A T R A N S

# Integration of Road Safety Education with Engineering Design for Safer Routes to School

## Interim presentation
## 27 August 2022

ATRANS
asian transportation research society

RESEARCH PROJECT FOR FISCAL YEAR OF 2022-2023

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# Outline

- Backgrounds
- Objectives
- Methodology
- Case studies
- Preliminary Results
- Further works

# Backgrounds - 1

**Previous ATRANS Research Projects on road safety education found that :**

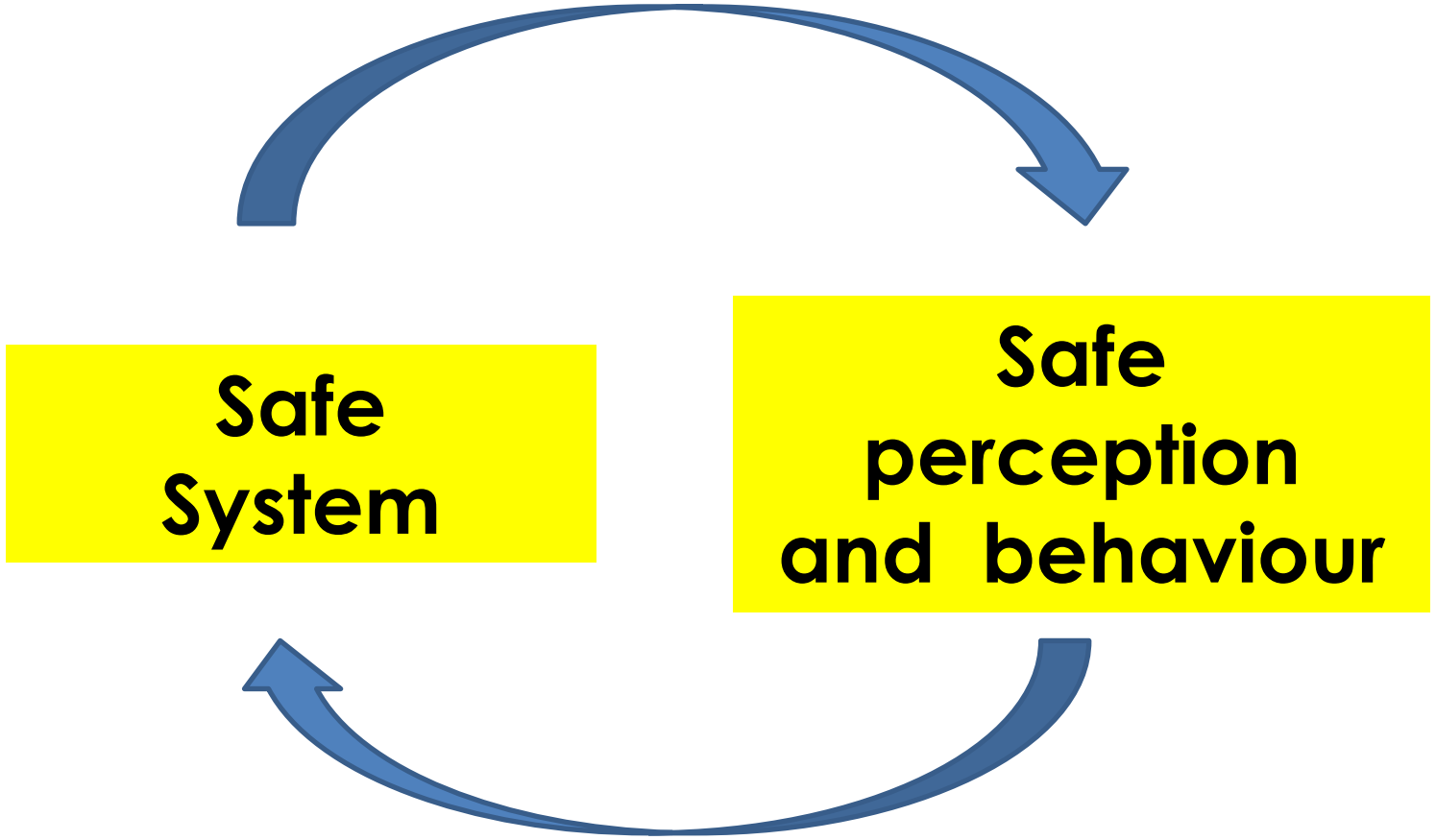
- **Road safety education** could change road users' and drivers' behaviours, but it must be a structured process.
- Road safety education should influence **attitudes and perceptions** toward risk awareness (not only provide knowledge of traffic rules and driving skills).
- Safety education by instructional and supportive interventions can encourage knowingly risky behaviour and knowingly safe behaviour, while **motivational interventions** can influence fluently safe behaviour.
- However, in the previous ATRANS project, the designed motivational intervention to encourage habitual behaviour seems not to be successful, because the designed activity is not attractive.
- Thus, new design of motivational interventions is needed.

# Backgrounds - 2

**Previous ATRANS Research Projects on safe routes to school (SRTS) found that :**

- The majority uses motorcycles to school (even living very near school).
- Some go to school by walking, cycling, or using public transport to schools.
- The routes to schools must be improved, particularly physical infrastructure need to be **safe**, comfort and attractive.
- However, students not rather clear what are safe and unsafe infrastructure and speed (significant difference between those who have and do not have engineering background knowledge).
- This may be one of reasons that they perform (unknown) risk driving behaviours.

# Concept



# Assumption

The findings lead to an assumption that :

- Students will behave safely on provided road infrastructure if they have knowledge on road safety assessment and basic engineering design.
- Involving road users in auditing road safety and redesigning road infrastructure may be an effective motivational intervention for road safety education.

# Expectation

- **In short term,** this integration of road safety education with engineering design, may motivate students to comply with traffic rules, avoid risks, act safely, and then survive on the unsafe infrastructure.
- **In long term,** it may influence students' attitudes towards risk awareness and habitual safe behaviour.

# Objectives

- To educate students on road safety assessment and basic engineering design.
- To allow students having experiences in auditing road safety and redesigning safer routes to school.

# Research Methods

## 1. Organising workshops on road safety assessment and basic engineering design

- Road safety assessment: Road safety audit (RSA), Hiyari Hatto and Atrans Safety Map
- Training courses: basic of highway engineering design
- Two workshops: 11th June and 5th August 2022

## 2. Assessing road safety and redesigning safer routes to school

- RSA was conducted on 5th August 2022 using the checklist of road assessment.

## 3. Monitoring change of attitudes and intentions

- Both workshops were conducted using the pre- and post-activity questionnaire.

# Case study

- Suphanburi Technical College
  - Target group
    - **11th June 2022** : 42 students
    - **5th August 2022** : 46 students
  - Control group (Ongoing)
- Prince of Songkla University (PSU)
- Ubon Ratchathani University (UBU)

# 1 Workshop on road safety and safe system (The 1st Workshop)

Involving basic background on **road safety, safe system, Hiyari Hatto and Atrans Safety Map**, with pre- and post-activity questionnaire surveys.


# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

Involving road safety audit (RSA) with a prepared checklist


# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

After lecture, 46 students were divided into 4 groups to assess the road safety at two sites, whereby two groups were assigned the same situation.

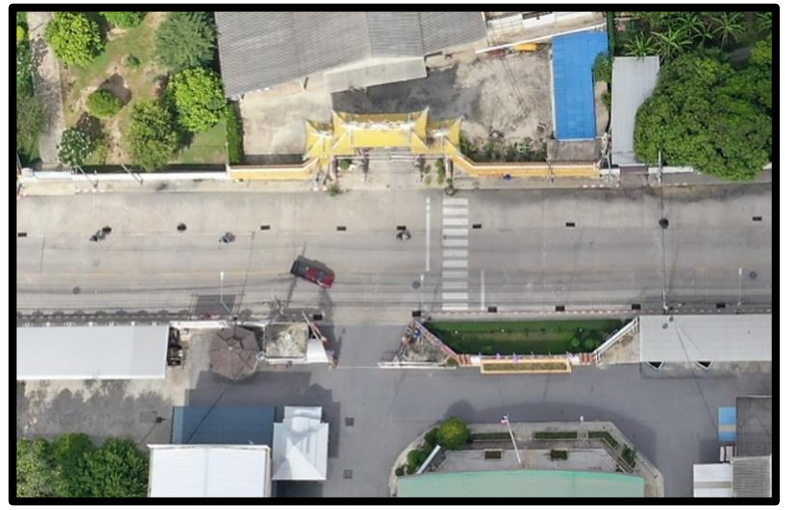
Sidewalks and road crossing facilities

T-Junction

# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

- Group 1 and 3: sidewalks and road crossing facilities in the front of college
- Group 2 and 4: T-junction



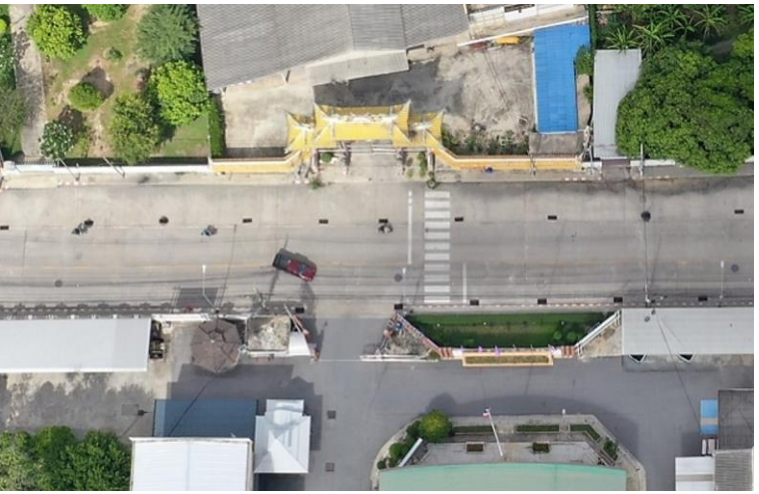


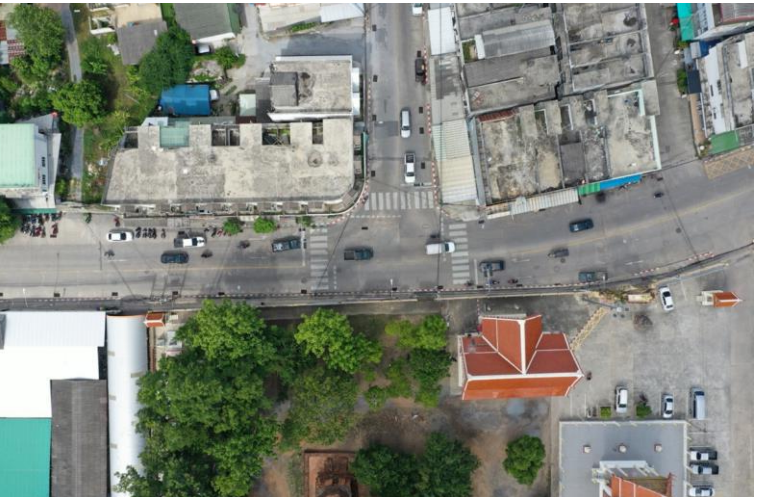
Crosswalk at the 3-intersection



# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

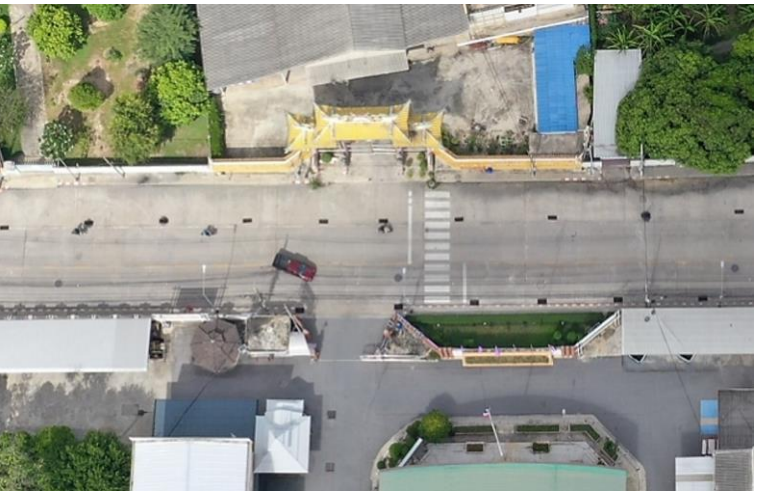
Group discussion for reflecting road safety problems and solutions



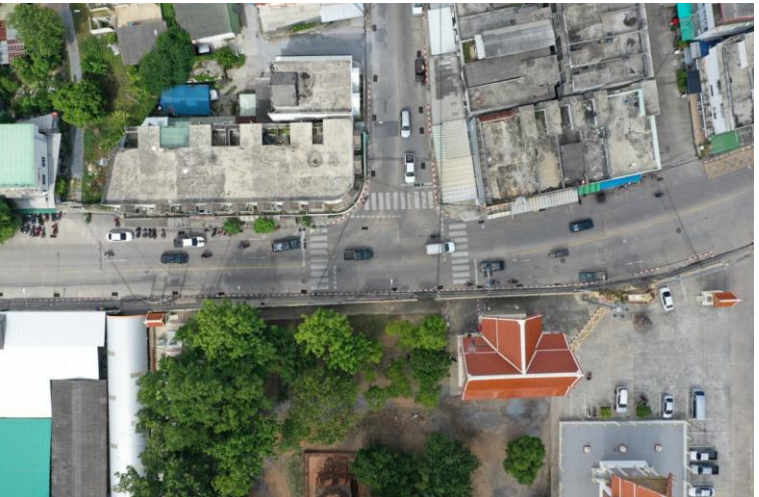



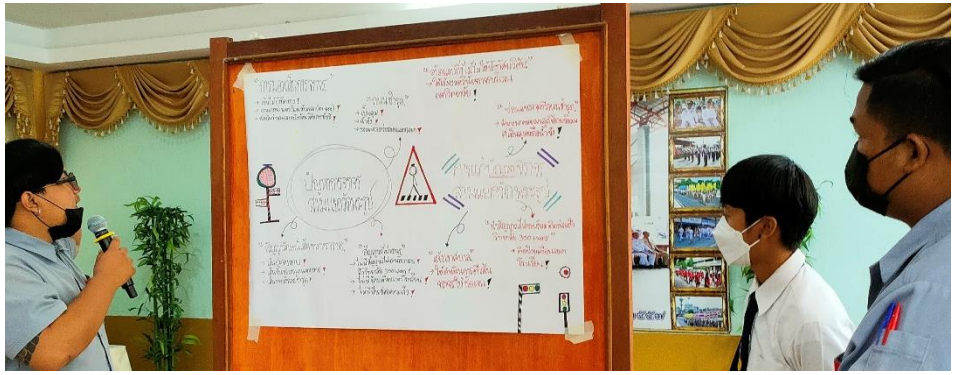
# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

## Group presentation





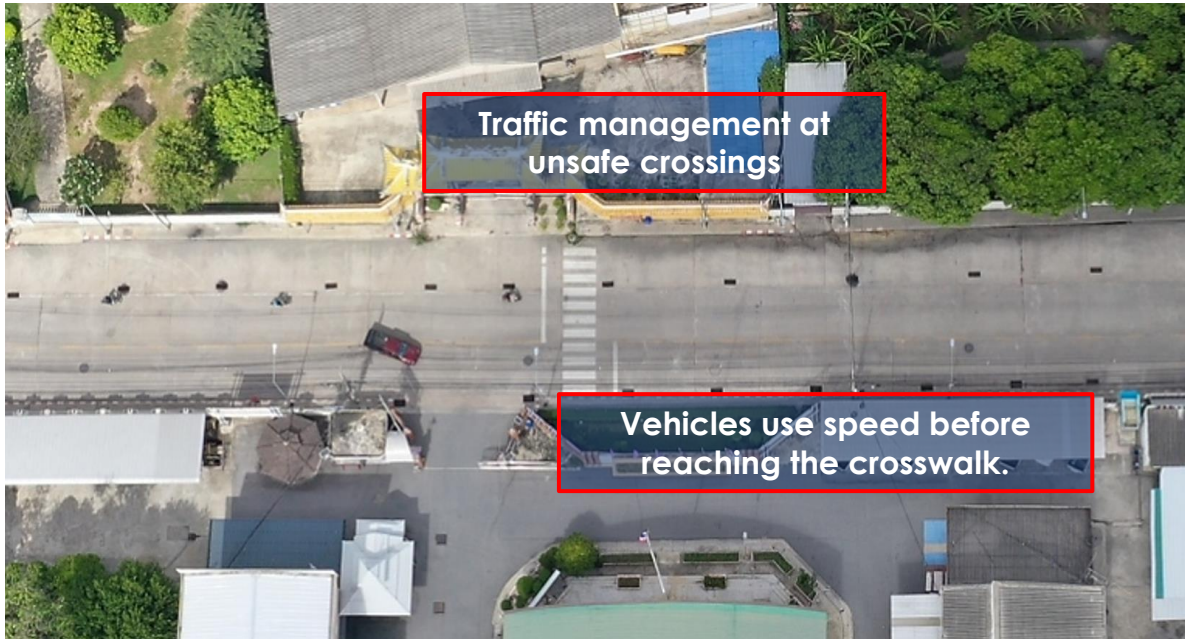




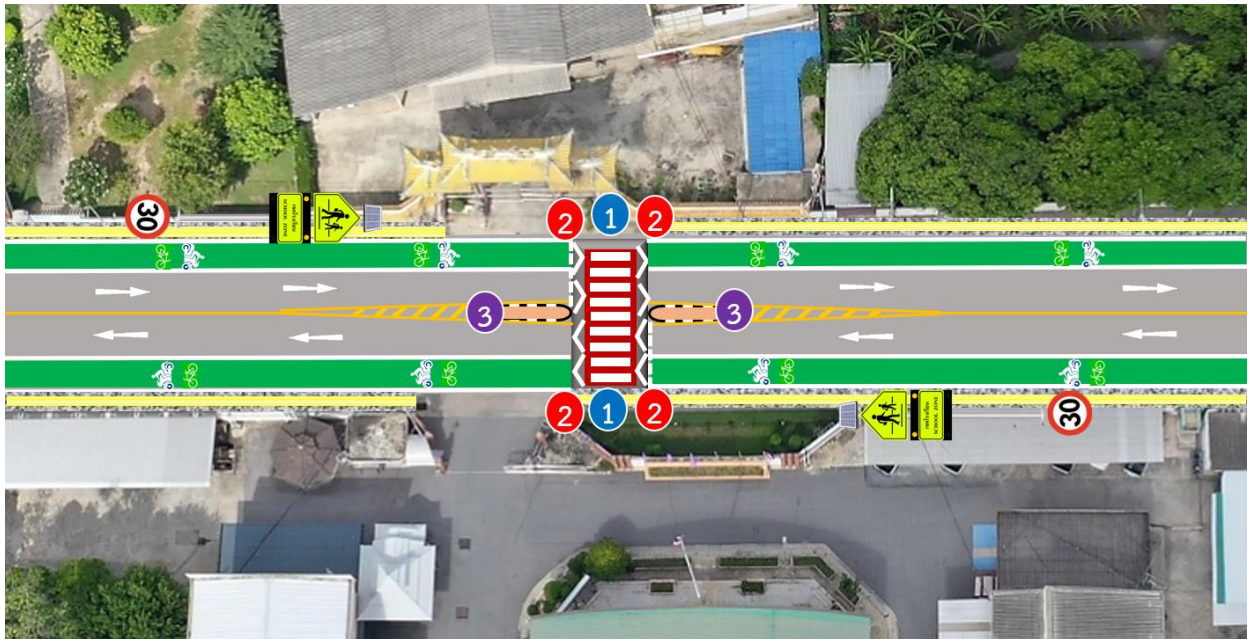
# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

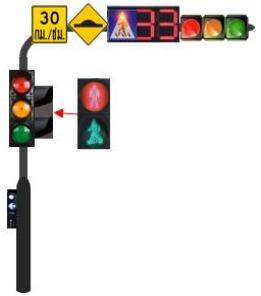
Finally, discussions with experts

## Current situation




## Initial solutions



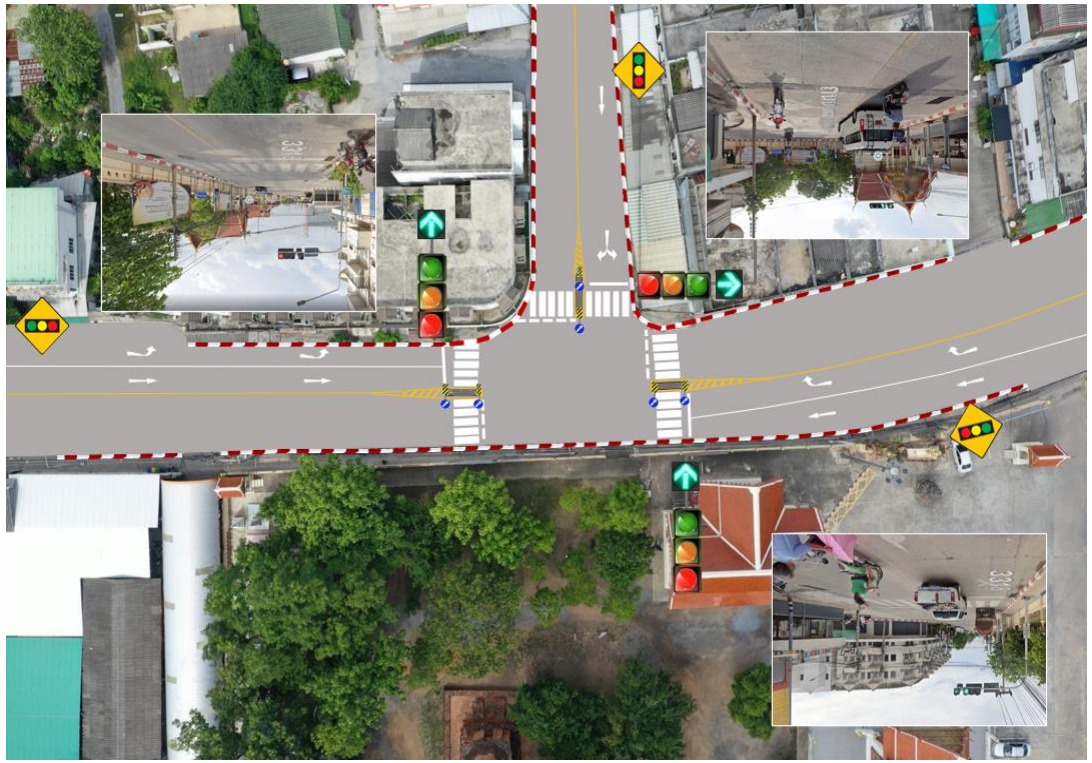




# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

Finally, discussions with experts

## Current situation


## Initial solutions



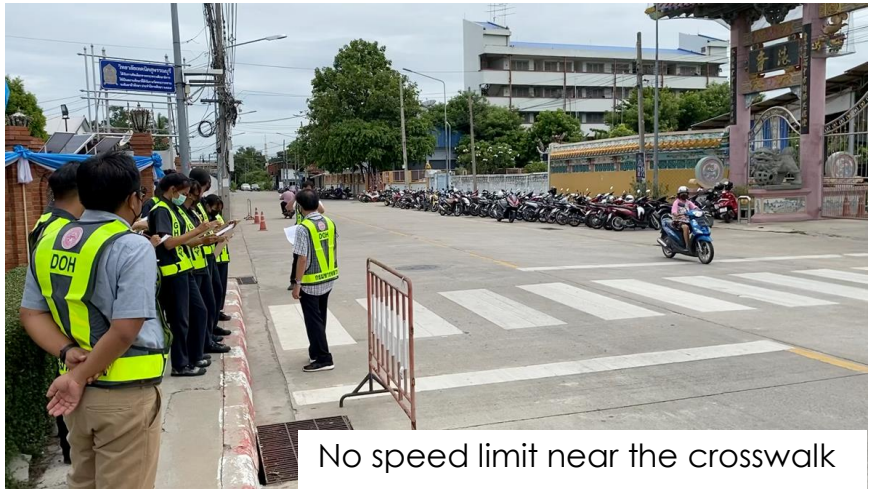
E.g.

- Improvement of road markings on the road
- Improvement of traffic lanes and entrances
- Installing an island in the middle of the road at the crosswalk
- Marking red and white traffic lines at intersections

# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

Summarised problems based on the checklist

vision and vision distance




No speed limit near the crosswalk

One lane is replaced by MC parking

Drainage problem

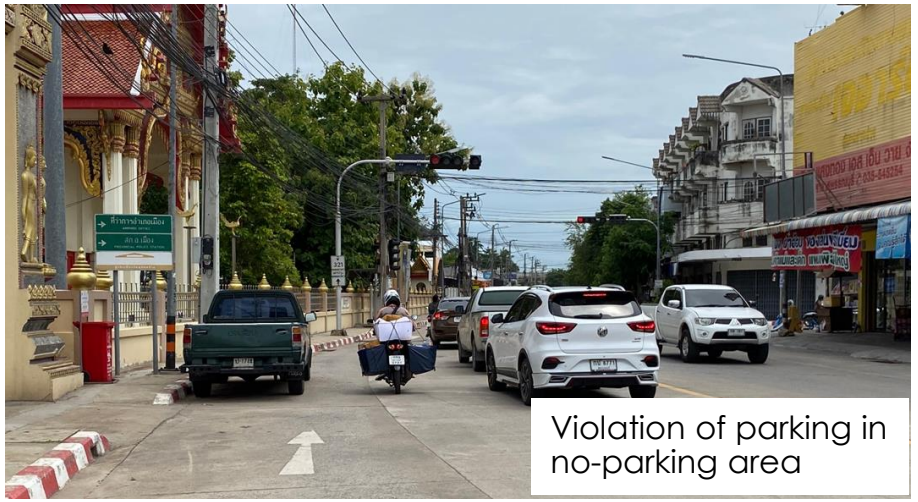

No marking to divide the traffic land and shoulder

Obstruction of vision

# 2 Assessing road safety and redesigning safer routes to school (The 2nd Workshop)

Summarised problems based on the checklist

Unclear traffic marking



Violation of parking in no-parking area

Poor pedestrian walkway

Poor road pavement

Insufficient vision distance

Insufficient lightings

# 3 Monitoring change of attitudes and intentions

The questionnaires were conducted before and after activities on both workshops using a google form.

## Pre-test

The questionnaire was divided into six main parts:

1. **Personal characteristics** (id, gender, age, personal income, household income)
2. **Travel behaviours to schools** (mode choice, alternative mode choice, driving experience, driving license, and accident experience)
3. **Attitude and behaviour of driving motorcycle** consists of 3 sections:
   (1) Attitude toward motorcycle usage,
   (2) Risk awareness of motorcycle usage,
   (3) Motorcycle usage **behaviour in the past 1 month**. Students were asked to choose the rate (5-scale) for how much they agree/disagree with each issue.
4. **Opinions on attending the road safety course according to traffic engineering principles** (5-scale)
5. **Knowledge of road safety with the youths** (multiple choice)
6. **Knowledge of road safety audit** (multiple choice)

## Post-test

The questionnaire was divided into four main parts:

1. **Attitude and behaviour of riding motorcycle** consists of 3 sections:
   (1) Attitude toward motorcycle usage,
   (2) Risk awareness of motorcycle usage,
   (3) Motorcycle usage **behaviour that intend to do in the future**. Students were asked to choose the rate (5-scale) for how much they agree/disagree with each issue.
2. **Opinions on attending the road safety course according to traffic engineering principles** (5-scale)
3. **Knowledge of road safety with the youths** (multiple choice)
4. **Knowledge of road safety audit** (multiple choice)

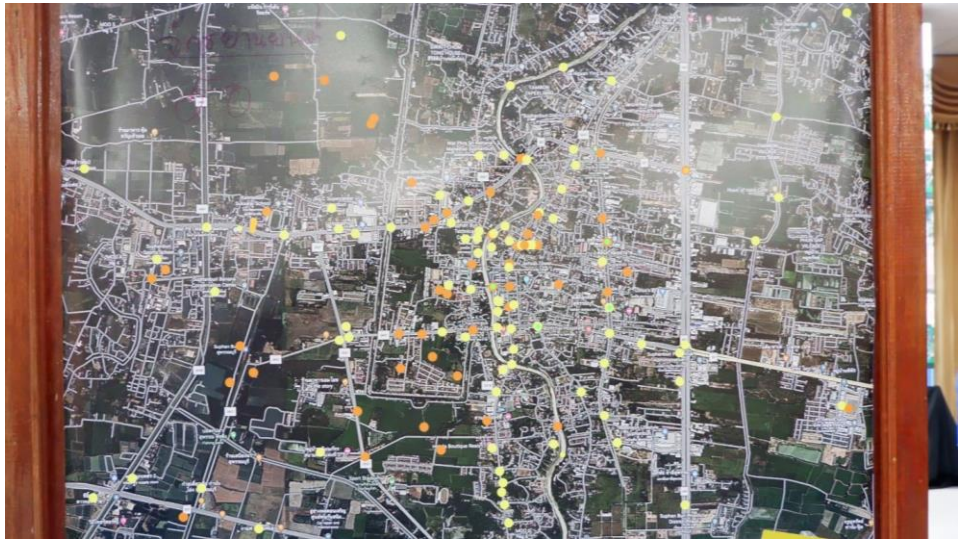
# PRELIMINARY RESULTS OF LEARNING WORKSHOPS

# 1 Preliminary results of the 1st workshop

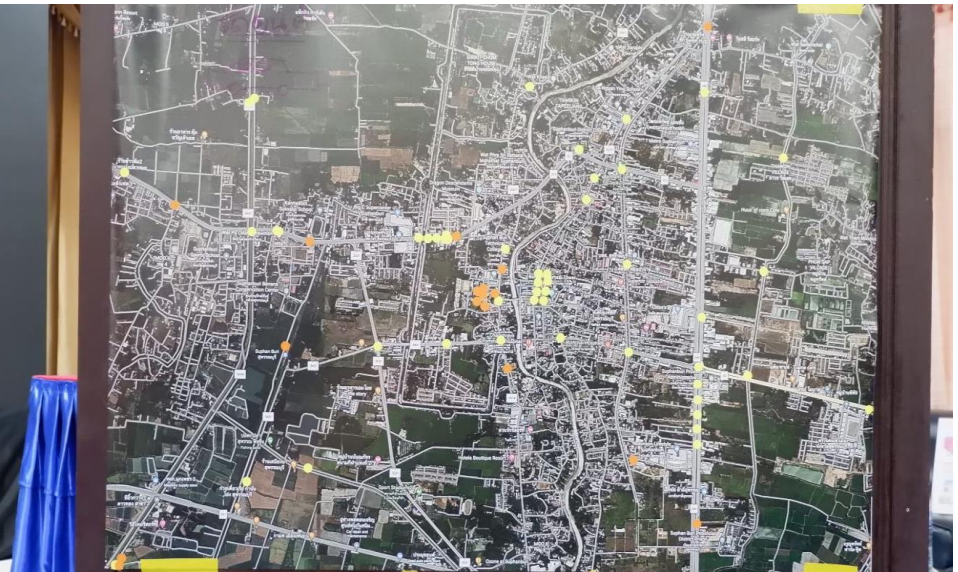
## Hiyari map

### Pedestrians

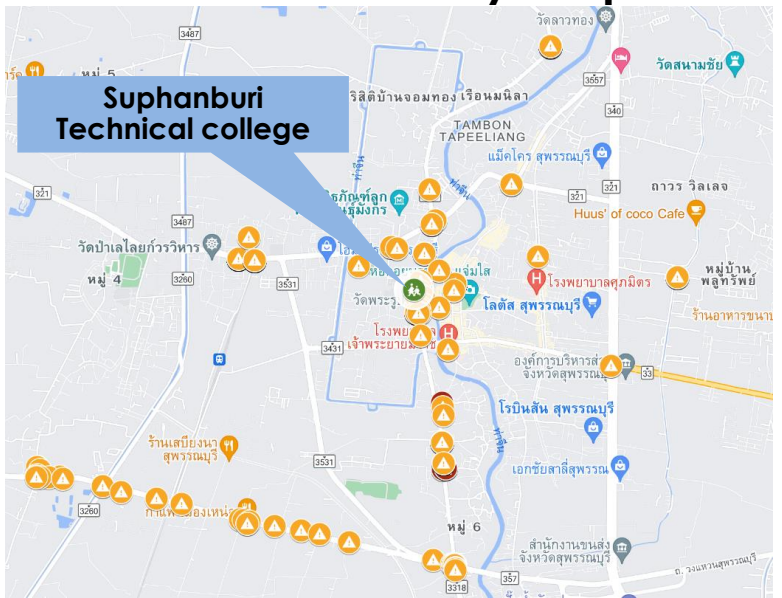
### Motorcycle users



### Car users



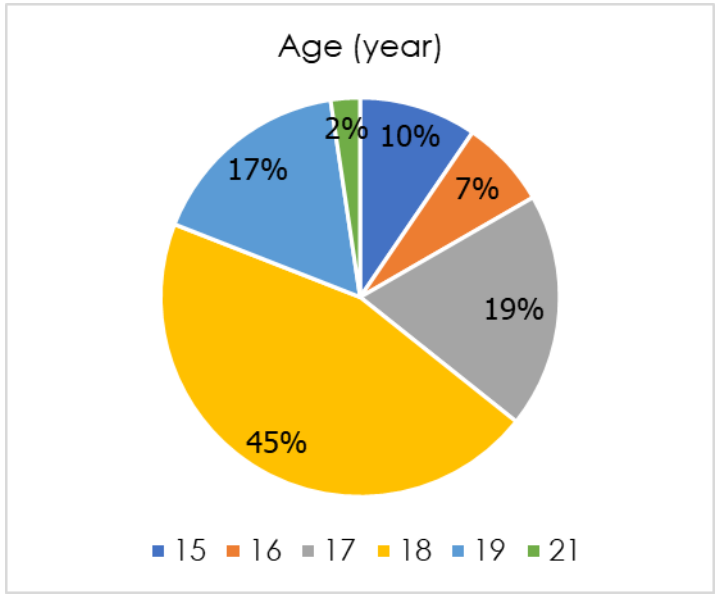
### ATRANS safety map

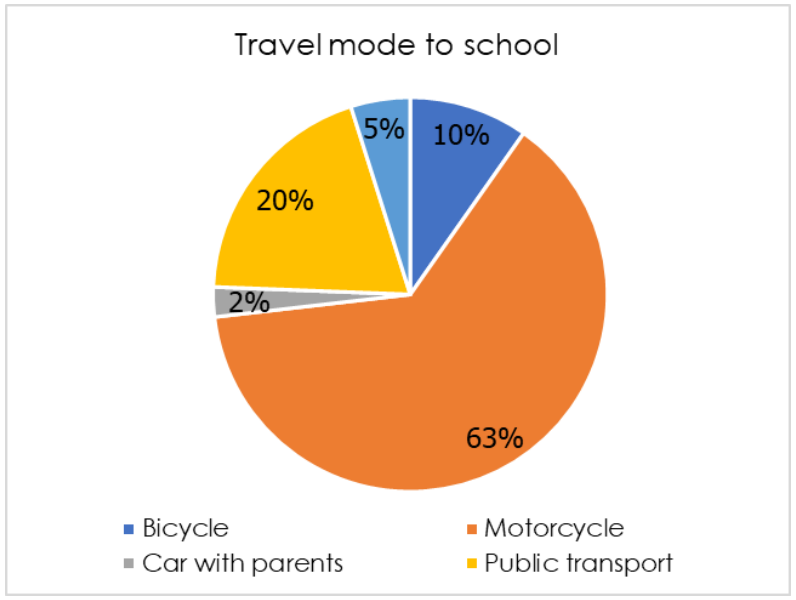


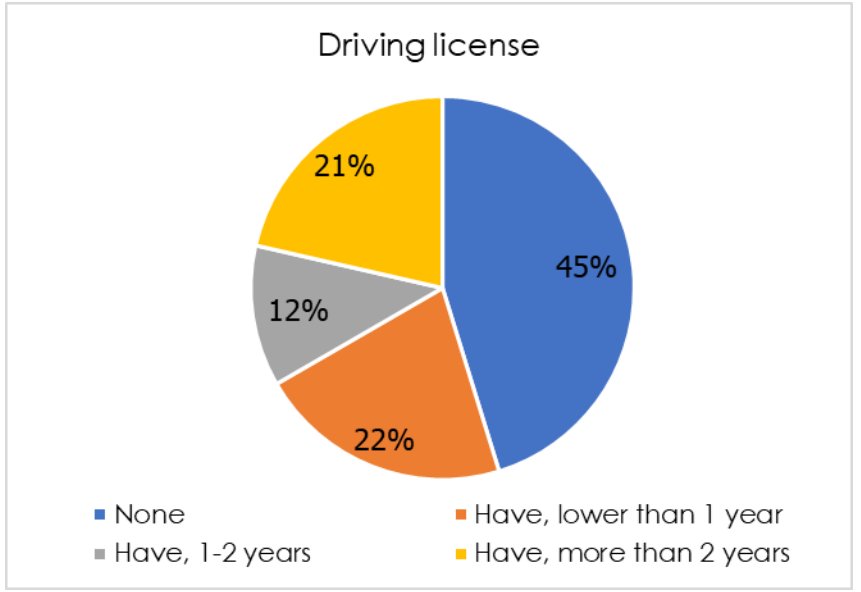

- Hiyari maps are separated in 3 aspects, showing the risk points of accident for pedestrian, motorcycle and car.
- Students could identify the risk points that are likely to be dangerous for three types of users.
- Also, they were able to use the ATRAN safety map for identifying the risk points.

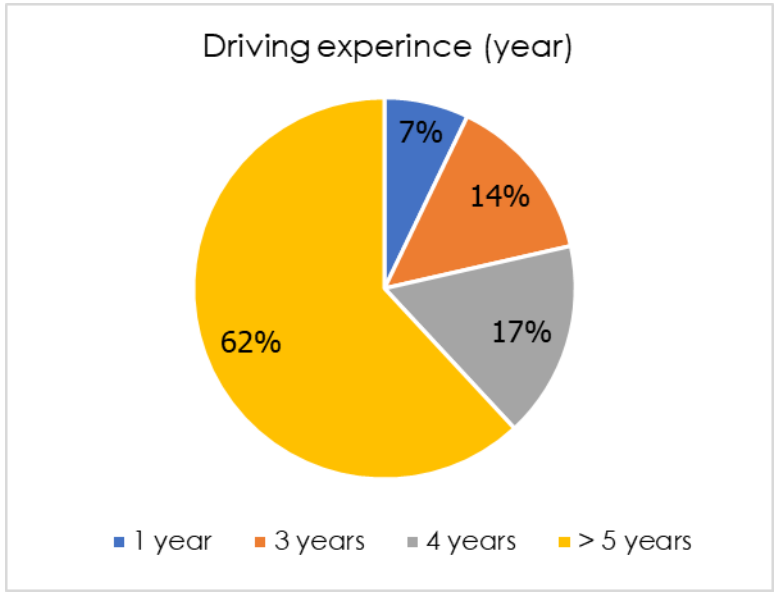
# 1 Preliminary results of the 1st workshop

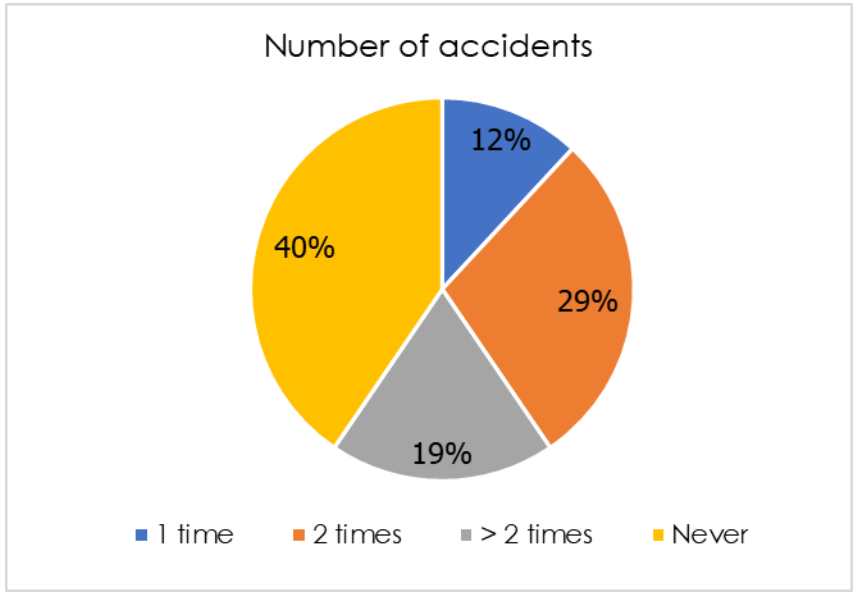
## Descriptive statistic

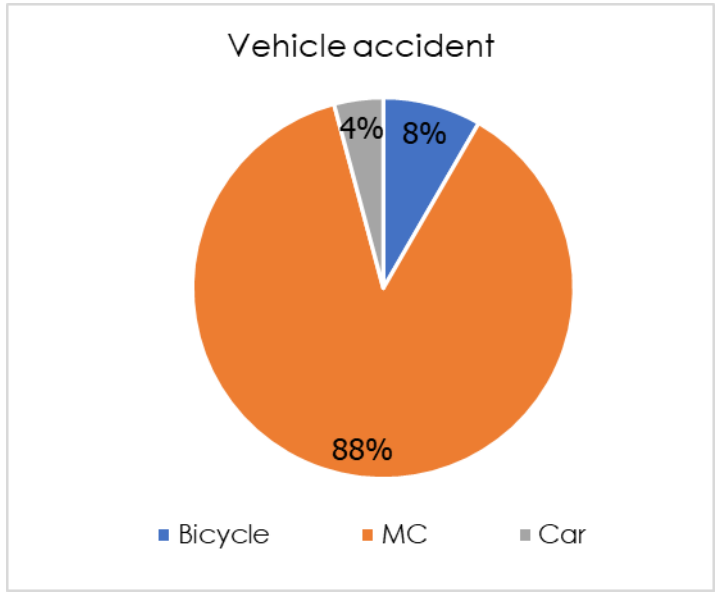


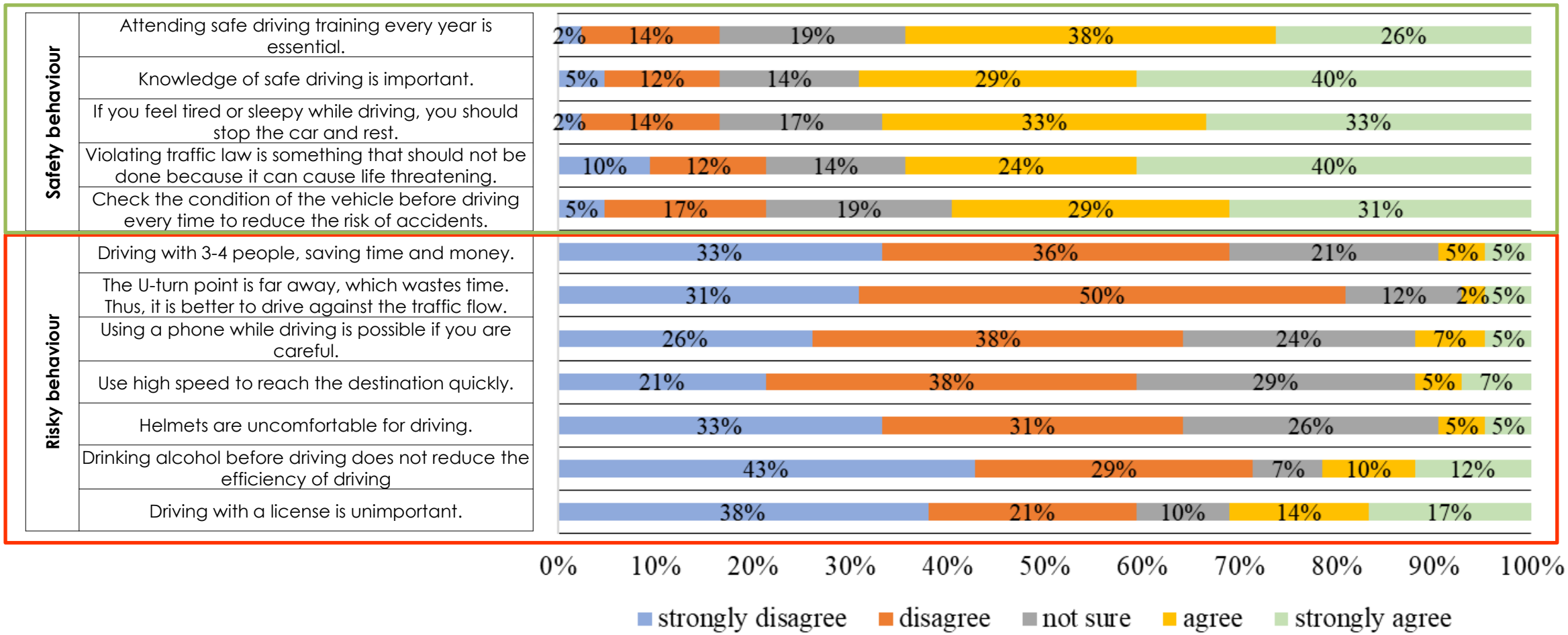



# Preliminary results of the 1st workshop

## Descriptive statistic

## ❑ Attitude of riding motorcycle (Before)

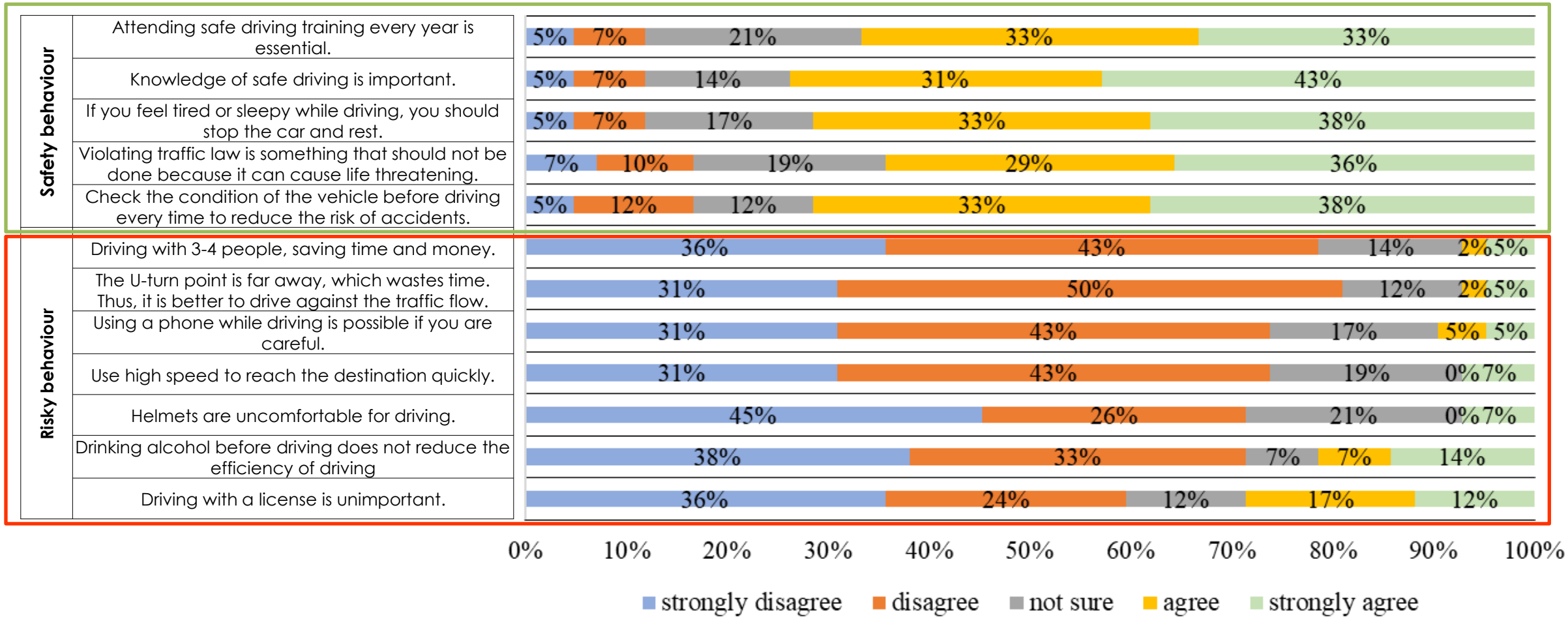



- Before learning, most students disagree with the risky behaviour, whereas agree with the safety behvaiour of driving motorcycle.
- Students were likely to have a good attitude toward a safe motorcycle driving, suggesting that they can recognise the risky and safety driving behaviour.
- **But some are not (≈ 35%)**

# Preliminary results of the 1st workshop

## Descriptive statistic

## ❑ Attitude of riding motorcycle (After)

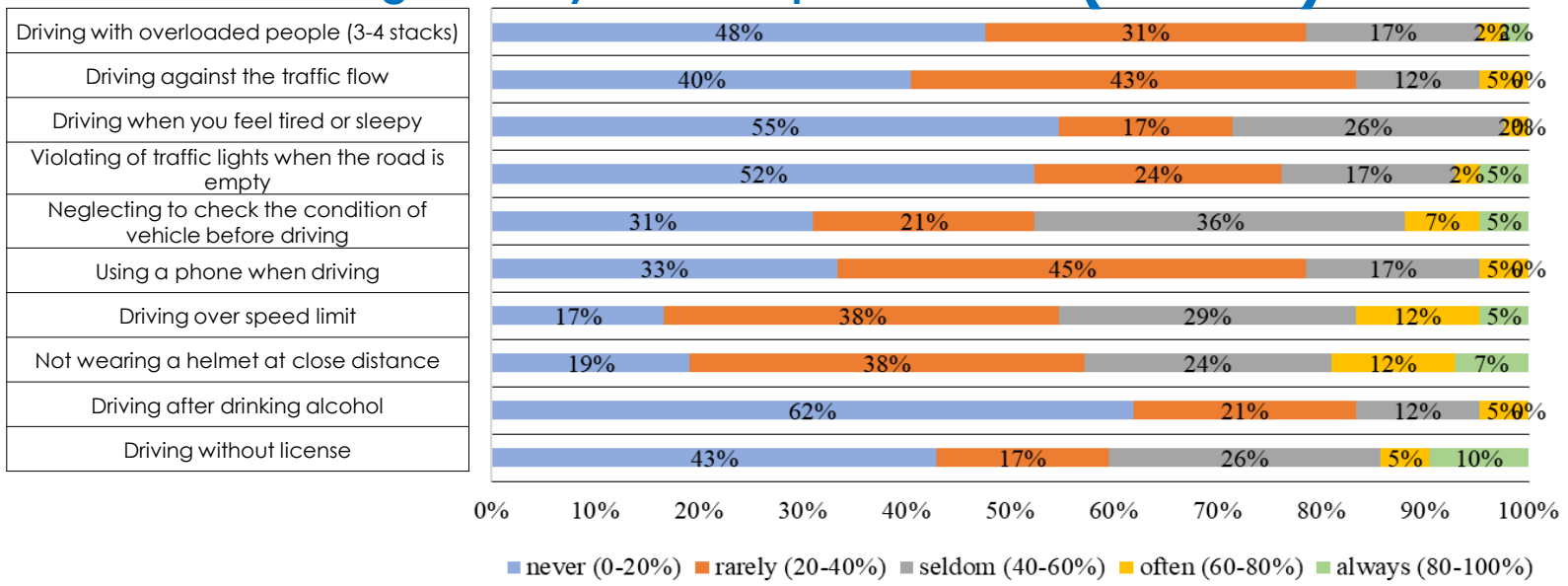



The tendency of students' attitude **seemed to be similar** to that of pre-learning; **however, the percentage who strongly agree with the safety behaviour tended to increase, implying that learning session can reinforce students' attitude toward motorcycle driving.**

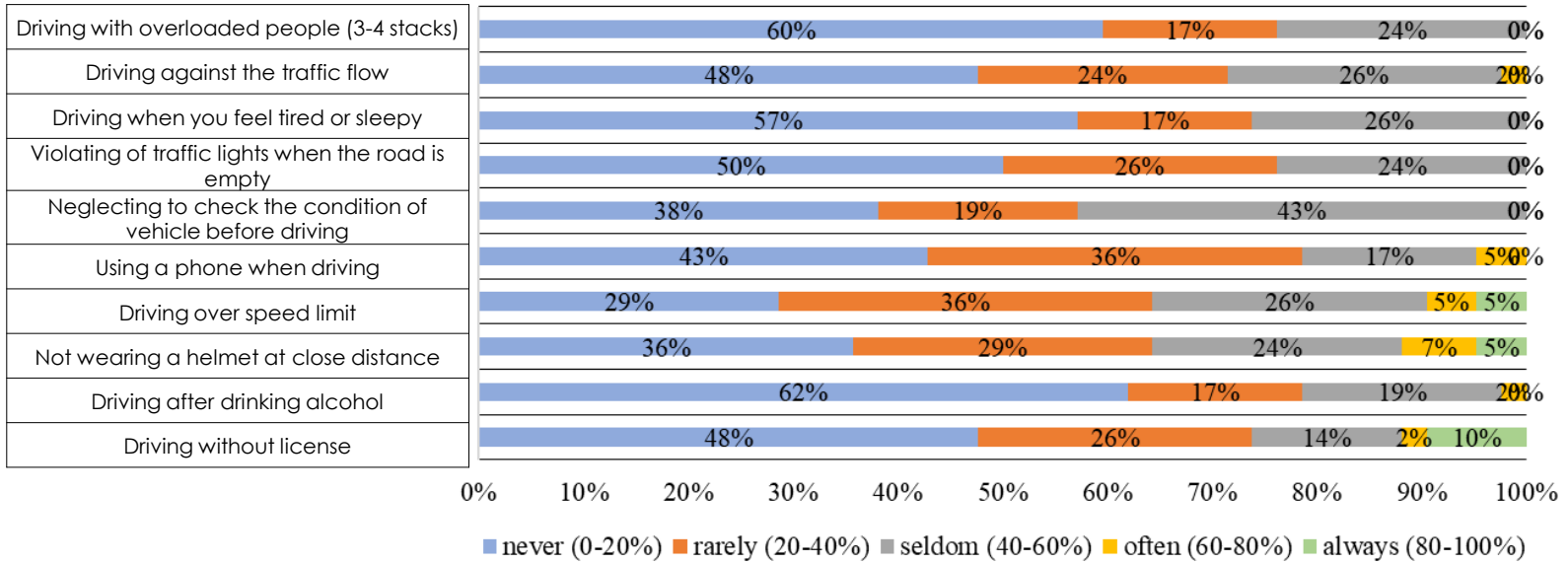
# 1 Preliminary results of the 1st workshop

## Descriptive statistic

### ❑ Behaviour of driving motorcycle in the past 1 month (Before)




### ❑ Behaviour of driving motorcycle that intend to do in the future (After)



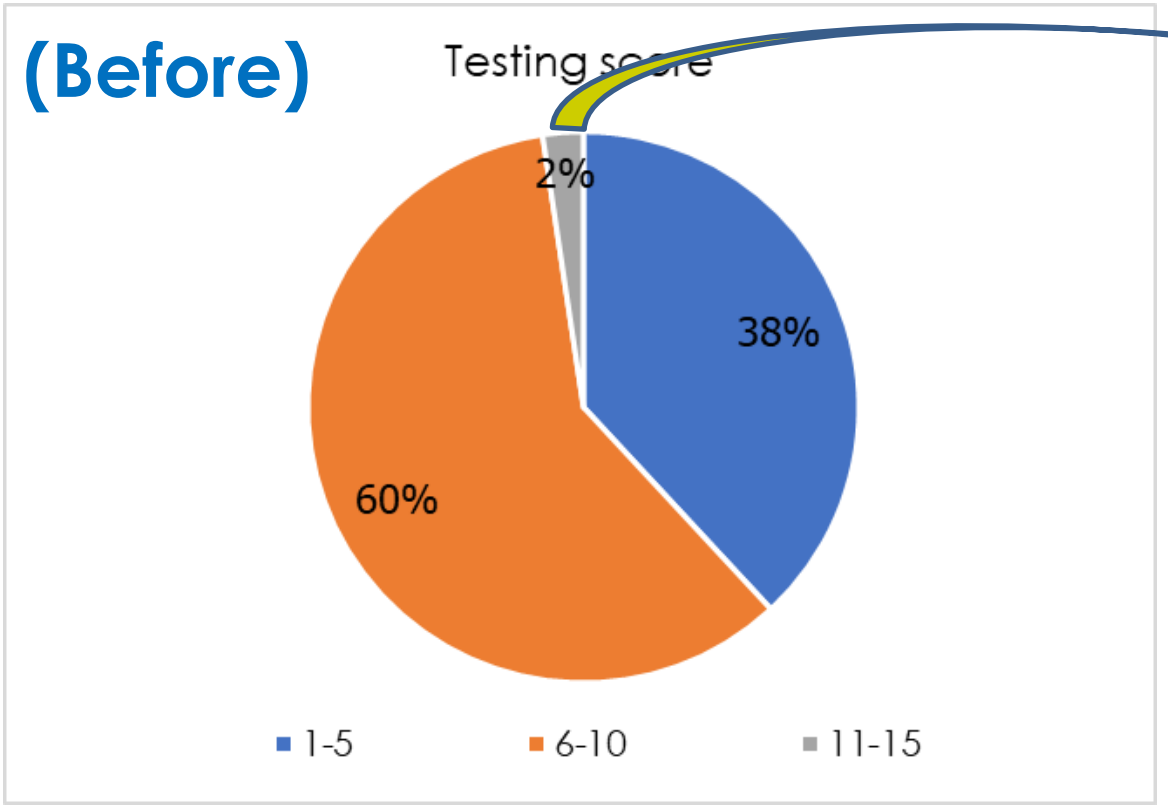

- Before learning session, the risky behavior concerned includes **driving over speed limit, not wearing helmet for a short distance, neglecting to check the condition of vehicle before driving, and using a phone when driving**, respectively.
- Driving without alcohol (never 62%) is the most influencing factors that students never behave.
- Considering after learning session, the tendency of intentional behaviour in the future seemed to be safer than that of pre-learning, in which **proportions of choosing "never" significantly increases on most issues.**
- Thus, **this result supports learning session can encourage students to change their driving behaviour to be safer.**

# 1 Preliminary results of the 1st workshop

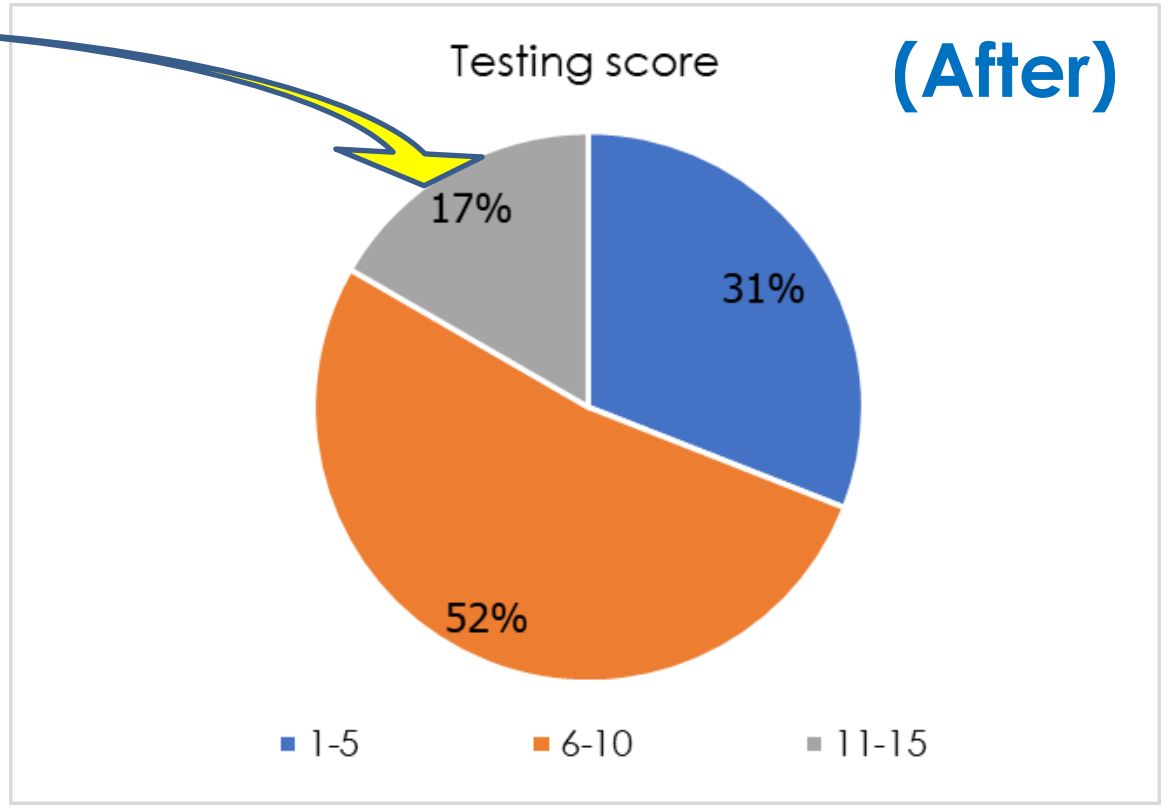
## Descriptive statistic

The pre-and post- test measuring **Knowledge of road safety** (10 points) and **Knowledge of road safety audit** (5 points) were conducted multiple choice via a google form.

**(Before)**



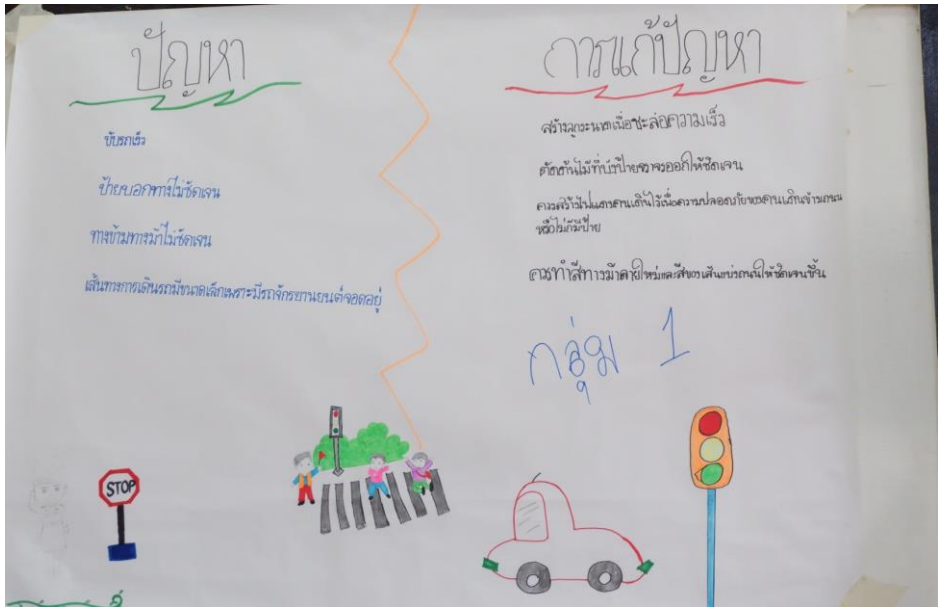

**(After)**



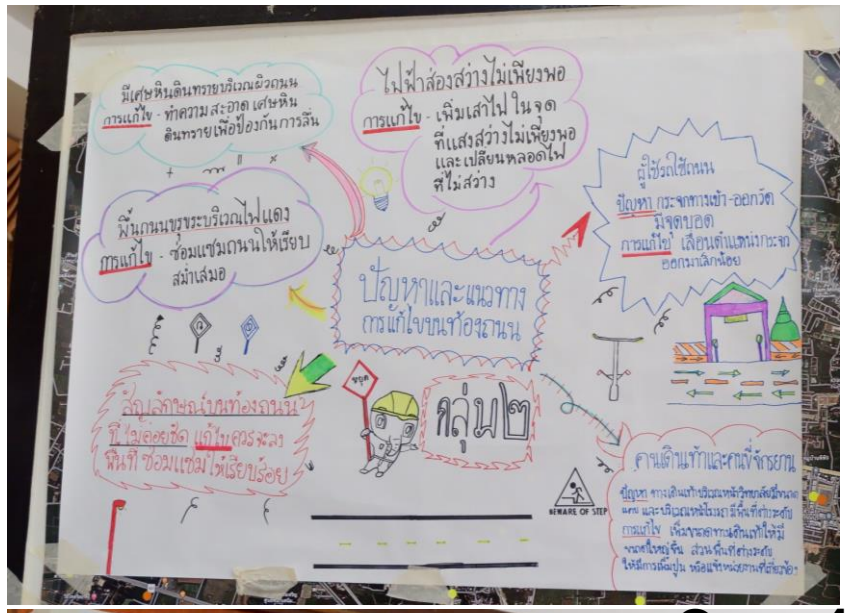

- The results showed the different percentage of knowledge levels between the pre- and post- test. It was clearly seen that students gained much knowledge of road safety and road safety audit from a 15% increase in score of 11-15.

# 2 Preliminary results of the 2nd workshop (5 Aug 22)

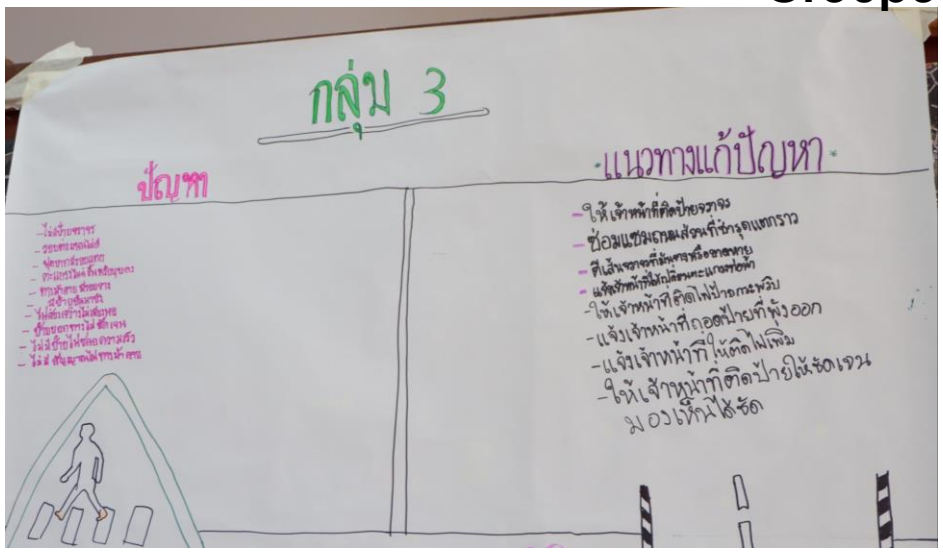
Group1




Group2




Group3




Group4


**Tasks**

- Students participated in group work to reflect on road safety problems and solutions.

- Group 1 and 3: sidewalk and crosswalk in the front of college
- Group 2 and 4: T-Junction

**Results**

- **Group 1** addressed the problems on the speed, traffic sign, traffic marking and roadside obstacles.
- **Group 2** focused on various problems such as roadside obstacles, traffic light, traffic marking and road surface.
- **Group 3** highlighted particularly on the traffic sign and roadside obstacle.
- **Group 4** highlighted various aspects such as roadside obstacle, damaged road surface, traffic sign and signal.

# Further analysis

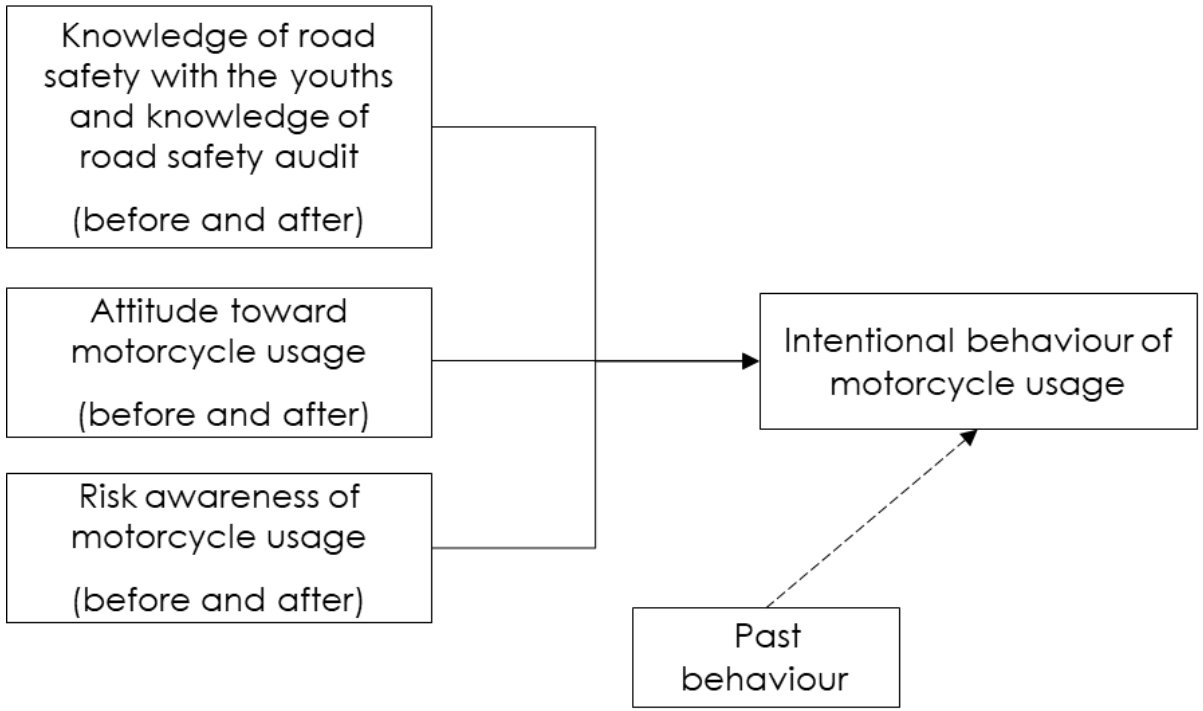
## ❑ Descriptive statistics

The descriptive analysis will be adopted to analyse the data including travel information, knowledge level, attitude, risk awareness and risk behavior of motorcycle usage by finding frequency, percentage, mean, standard deviation, and range.

## ❑ Inferential statistics

The inferential statistic will be used to analyse the relationship between influencing factors. Pearson's correlation coefficient statistic and multiple regression analysis models will be carried out as shown in the conceptual framework of the model.

Ideally, five factors will be used in the model analysis. We expect that level of knowledge, attitude, risk awareness and past behaviour may influence the intentional behaviour of MC usage. The model will be analysed for both before and after learnings as well as the combined data.




**Conceptual framework**

# RESPONSES TO IATSS ADVISORS' COMMENTS

# Prof. Kazuhisa Ogawa

## Comments

- It is important for young people to be “proactively” involved in different safety activities.
- Exchanging opportunities between young people and experts need to be included.

## Responses

- Two workshops were provided for Students
- Discussing risk locations on the way to school
- Experiencing road safety audit
- Discussing solutions with experts

# Dr. Nagahiro Yoshida

## Comments

- I really would like to encourage the research team to work closely with college students in order to understand their actual driving behaviors and their consciousness about the road safety and the safer commuting environments.

## Responses

- Carefully taken into account

# Prof. Yuto Kitamura

## Comments

- This is a very unique study that focuses on the integration of road traffic safety education and engineering design.
- Before conducting this research, please systematically organize engineering design before proceeding.

## Responses

- After the 1st workshop introducing the system approach and road safety audit, it found that students were not ready for engineering design,
- So, the 2nd workshop participated them to practice on road safety audit in the field, and consider safety countermeasures.

# Prof. Akinori Morimoto

## Comments

1. Tell us about sidewalks and road crossing facilities in Thailand.
2. Work on analysing the actual situation of road accidents as described above and then identify specific traffic behaviours that need to be changed.
3. Consider involving local communities to support such activities.

## Responses

1. The sidewalks and road crossing facilities in front of the college is a typical example of problem in Thailand.
2. Done with limit number of samples
3. This is difficult because of most students travelling more than 5 km. to the college by MC from different directions.

A T R A N S

# Thank you for your attention.

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RESEARCH PROJECT FOR FISCAL YEAR OF 2022-2023