



ADVANCING ROAD SAFETY THROUGH TWINNING

PhD SEMINAR SESSIONS

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Evaluating the Effectiveness of an Online Gamified Traffic Safety Education Platform for Adolescent Motorcyclists in Pakistan

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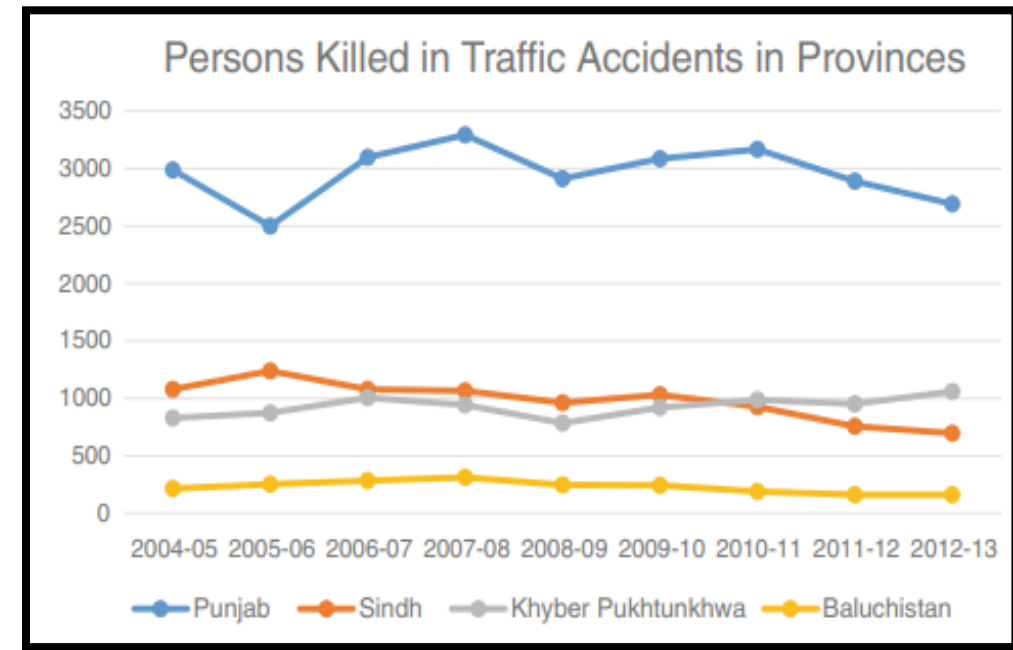
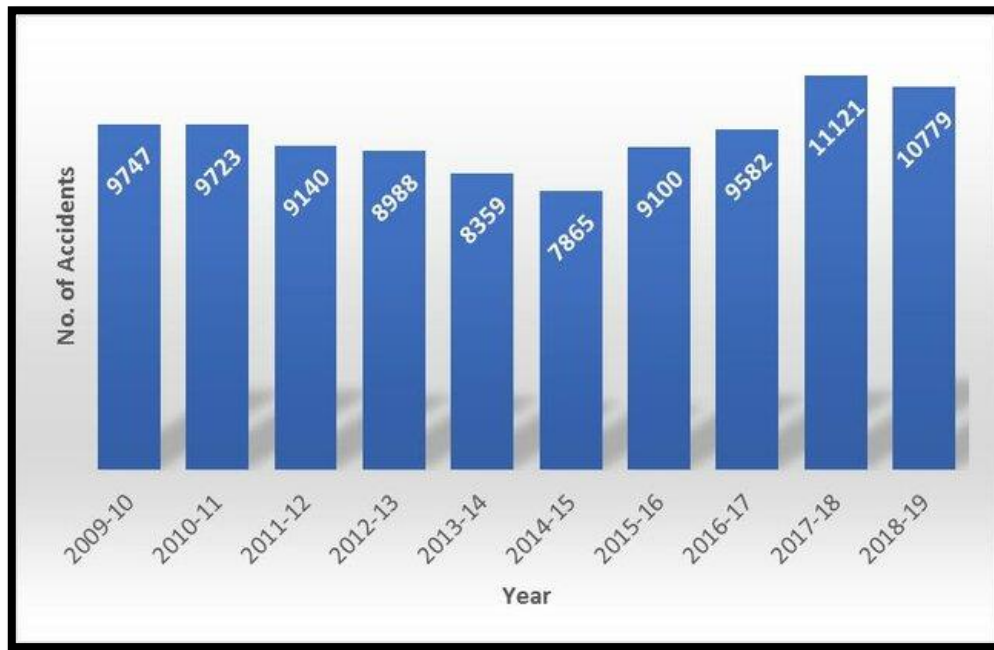
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Content

- Road Safety in Pakistan
- Research Objectives & Questions
- Development of the Online Platform
- Sample & Analysis
- Traffic Behavior & Knowledge

- Module Scores & Time Investment
- Key Findings
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- Conclusions





- Death rate from traffic accidents 17.12 per 100,000 population
- 95th globally in terms of road traffic accidents
- inadequate infrastructure, limited safety awareness programs, and weak law enforcement

- Punjab consistently reported the highest number of traffic accident fatalities
- Larger population and higher traffic density
- Lahore recorded over 100,000 traffic accidents in 2023, with approximately 61% involving motorcyclists



Road Safety in Pakistan

- Motorcycles make up about 74% of all registered vehicles in Pakistan
- Major injuries occur to a person between 16-45 years of age. (Ghaffar et al., 2004)
- A study was conducted in Pakistan about teaching children road safety through storybooks. (Ahmad et al., 2018)
- Students between 13 and 17 years old are more exposed to traffic injuries while riding a motorbike



Objectives & Research Questions

- What are the participants' scores and time investment across the different modules of the platform?
- To what extent do participants' knowledge, situation awareness, risk detection, and risk management skills differ at the pre-measurement stage?
- What improvements in knowledge, situation awareness, risk detection, and risk management are observed after using the platform?
- What are participants' opinions about the usability and effectiveness of the platform?

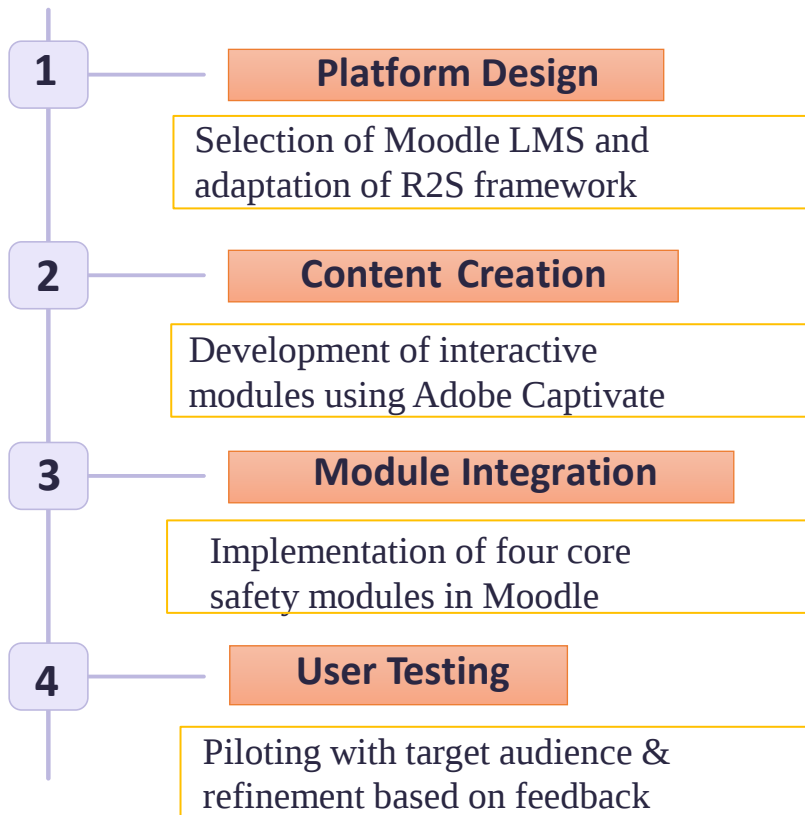


Development of an Online Platform

- 1 Traffic Knowledge**
Traffic laws and regulations.
- 2 Situation Awareness**
Recognizing traffic situations.
- 3 Risk Detection**
Identifying potential hazards.
- 4 Risk Management**
Responding to hazards safely.



Development of Online Platform



Interactive Content



Traffic Scenarios

Real-world situations.



Quizzes

Test knowledge and skills.



Adobe Captivate

Interactive development.



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Knowledge Module

2) What do you think when you see this sign?

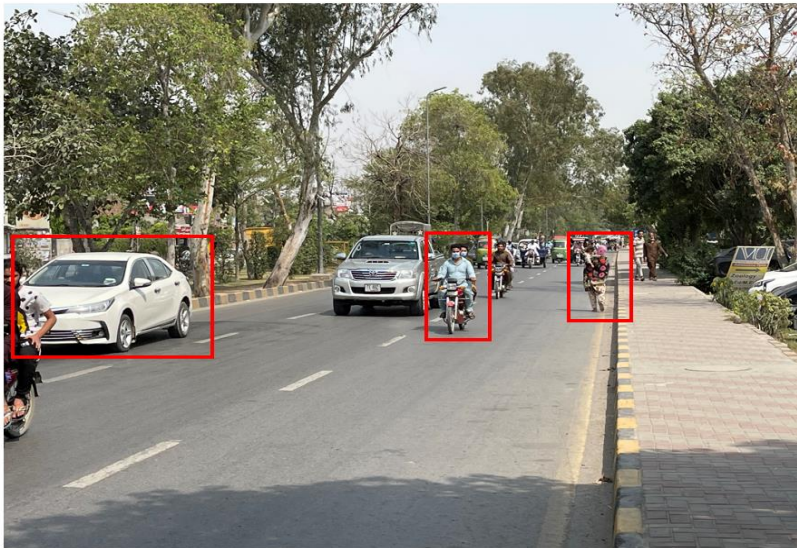


- The vehicle can drive above 60 km/h
- **The vehicle speed should be maximum 60 km/h**
- The vehicle can drive at any speed

This sign shows the maximum allowable speed that vehicles may travel on that specific section of roadway. Here it is showing 60 km/h which means that a vehicle can travel at maximum 60 km/h on this specific road.

Risk Detection

3) What thing you pay attention while moving on the road



Risk Management



2. You want to go straight on the road, What will you do best?



- ☐ Go straight when the traffic signal is red.
- ☐ Go straight when the traffic signal is yellow
- ☐ Go straight when the traffic signal is yellow



Situation Awareness



1. What you see while driving Motorbike? (multiple answers possible)

- ☐ Car
- ☐ Truck/Van/Rickshaw
- ☐ Motorcycle
- ☐ Pedestrian
- ☐ Traffic sign
- ☐ Traffic light
- ☐ Zebra crossing
- ☐ Street lights



Questionnaires

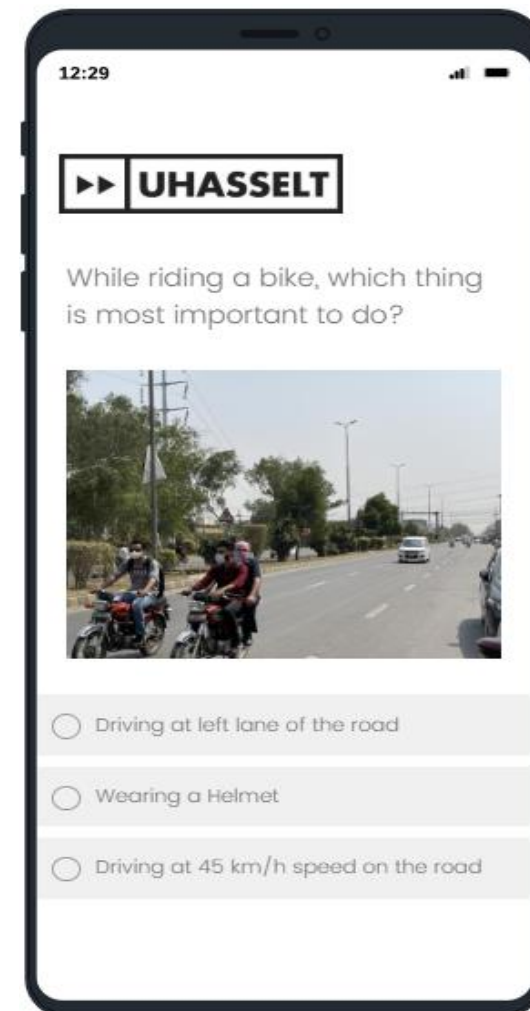
Pre-Measurement

Demographic,
Module questions,
Within platform questions
Outside Platform questions

Post-Measurement

Demographic,
Module questions,
Within platform questions
Outside Platform questions
Platform Feedback (for EG)

Qualtrics used for making a questionnaire.



Sample and Analysis



Participants

- Male Adolescents
- 14-18 years old L



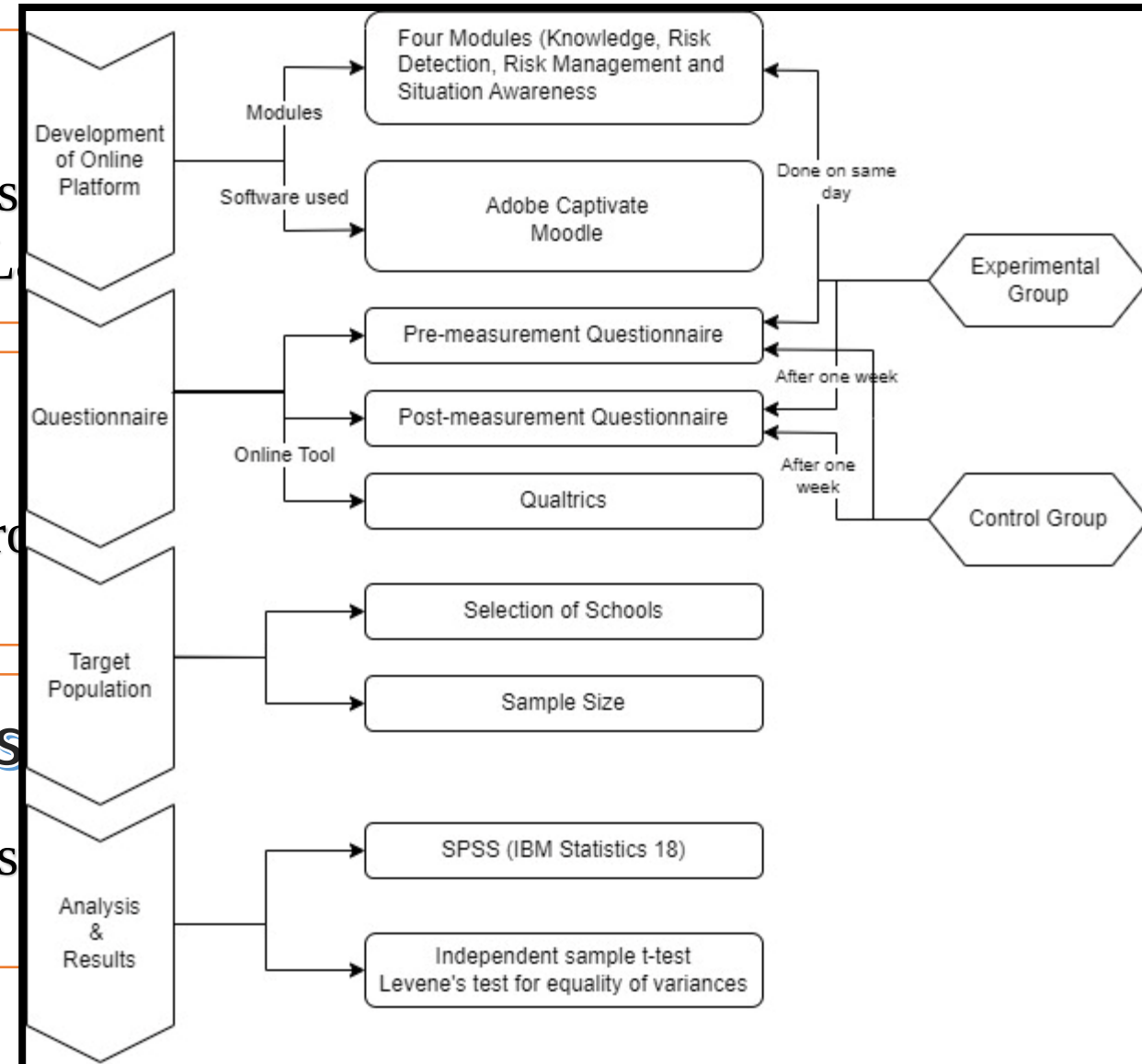
Two Schools

- Experimental Group
- Control Group



Data Analysis

- Independent t-test
- SPSS Software



Demographic Data

1 Platform Registration

69 registered, 35 started,
49.28% drop-out.

2 Completion Rate

26 completed platform,
74.29% response.

3 Questionnaire Response

EG: 69 pre, 39 post.

CG: 29 pre, 12 post.

Group	Grade	Number of Pre-Measurements Questionnaires (%)	Number of Post-Measurement Questionnaires (%)
EG	9th grade	18 (26.09)	18 (46.15)
	10th grade	51 (73.91)	21 (53.85)
	Total	69 (100)	39 (100)
CG	9th grade	10 (34.48)	4 (33.33)
	10th grade	19 (65.52)	8 (66.67)
	Total	29 (100)	12 (100)



Traffic Behavior & Knowledge

Primary Transport

76% use motorbikes.

Driving License

89% lack a license.

Traffic Incidents

63% involved in fines/accidents.

Traffic Knowledge Self Assessment

Self-Perception

Most rate knowledge/skills "Good".

Contradiction

High violations contradict self-assessment.

Deficiencies

Some recognize knowledge/skill gaps.

Module Scores

1

Risk Management

Highest average score.

2

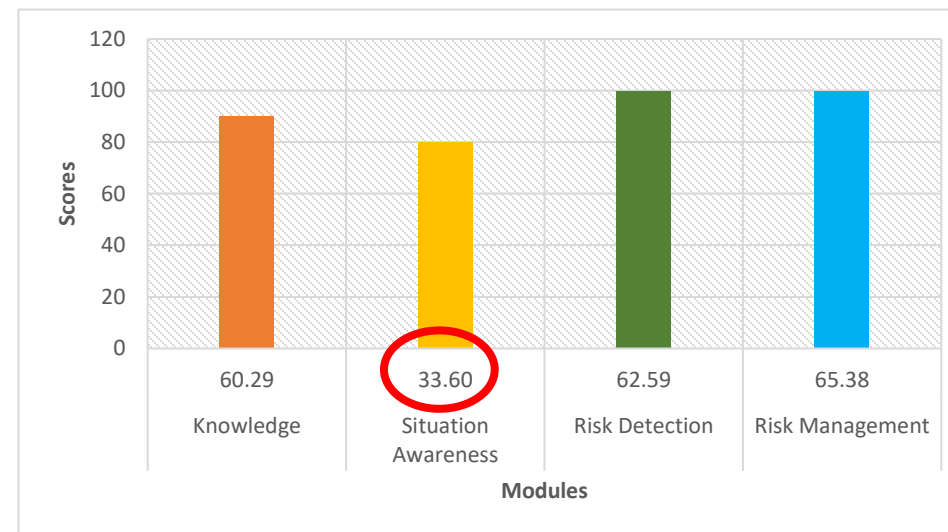
Situation Awareness

Lowest average score, high variability.

3

Overall

Mixed performance across modules.



Modules	Mean	N	Std. Deviation	Minimum	Maximum
Knowledge	60.29	35	15.80	10	90
Situation Awareness	33.60	25	27.21	0	80
Risk Detection	62.59	27	26.68	10	100
Risk Management	65.38	26	24.53	0	100
Total	56.43	115	26.02	0	100



Time Investment per Module



Knowledge & Risk Management

15s & 13s per question.



Risk Detection

25s per question.



Situation Awareness

98s per question.

Pre-measurement Stage

No Significant Difference

CG and EG at the same level regarding traffic safety knowledge.

Room for Improvement

Potential of online traffic safety education for adolescents.

Within platform questions

Module	Groups	Question 1		Question 2	
		F (p-value)	Mean (SD)	F (p-value)	Mean (SD)
Knowledge	CG	0.02 (0.87)	1.29 (0.46)	1.57 (0.21)	1.14 (0.36)
	EG		1.30 (0.46)		1.10 (0.30)
Risk Detection	CG	1.42 (0.23)	1.55 (0.50)	0.07 (0.78)	1.40 (0.50)
	EG		1.63 (0.48)		1.60 (4.49)
Situation Awareness	CG	0.76 (0.38)	1.72 (0.45)	0.73 (0.39)	1.58 (0.50)
	EG		1.68 (0.46)		1.63 (0.48)
Risk Management	CG	0.01 (0.93)	1.44 (0.50)	3.33 (0.07)	1.25 (0.44)
	EG		1.44 (0.50)		1.34 (0.47)

Outside platform questions

Module	Groups	Question 3		Question 4	
		F (p-value)	Mean (SD)	F (p-value)	Mean (SD)
Knowledge	CG	0.15 (0.69)	1.68 (.47)	0.41 (0.52)	1.48 (0.50)
	EG		1.71 (0.45)		1.56 (0.49)
Risk Detection	CG	6.75 (0.01)	1.33 (0.48)	0.06 (0.79)	1.51 (0.50)
	EG		1.46 (0.50)		1.53 (0.50)
Situation Awareness	CG	3.83 (0.05)	1.75 (0.43)	0.15 (0.69)	1.58 (0.50)
	EG		1.66 (0.47)		1.56 (0.49)
Risk Management	CG	0.33 (0.56)	1.27 (0.45)	0.34 (0.55)	1.27 (0.45)
	EG		1.30 (0.46)		1.24 (0.43)



Post-Measurement Stage

1

EG Performed Better

Knowledge, risk detection, and risk management modules.

2

Detailed Feedback

Helped EG understand situations and enhance skills.

3

Similar Performance

No significant difference in situation awareness.



Platform Usability & Effectiveness

Satisfaction

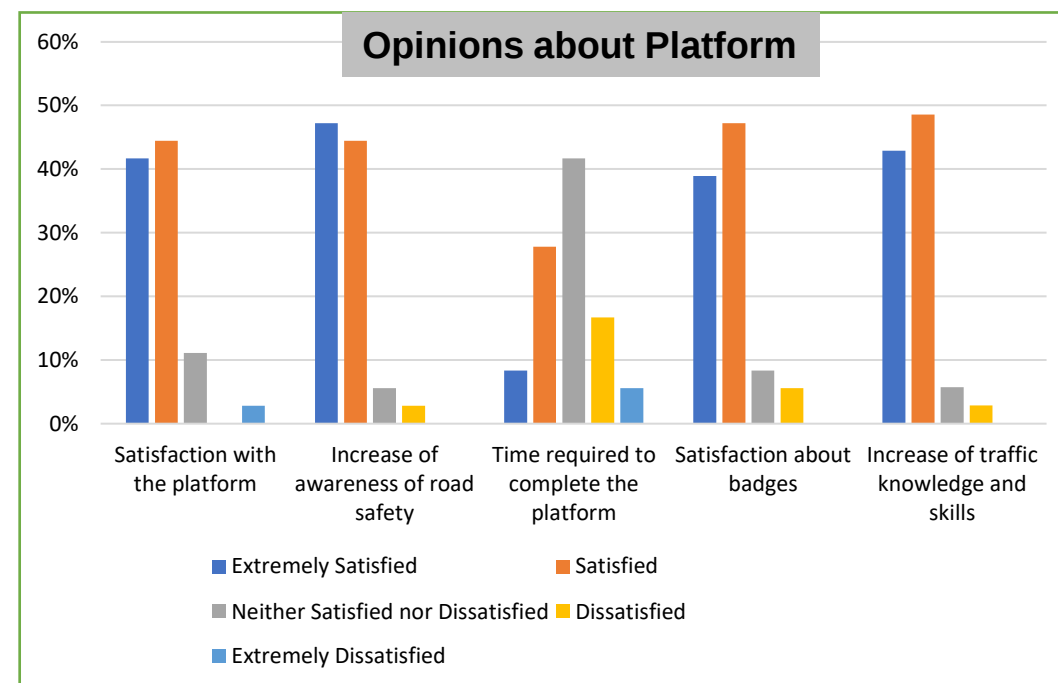
Adolescents satisfied with platform.

Increased Awareness

Helped increase traffic knowledge.

Suggestions

Include videos, make it shorter.



Limitations

1

Linking Issues

Difficult to link platform users with questionnaire respondents.

2

Study Period

End of academic year, fewer adolescents available.

3

COVID-19 Restrictions

Home use limited questions and decreased response rate.

Further Research



More Adolescents

Involve more participants from different cities.



Stakeholder Opinions

Investigate parents' and teachers' perspectives.



Long-Term Testing

Assess retention and behavior changes over time.

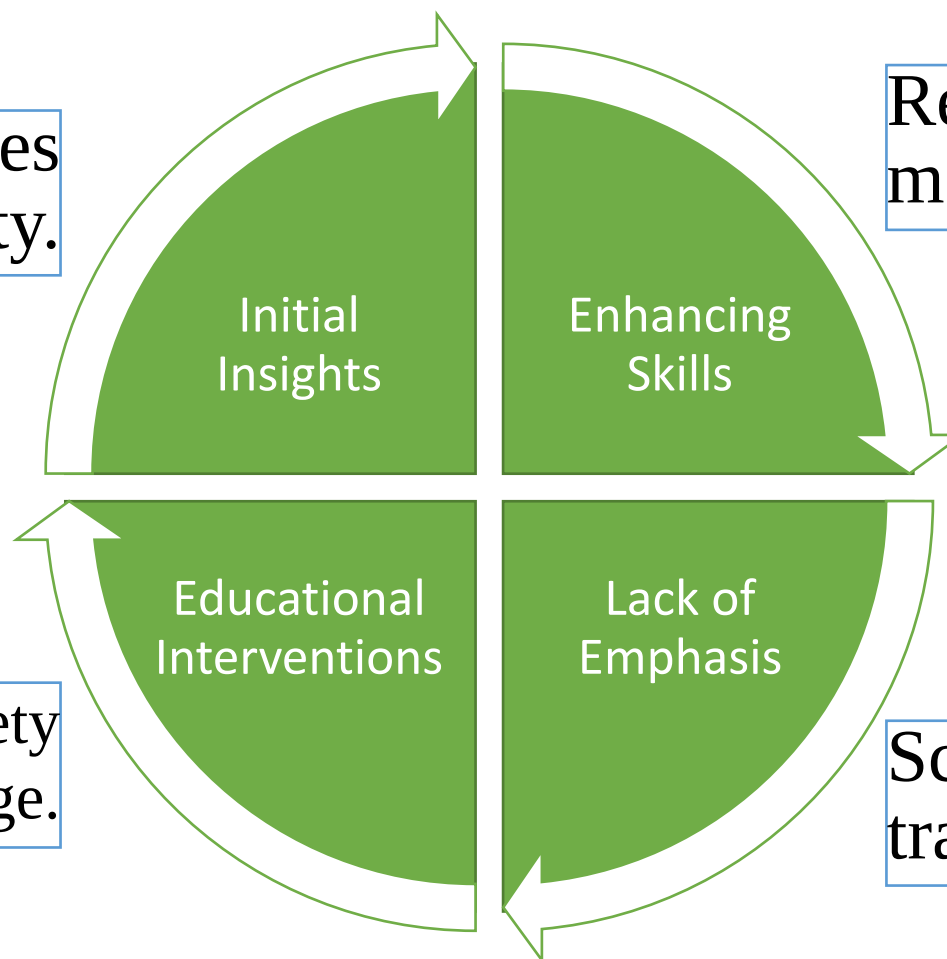


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Conclusions

Online platform teaches traffic safety.

Real-life scenarios motivate engagement.



Increase traffic safety knowledge.

School system needs traffic safety.





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