expertise for building energy efficiency transition and implementation through joint activities and workshops. OC: Improve the knowledge exchange between the UK and Egypt.	LSBU	M 3-6
WP4: • Analysis of energy performance data for higher education buildings from both the UK and Egypt, taking into account the different climate characteristics of Egypt and the UK as well as microclimates. • Sharing the UK expertise for building energy efficiency transition and implementation through joint activities and workshops.	OP: Develop the outline for guidelines for the higher education buildings in Egypt. OC: Tailoring the knowledge into the codes for the higher education buildings in Egypt.	LSBU BUE	M 6-9

PROJECT WORK PACKAGES

Work Package (WP)	Output/ Outcome	Assigned Team	Time M1-12
WP5: Evaluation of the guideline with academics, professionals, stakeholders and representatives of local authorities.	OP: Guidelines for energy savings. OC: Increase understanding energy saving and sustainability.	LSBU BUE	M 9-11
WP6: Disseminate workshop on the outputs through development of training material and masterclass workshop in Cairo, Egypt.	OP: Awareness workshop in energy efficiency. OC: Widened research collaboration between the UK and Egypt.	LSBU BUE	M11-12

PLAN FOR THE NEXT PERIOD (WP1 BUE TASKS)

Identify and study the main determinants that affects Egypt's energy consumption in educational buildings, in addition to defining activities related to educational buildings energy consumption (space cooling, lighting, offices and lab work, water heating.) and the role of various factors in shaping energy expenditure to define and develop suitable strategies and solutions for energy efficiency.

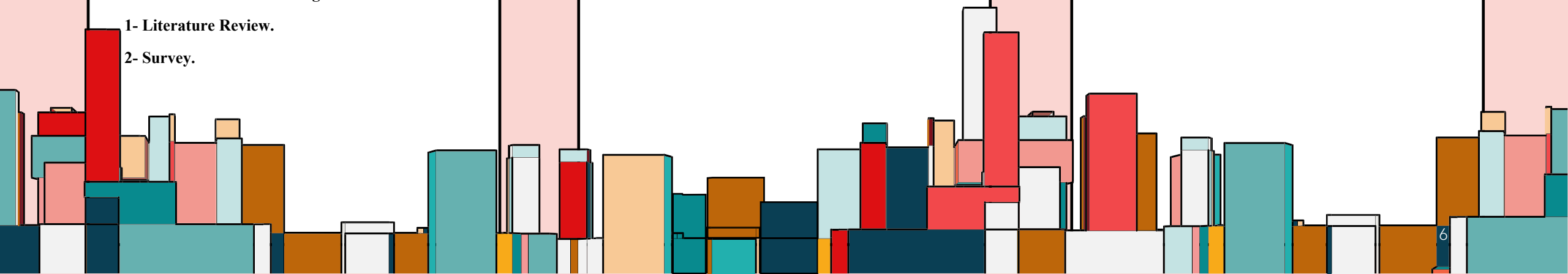
This can be achieved through:

1- Literature Review.

2- Survey.

Workshop for educational stakeholders (schools' directors and senior students) in the BUE to increase the awareness of Energy Efficiency in educational buildings.

- Survey questions preparation.
- Survey implementation.



WP1: Research the current state of energy efficiency implementation in educational buildings for Egypt focusing on the user engagement with the energy using systems and understanding the energy use. This will include **literature review, data collection and building performance evaluation survey**.

OP: Sharing the UK expertise for building energy efficiency transition and implementation through joint activities and workshops.

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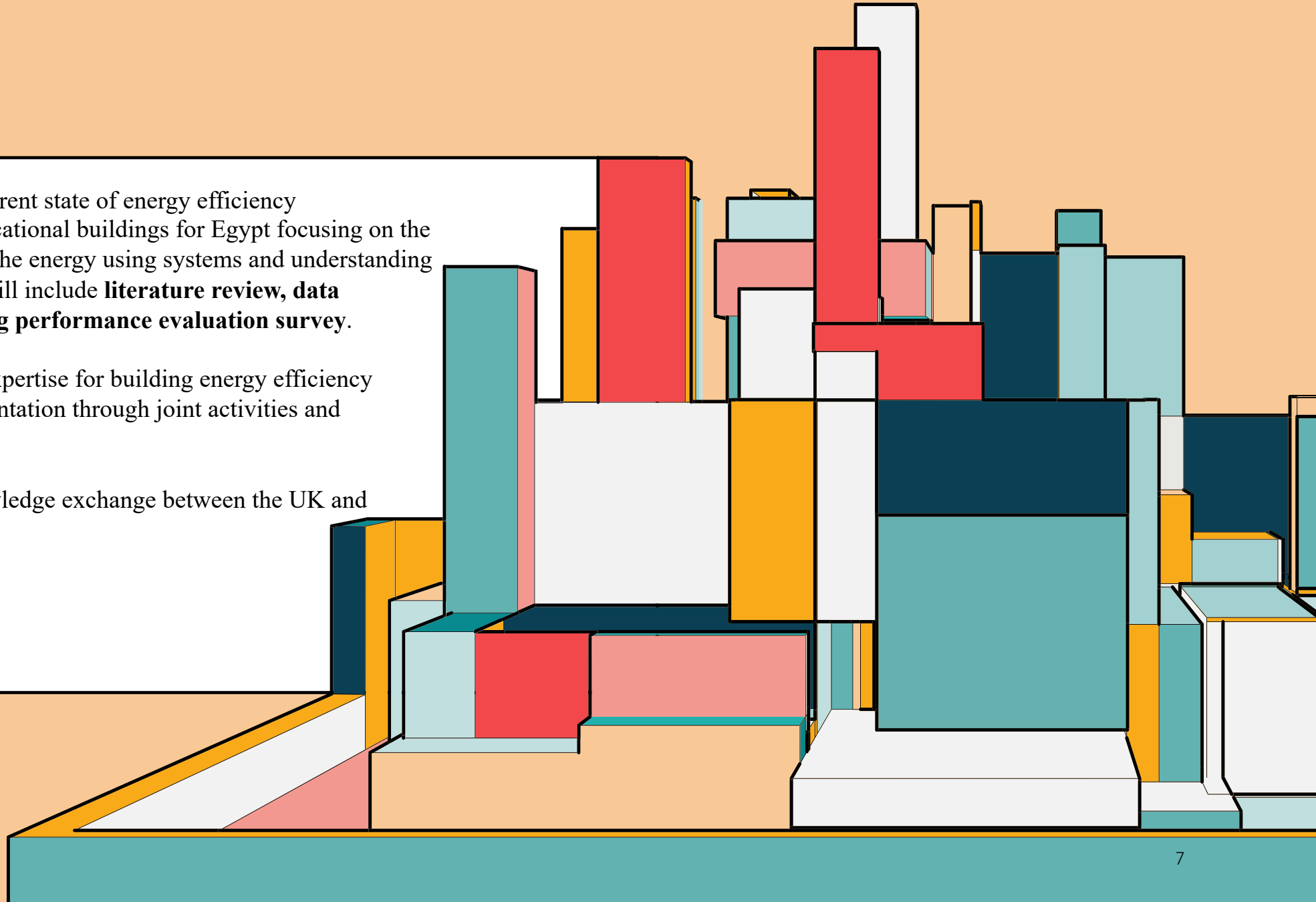


LITERATURE REVIEW OUTLINE

Introduction

- Energy analysis of buildings.
- Green buildings, net-zero energy buildings (NZEBs).
- Different rating systems.
- Government policies and incentives.
- International standards and guidelines.

The design of educational buildings

- Advanced technologies and sustainable practices.
- Assess of how much energy educational buildings use.
- Evaluate the conventional and renewable energy consumption of university buildings.

The energy efficiency in Egyptian educational facilities

- Initiatives and efforts in the past few years to investigate energy efficiency in Egyptian educational facilities.
- Recent Studies addressed data collection and energy saving challenges in Egypt.
- Conclusion.

DATA COLLECTION

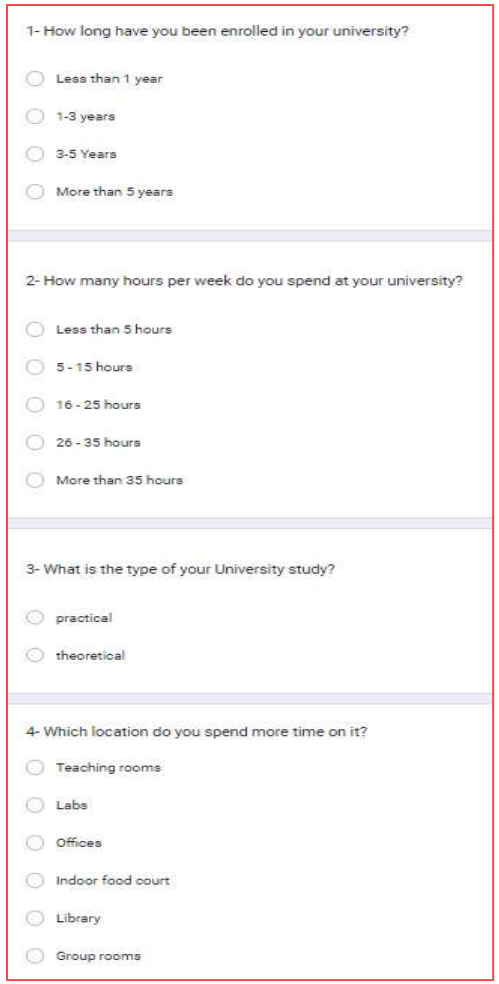
University Students Survey

- 25 questions
- Survey data indicates university students' experience of energy control, indoor comfort, and energy flexibility in campus buildings.
- BUE – GIU – Cairo University and ElSherouk Academy Students participated in the survey – 80 responses till now.

School Students Survey

- 28 questions
- Survey data measures school students' knowledge levels about energy saving importance, renewable energy technologies, and energy control.
- 15 responses till now.

UNIVERSITY SURVEY SAMPLE



1- How long have you been enrolled in your university?

- Less than 1 year
- 1-3 years
- 3-5 Years
- More than 5 years

2- How many hours per week do you spend at your university?

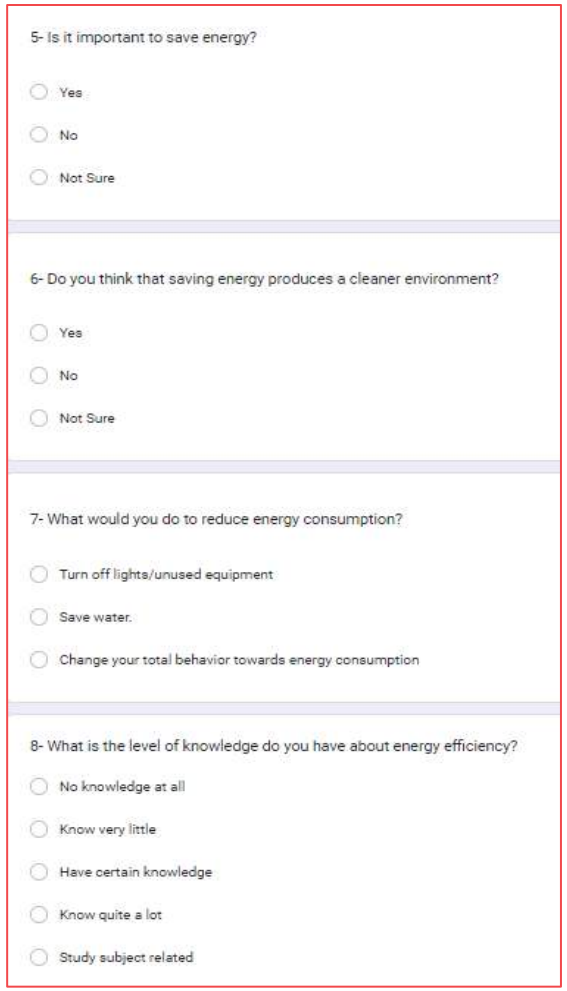
- Less than 5 hours
- 5 - 15 hours
- 16 - 25 hours
- 26 - 35 hours
- More than 35 hours

3- What is the type of your University study?

- practical
- theoretical

4- Which location do you spend more time on it?

- Teaching rooms
- Labs
- Offices
- Indoor food court
- Library
- Group rooms



5- Is it important to save energy?

- Yes
- No
- Not Sure

6- Do you think that saving energy produces a cleaner environment?

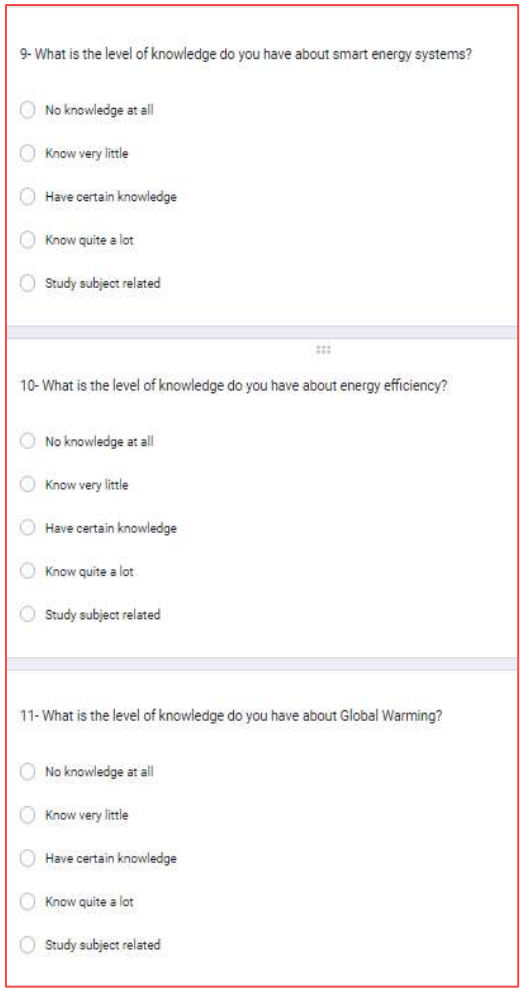
- Yes
- No
- Not Sure

7- What would you do to reduce energy consumption?

- Turn off lights/unused equipment
- Save water.
- Change your total behavior towards energy consumption

8- What is the level of knowledge do you have about energy efficiency?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot
- Study subject related



9- What is the level of knowledge do you have about smart energy systems?

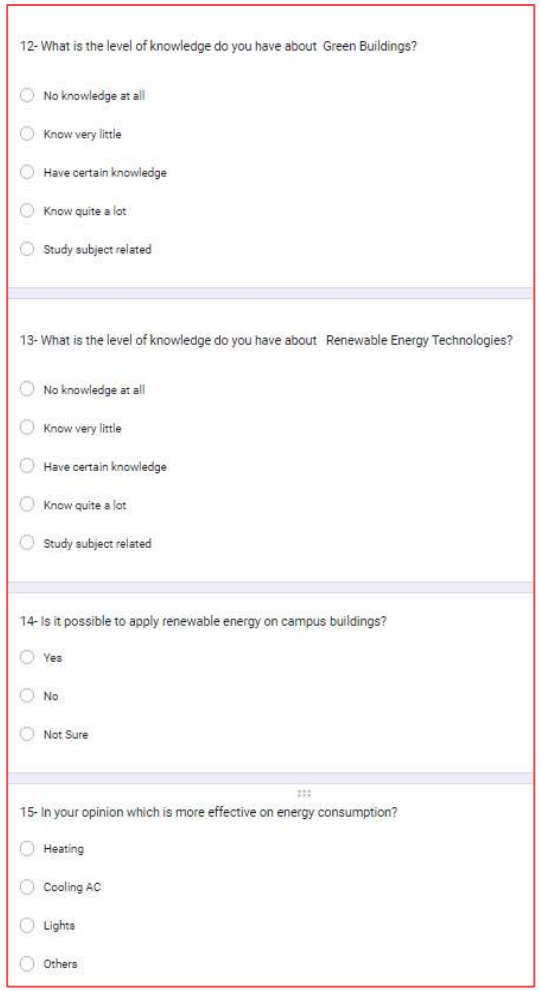
- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot
- Study subject related

10- What is the level of knowledge do you have about energy efficiency?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot
- Study subject related

11- What is the level of knowledge do you have about Global Warming?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot
- Study subject related



12- What is the level of knowledge do you have about Green Buildings?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot
- Study subject related

13- What is the level of knowledge do you have about Renewable Energy Technologies?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot
- Study subject related

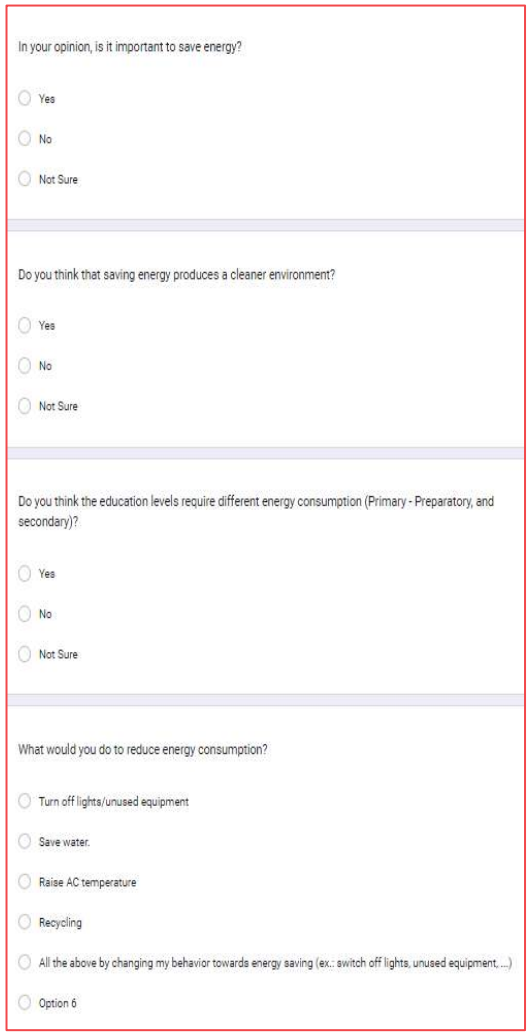
14- Is it possible to apply renewable energy on campus buildings?

- Yes
- No
- Not Sure

15- In your opinion which is more effective on energy consumption?

- Heating
- Cooling AC
- Lights
- Others

SCHOOL SURVEY SAMPLE


In your opinion, is it important to save energy?

- Yes
- No
- Not Sure

Do you think that saving energy produces a cleaner environment?

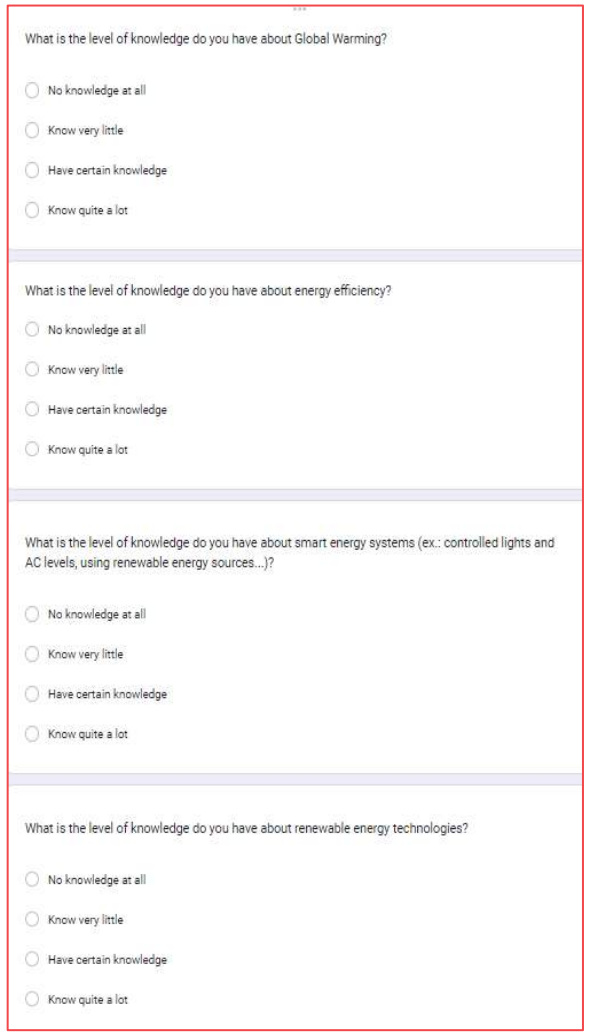
- Yes
- No
- Not Sure

Do you think the education levels require different energy consumption (Primary - Preparatory, and secondary)?

- Yes
- No
- Not Sure

What would you do to reduce energy consumption?

- Turn off lights/unused equipment
- Save water.
- Raise AC temperature
- Recycling
- All the above by changing my behavior towards energy saving (ex.: switch off lights, unused equipment, ...)
- Option 6


What is the level of knowledge do you have about Global Warming?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot

What is the level of knowledge do you have about energy efficiency?

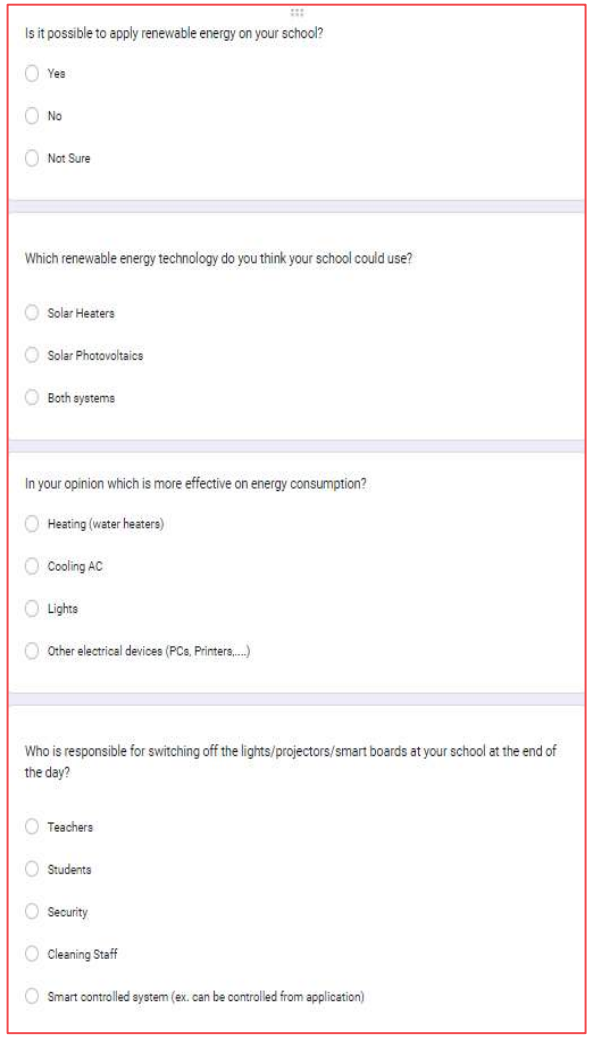
- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot

What is the level of knowledge do you have about smart energy systems (ex.: controlled lights and AC levels, using renewable energy sources...)?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot

What is the level of knowledge do you have about renewable energy technologies?

- No knowledge at all
- Know very little
- Have certain knowledge
- Know quite a lot


Is it possible to apply renewable energy on your school?

- Yes
- No
- Not Sure

Which renewable energy technology do you think your school could use?

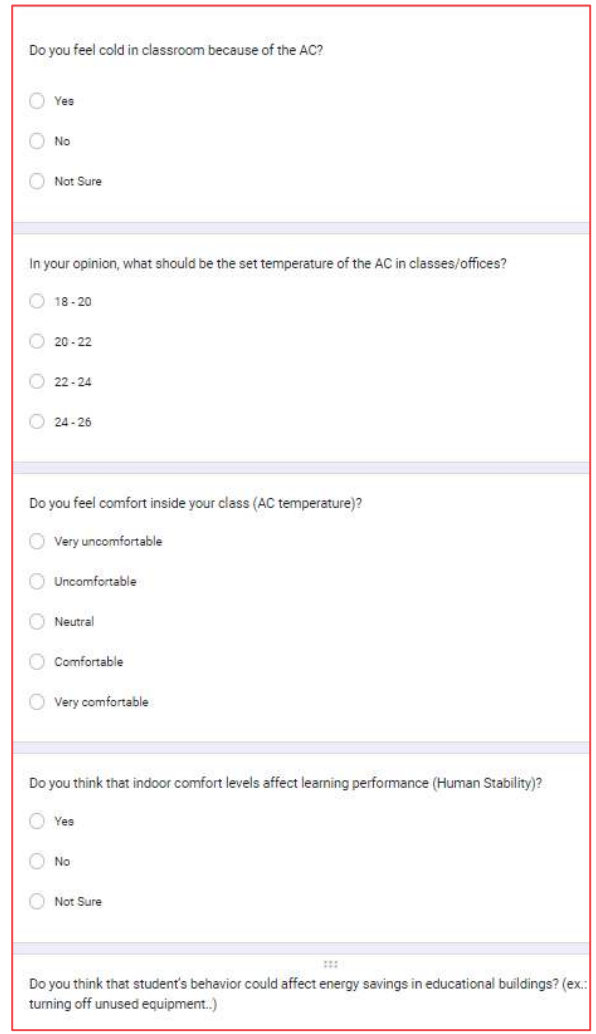
- Solar Heaters
- Solar Photovoltaics
- Both systems

In your opinion which is more effective on energy consumption?

- Heating (water heaters)
- Cooling AC
- Lights
- Other electrical devices (PCs, Printers,....)

Who is responsible for switching off the lights/projectors/smart boards at your school at the end of the day?

- Teachers
- Students
- Security
- Cleaning Staff
- Smart controlled system (ex. can be controlled from application)


Do you feel cold in classroom because of the AC?

- Yes
- No
- Not Sure

In your opinion, what should be the set temperature of the AC in classes/offices?

- 18 - 20
- 20 - 22
- 22 - 24
- 24 - 26

Do you feel comfort inside your class (AC temperature)?

- Very uncomfortable
- Uncomfortable
- Neutral
- Comfortable
- Very comfortable

Do you think that indoor comfort levels affect learning performance (Human Stability)?

- Yes
- No
- Not Sure

Do you think that student's behavior could affect energy savings in educational buildings? (ex.: turning off unused equipment..)

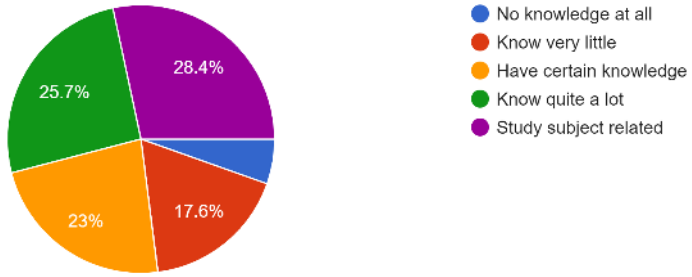
SURVEY LINKS

- https://forms.gle/XfuA3TYQUPXrefdH6
- https://forms.gle/KbqBhbhfFaNwooGi8

SURVEY CHARTS SAMPLES

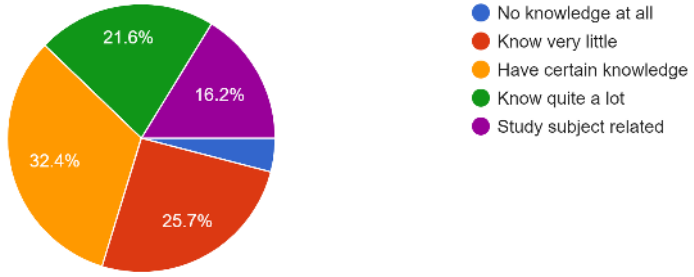
8- What is the level of knowledge do you have about energy efficiency?

74 responses



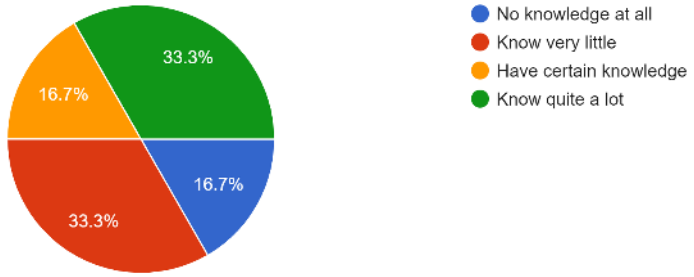
9- What is the level of knowledge do you have about smart energy systems?

74 responses



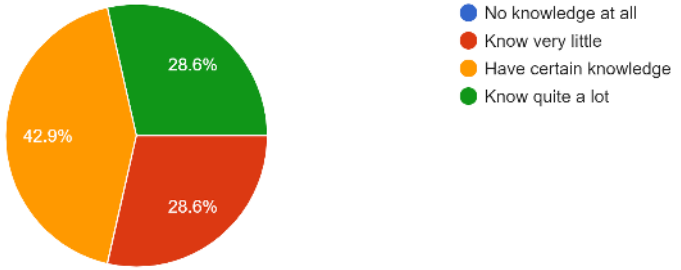
What is the level of knowledge do you have about energy efficiency?

6 responses



What is the level of knowledge do you have about smart energy systems (ex.: controlled lights and AC levels, using renewable energy sources...)?

7 responses



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