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A Five-Year Evaluation of Safety and Traffic Course by Students and Lecturers Using the CIPP Evaluation Model

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Abstract

This study evaluated a traffic safety course to inform further implementation of the course in all Iranian universities. The current study used the CIPP evaluation model and included questionnaires and interviews to evaluate the one-credit course by students and lecturers at 15 universities from 2016 to 2020. The study population included 25 traffic safety lecturers and 2,066 university students who had completed the course. The evaluation showed that the highest mean (SD) score of students' satisfaction was about Product domain with 66.16 (24.60) and the lowest score was for Context domain with 58.65 (32.53). While the highest and lowest scores by lecturers were for Input and Process dimensions. According to the students and lecturers, the traffic safety course was identified as efficient. The findings indicate that inclusion of the traffic safety course as a general academic course may promote traffic knowledge among families and society and contribute to traffic safety and a decrease in road traffic crashes.

Key Findings

- The course of traffic safety was evaluated as Good by the lecturers and students and reported high levels of knowledge among the students.
- The inclusion of a general traffic safety course at universities could be an effective way to develop and promote traffic knowledge in families and society.
- Promoting public knowledge can lead to increased public demand from action to improve traffic safety and reduce crashes on the road.

Introduction

Road traffic crashes (RTC) is one of the main social and health challenges with annually 20 to 50 million injuries and 1.19 million deaths worldwide (WHO, 2023). Low- and middle-income countries account from 90 percent of the mortality rate (Ul Baset et al., 2017; Zafar et al., 2018). In Iran, two major crash contributing factors have been identified, a lack of education and lack of opportunity to develop traffic knowledge, and this led to government investment in training courses as part of a crash prevention approach to

improve road safety outcomes (Ainy et al., 2010; Bakhtari Aghdam et al., 2020).

Road safety educational interventions are the most frequently used approach to change young drivers' driving behaviours and encourage road safety attitudes (Cutello et al., 2020). Training interventions have been shown to reduce young drivers' crash involvement rates by 9 percent (Phillips et al., 2011). In some universities around the world, traffic safety is taught as an academic major or an educational course. For instance, majors are available in university degrees including environment and traffic safety in Sweden (University of Linköping), traffic safety in the

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United States of America (Minnesota University), road safety major in the United Kingdom (Newcastle University) and a Ph.D. of road traffic injuries and safety in Sweden (Karolinska University) (Arasteh et al., 2011; Peden, 2010).

Achieving high quality in educational programs needs constant evaluation and improvement (Neyazi et al., 2016). Gaining feedback could propel an educational program from passivism to dynamism (Lippe & Carter, 2018; Neyazi et al., 2016). Several models have been presented for educational evaluation (Mazloomi Mahmoudabad & Moradi, 2018). Heidari et al (2021) identified that the people involved in an educational program and the students are best suited to evaluate and scrutinise an educational program.

The CIPP evaluation model is considered one of the most comprehensive evaluation methods for educational programs and has a significant role in the identification of gaps and promoting educational programs (AbdiShahshahani et al., 2015; Heidari et al., 2021). The CIPP evaluation model encompasses four types of evaluation:

- *Context*: assessing the need, opportunities, and facilities
- *Input*: identifying and assessing the present potentialities, guiding the programs to achieve the goals, and the methods of implementing programs
- *Process*: supervision, documentation and assessment of activities, identification or prediction of executive challenges during the implementation of program, and the level of desirability of executive process
- *Product*: measurement, interpretation and judgment about the outcomes of the program

Although the World Health Organization (WHO) declared traffic safety as the main challenge in Iran imposing numerous problems to the country (Sadeghi-Bazargani et al., 2022), no academic training had been developed and implemented. Therefore, to promote the road safety knowledge, a one-credit course was presented as part of a compulsory pilot course in volunteering universities for five years. At the end of that period, and before it was decided if the course should be expanded to other universities, a CIPP evaluation of the course was required. This paper presents the findings of this evaluation. Specifically, the aim was to: 1) evaluate the one-credit course of traffic safety based on CIPP evaluation model, and; 2) evaluate the effectiveness of the course on increasing students' traffic safety knowledge.

Methods

The current study was conducted in two stages. The first was the development and implementation of one-credit course of traffic safety at volunteering universities. The second was the evaluation of the course by the students and lecturers using the CIPP model.

Course development and implementation

The traffic safety course was developed by a specialised authority for the Iranian government with contributions from

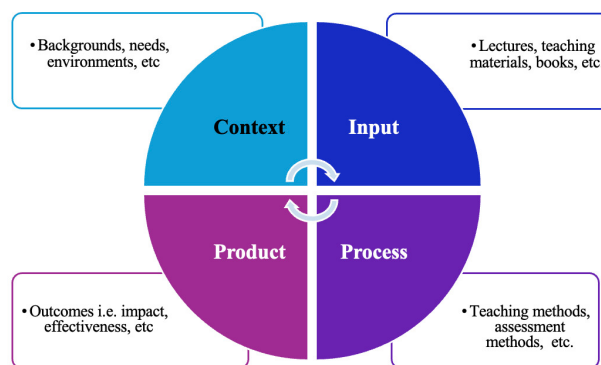


Figure 1. CIPP evaluation model and its components

experts in the field of traffic. Over 30 lecturers contributed to creating a reference textbook, entitled *Safety and Traffic*. In addition to the textbook, electronic content was created that was used to present consistent course content at the universities using Microsoft PowerPoint.

Then, four consecutive Train the Trainer courses were conducted. After successful completion, lecturers were certified to teach the course at their university. The one-credit, compulsory course was taught as a pilot at 15 volunteering universities of medical sciences for five years from 2016 to 2020.

Course evaluation using the CIPP evaluation model

Participants

Participants were recruited using convenience sampling. For the students, the inclusion criteria were their enrolment and study in one of the participating universities and completion and passing of the traffic safety course. Students who did not complete the course or provided incomplete responses in the evaluation were excluded from the study. The inclusion criteria for lecturers were that they had completed the Train the Trainer course and had taught the traffic training course to students.

Conceptual model and study instrument

To evaluate the traffic safety course, the current study utilised CIPP evaluation model (Figure 1). Four parts including *context*, *input*, *process*, and *product* of the course were separately evaluated utilising a researcher-designed questionnaire.

For data collection, a questionnaire with 15 questions was applied which covered:

- Prioritisation of safety
- The quality of the course
- Timing of course in the degree and position during study time
- Online teaching aspects

Based on CIPP model, nine questions addressed the Context, Input, Process, and Product. This varied in the questions asked of lecturers and students.

CIPP questions for Students

- Context: the necessity of including the course in curriculum
- Input: the necessity of learning educational content; motivation for more learning about traffic; the necessity of presenting the course as a general course
- Process: general satisfaction about the teaching method
- Product: the application of the course in daily life; the effect of course on social life; the effect of teaching the course on traffic behaviour; the effect of expecting the authorities to demand citizenship rights

CIPP questions for Lecturers

- Context: the necessity of placing the course in curriculum
- Input: the necessity of implementing the course as a general course; the appropriateness of the context of the course; utilising lecturers with different specialties
- Context: classic implementation; evaluating the students in combinative form (multiple choice/explanatory)
- Product: the application of the course content in daily life; the effect of the course on students' social behaviour; the effect of the course on the safety promotion of the students

The content validity of students' questionnaire was 0.84, the content validity ratio was 0.78, and the reliability with intra-class correlation coefficient was 0.81. The content validity of lecturers' questionnaire was 0.86, the content validity ratio was 0.84, and the reliability of the questionnaire with intra-class correlation coefficient was 0.79.

Statistical methods

The quantitative data and descriptive methods (frequency and percentage for qualitative variables and core indices and statistical dispersion for quantitative data) were analysed using Stata software (version 14). For the analysis of qualitative data, gained from open-ended questions, purposive and qualitative content analysis were used.

Results

The traffic safety course was delivered in 15 universities and evaluated by 2,066 students and 25 lecturers.

Evaluation of one-credit course of traffic safety: students

Table 1 shows the distribution of the student participants across the universities. Most of the students were from Sabzevar University of Medical Sciences (36.93%) and Tabriz University of Medical Sciences (32.28%). The majority of students that the course must be taught in Bachelor of Science studies (83.4%) and administered in the first year of academic studies (72.1%).

Table 2 shows the results of the evaluation of the students' comments based on CIPP evaluation model in a form

of single item. The results indicated that most students rate the items as average or above (Figure 2).

The mean (SD) scores of students' satisfaction from traffic safety course based on CIPP model was 62.76 (24.91). The highest score was for product domain 66.16 (24.60) and the lowest score was for context domain with 58.65 (32.53). Table 3 shows the categorised satisfaction of students. According to the results, nearly 90 percent of the student participants reported average and upper-average satisfaction of the course. The highest satisfaction was for context domain (23.45%) and the lowest satisfaction was for product domain (8.37%). The most interested and prioritised subjects identified in the student interviews were: cycling, first aid, eco-driving, and vehicle safety. Suggestions from the students on ways to improve the quality of the course included: practical teaching of some subjects, use of educational videos, continuation of teaching, increasing the number of educational portions and hours.

Evaluation of safety and traffic course: lecturers

To evaluate safety and traffic course based on lecturers' point of view, interviews were conducted with 25 lecturers from different majors. The highest distribution of lecturers was from health education and promotion majors (20%) and professional health engineering (20%). In terms of teaching method, 68 percent of lecturers reported that a combined teaching format (online and physical) would be better. Nearly half of the lecturers (40%) agreed that the course should be presented in all degrees and in initial semesters.

Table 4 shows the lecturers' attitudes about traffic safety course based on CIPP evaluation model. Lecturers' attitudes towards the course were positive with the majority agreeing to the necessity of the course (Input: 92%) and that the course must be included in curriculum (Context: 88%). In input domain, most lecturers agreed that lecturers with different specialties must be utilised to teach the course (72%). While almost two thirds (62%) agreed that the course should be taught in classical form of teaching.

The interviews yielded important points from both students and lecturers. For instance, about the necessity of this course as it presented new information:

"... this course is very essential because it is a new topic and it has not been mentioned anywhere else before, not even in the media and advertisements. But it is better to start from the first years of university as a continuous course..."

Lecturer

"... It is necessary to present this course because I personally was not so familiar with the safety and dangers that we always face, and this knowledge helps us a lot. I know that it is very important to start this discussion even from high school..."

Lecturer

One student noted the effectiveness of this course was likely to be much more widespread than just the students in the classroom:

Table 1. Distribution of student participants by university

University Name	Study Participants	
	Number	Percentage
Sabzevar	763	36.9
Tabriz	667	32.3
Tehran	187	9.1
Maragheh	119	5.8
Dezful	91	4.4
Neishabur	85	4.1
Other	154	7.5
Total	2,066	100

“... If the students receive training, they can transfer it to their family. This course is very effective in increasing safety...”

Student

Based on the interviews with lecturers about traffic safety course, the subjects such as safety and prevention promotion, pedestrian's safety, and motorcycle drivers' safety had the highest priority. The lowest priorities were for traffic rules, special subjects in traffic, and mental and physical health in traffic safety. [Figure 3](#) shows the references suggested by the lecturers to promote the quality of the course.

Discussion

This study reports on the evaluation of a one-credit course of traffic safety based on CIPP model by students and lecturers. Findings show that there are differences in the attitudes of students and lecturers, particularly regarding context and input domains. The highest mean scores from students were in the product and input domains and the lowest was for process and context domains. While the highest mean score of lecturers about the course went to product and context domains, the lowest was to process domain. This finding concurs with previous research by AbdiShahshahani et al. (2015) that reported differences between students' and lecturers' attitudes about the Ph.D. course of fertility health in input, process, and product domains. They found that the highest mean score according to lecturers was for context, as it was in this study and for students, the lowest score was for product and process. In a study by Mazloomi Mahmoudabad and Moradi (2018), the highest mean score of the quality of public health internship according to the students was in context and the lowest was in input domains. No significant difference was noted between lecturers' and students' attitudes regarding CIPP domains.

Total evaluation scores showed that safety and traffic course was good according to students and lecturers. This is also similar to earlier findings including by Heidari et al. (2021) who reported general health internship based on CIIP as good. The findings of Quinchía Ortiz et al. (2015) about English language reading comprehension course, us-

ing CIPP evaluation model in Colombia also showed the quality of the course as good. Moreover, in study by Mohebbi et al. based on CIPP, they showed that medical records education course was acceptable (Mohebbi et al., 2011).

Context evaluation

The majority of students and lecturers reported that given the urgency for improved road safety in Iran, this course is of greater importance than the other general courses and must be included in educational curriculum. Despite high rate of RTC in Iran, training on road safety is scattered and offered through public media with each organisation acting separately. Iranian broadcasting company provides children and adults with training programs but, there is a lack of coherence required for an effective educational program. Further, public training also lacks rigor and is not monitored which does not ensure the student is gaining the appropriate information.

Traditionally, academic training in the field of traffic safety has been neglected. Fortunately in recent years, there is a renewed focus on road safety with a Masters of Science of Health and Traffic established at the Tabriz University of Medical Sciences. Moreover, the one-credit course in traffic safety, as a general course, can be extended to all university students. Another opportunity in tertiary education is a Ph.D. by-education course of transportation safety and health and Ph.D. by-research. The continuation of academic education in traffic safety, by developing traffic safety course as general compulsory course or developing MSc and Ph.D. courses, is one important component in increasing public knowledge to improve road user behaviour and decrease RTC in Iran.

Additionally, implementing this course may lead to increased knowledge among individuals in the community. Consequently, greater awareness can increase people's demand from the responsible authorities to promote the quality of traffic-related settings (Sadeghi-Bazargani et al., 2018). Also, there is a lack of any specific and coherent course regarding traffic for managers. Therefore, managers and policy makers should be considered when providing target groups with trainings. In the AbdiShahshahani et al.

Table 2. The single-Item evaluation of students' comments based on CIPP model

CIPP question		Very low		Low		Average		High		Very high	
		n	%	n	%	n	%	n	%	n	%
Context	Necessity of placing the course in curriculum	286	13.9	199	9.7	544	26.4	578	28.1	453	22.0
Input	Necessity of learning educational content	163	7.9	168	8.1	520	25.2	724	35.1	487	23.6
	Motivation for more learning about traffic	254	12.4	299	14.5	593	28.8	539	26.2	371	18.0
	Necessity of presenting the course as general course	116	5.6	163	7.9	489	23.8	754	36.7	534	26.0
Process	Total satisfaction from teaching method	290	14.3	226	11.1	554	27.3	561	27.6	399	19.7
Product	Application of course in daily life	121	5.9	151	7.3	499	24.3	780	37.9	506	24.6
	The effect of the course on social behaviour	133	6.5	135	6.6	547	26.6	772	37.6	466	22.7
	The effect of the course on traffic behaviour	155	7.6	161	7.9	549	26.8	729	35.6	456	22.2
	The effect of expecting from authorities to demand citizenship rights	205	10.0	186	9.1	572	27.9	629	30.6	461	22.5

study (2015), they pointed to the importance of the context domain in the need of society for fertility health trainings and the need to develop a Ph.D. course. However, in the Derakhshanfar et al. study (2022), the need for working staff in the field of medical education in the country was reported to be a focus of university chancellors and academic staff in evaluating medical education major. The need of society is one of the most important factors in making changes in educational programs. WHO also emphasises fulfilling the needs of society by universities by guiding trainings and studies to answer social demands (Woollard & Boelen, 2012).

Input evaluation

In the Input domain, the majority of students and lecturers emphasised the importance of making traffic safety course a general course because they believed the content was more practical than the other general courses and trained students to promote the traffic safety by transferring their knowledge to their families. Responses also indicated that while other general courses are presented in high school, a traffic safety course is not and this gap can be addressed by including traffic safety courses at universities. At the present time in Iran, general trainings about safety and traffic are at an elementary level. Traffic safety-related training

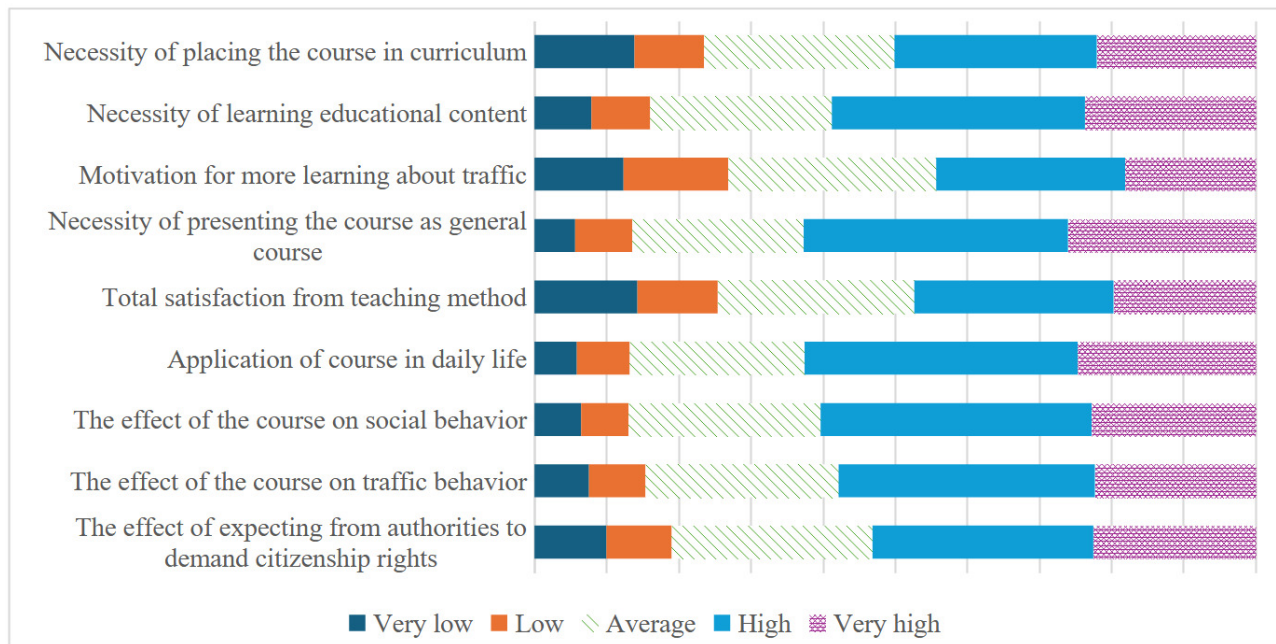


Figure 2. The single-Item evaluation of students' comments based on CIPP model

Table 3. Satisfaction distribution of safety and traffic course based on CIPP model: Students

Domain	Satisfaction*, n (%)		
	Low	Average	High
Context	485 (23.54)	544 (26.41)	1031 (50.05)
Input	334 (16.53)	892 (44.16)	794 (39.31)
Process	391 (19.05)	572 (27.86)	1090 (53.09)
Product	170 (8.37)	884 (43.50)	987 (48.13)
Total	234 (11.75)	906 (45.50)	851 (42.74)

* Students' satisfaction score for the four domains was calculated and categorised from 0 to 100
 Low: <30; Average: 30-70; High: >70

Table 4. Attitudes about safety and traffic course based on CIPP evaluation model: Lecturers

Domain	Items	Agreement N (%)
Context	The necessity of including the course in curriculum	22 (88)
Input	The necessity of presenting the course as general course	23 (92)
	Appropriateness of the course context	16 (64)
	Using lecturers from different majors	18 (72)
Process	Presenting the course in classical type of teaching	15 (60)
	Combined assessment of students (multiple-choice/explanatory)	9 (36)
Product	Applicability of the course in daily life	21 (84)
	The effect of the course on students' social behaviour	18 (72)
	The effect of the course on safety promotion among students	20 (80)

courses are not given according to needs-assessment of different target groups specially the vulnerable groups. Therefore, it is necessary to include safety and traffic course as a general course. The findings of this study support previous results from Sadeghi-Bazargani et al. (2018) that the general academic course on traffic health and safety was more applicable compared to other general courses. This satis-

faction may prove to be an advantage for expanding the course across universities.

In this study, students reported that to absorb the lessons, the education format should not be confined to theory and a part of the course must be practical (e.g., first aid). In AbdiShahshanhani et al. (2015), the theoretical nature of all units and the absence of practical units in curriculum was regarded as a defect of input domain. They

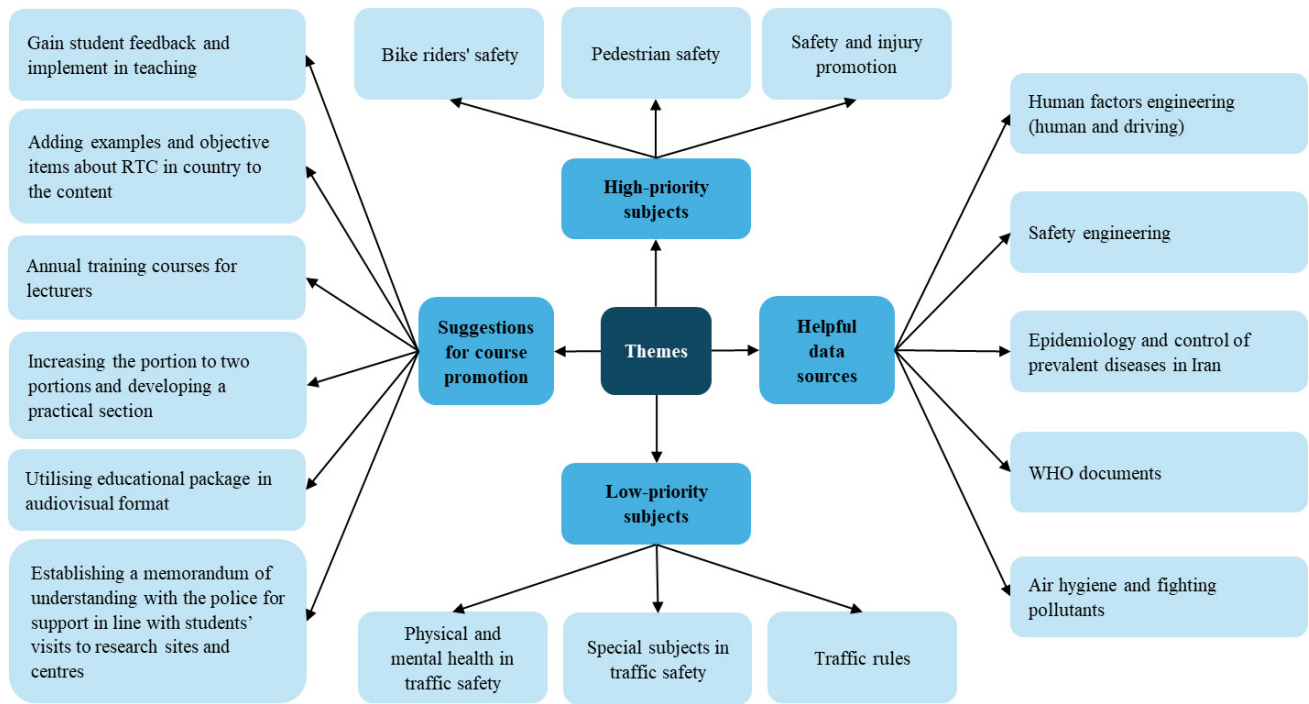


Figure 3. Comments and suggestion given by the lecturers about traffic safety course (n=25)

emphasised adding practical units to promote students' clinical skills. Most of the students in this study emphasised the importance of learning the content of the traffic safety course, indicating that they were highly motivated to learn as the content was novel and was not presented in their former studies. However, students also stated that it was better to study the traffic safety course before university.

In input domain, most of the lecturers emphasised utilising lecturers with different specialties (max. 3 lecturers) because of the diversity and comprehensiveness of the content. Also, more than half of the students indicated the usefulness and importance of all chapters of traffic safety book and evaluated the book as efficient. Accessibility to proper educational content and the presence of relevant lecturers for optimal implementation of educational programs, as the most important items of input domain, has been emphasised in previous research such as Mazloomi Mahmoudabad and Moradi (2018). Moreover, in a study by Rooholamini et al. (2017), the educational period was one of the most important factors of input domain and they explained that basic sciences period in medical students must be lowered to two years. Derakhshanfard et al. (2022) also indicated that the chapters must be proportionate to the number of educational portions and course period. In the current study, according to the students, the course must be two portions and the educational hours must be increased to allow time to cover the large amount of educational content.

Process evaluation

The evaluation results in the process domain showed students' satisfaction about the teaching method. Izadpanah

et al. (2019) reported that holding educational courses by Drug and Food Organization was effective in all four CIPP domains and the staff were satisfied with the way the courses were held. In the current study, more than half of the lecturers believed that safety and traffic course must be taught in classical form in a semester because constant education is more effective than temporary training. Teaching the course in the form of workshops compresses the process and erodes the students and decreases the efficiency. In process domain, Mazloomi Mahmoudabad and Moradi (2018), indicated the constant and proper internship program. In the present study, fewer than half of the lecturers indicated that it is good to evaluate the students with a mixture of multiple-choice and explanatory questions while the remaining said that only a single method (multiple-choice/explanatory) would be appropriate.

Product evaluation

Product evaluation is one of the determining factors in deciding whether an educational program continues or stops in other regions. The majority of students and lecturers reported that due to the daily encounter with traffic challenges, the content of traffic safety course would be highly applicable and promote their traffic knowledge. A study by Bakhtari Aghdam et al. (2020) showed that the general academic course on traffic health and safety must be delivered by trained teachers in universities for all fields. Golestani et al. (2024), conducted a study to evaluate cost-effectiveness of single-credit traffic safety course based on the Kirkpatrick model of evaluation. Their study revealed the effectiveness of the traffic safety course in all four levels of the Kirkpatrick model (reaction, learning, behaviour, results). The majority of learners were satisfied with the pre-

sentation of the course. The traffic safety course improved the participants' traffic knowledge and behaviour, and the course content was useful in their personal and social lives.

In a study by Derakhshanfard et al. (2022), they evaluated all items of product domain as Good according to students and lecturers. Heidari et al. (2021) indicated the applicability of internship programs of public health course, increased scientific knowledge, and practical skills as the indices of product domain.

Responses from students in this study showed an interest in more content on topics such as pedestrian safety, bicycle and motorbike riders' safety, eco-friendly driving, and vehicle safety standards. This suggests the need for the responsible authority of traffic knowledge to conduct a content review to address the areas highlighted by the students. While some training courses have been provided for professional suburban drivers, there has been less focus on urban drivers where delivery of training courses has been sporadic or periodical. Urban drivers, particularly commercial drivers (e.g., taxi, school bus etc.) face different challenges in health and safety and need coherent and constant training courses in this field.

Strengths and limitation

The major strength of this study is its scale. This is the first national study in Iran that implemented and evaluated the one-credit traffic safety course. Including participants from 15 universities, over 2,000 students and lecturers from across a range of disciplines, this study provides the most comprehensive insights of road safety education delivery and evaluation conducted to date.

However, the study also faced some limitations. Although four courses of the national teacher training program were held to empower the teachers of this course, the number of experienced teachers who can cover all the topics of the course is still small and it requires planning and providing a suitable platform in this field. It was also identified that administrative bureaucracies hampered the effective implementation of the program. The training was done in a hybrid way and due to the scope of the program, it was difficult to use traffic experts to teach this subject. In this regard four Train the Trainer programs were held. For students, three quarters of the classes were completely face-to-face and one quarter of the classes were held online. Given the timing of the course delivery, some classes were held entirely online due to the disruptions by the Covid pandemic restrictions.

Conclusion

Based on the CIPP model of evaluation, the course of traffic safety was in good condition according to the students and

lecturers. As the course was available across majors, it could be presented to all students and learners. Therefore, the inclusion of traffic safety course in as a general course in universities could be effective in developing and promoting traffic knowledge that will expand into families and the broader community. Further, greater public knowledge increases peoples' demand from relevant organisations to take action to improve road safety outcomes and reduce road traffic crashes across the country.

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Author contributions

MG designed the study and managed the data collection and drafted the manuscript. HSB created the main idea of the study and cooperate in writing the text of the manuscript. SHJ did the data collection and article writing has collaborated, AJK did the data analysis and cooperate in writing the text of the manuscript, SG, MR, and AJK have collaborated in study design and data analysis and article writing.

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Human Research Ethics Review

The project received ethical approval from the Ethics Committee of Tabriz University of Medical Sciences (Identifier: IR.TBZMED.REC.1397.173).

Data availability statement

Data used for this project are available upon reasonable request from the corresponding author.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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