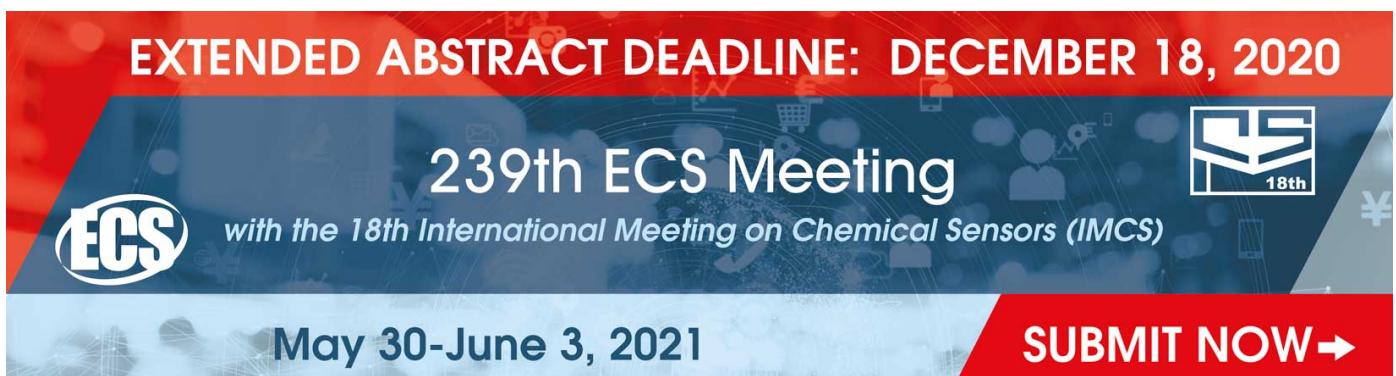


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Driving behaviour among civil engineering students: a case study at Universiti Teknologi Malaysia

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Abstract. Driver Behaviour Questionnaire (DBQ) is the most popular self-report driving assessment tool globally for assessing crash risk and aberrant driving behaviours among motorists. Therefore, this study reports on the utilisation of the DBQ to examine the self-reported driving behaviours (and crash outcomes) of a sample of university students. Questionnaires which contains demographic questions and 36 items measuring driving behaviour (including driving distractions, violations, errors and lapses) in traffic were distributed manually to participants. The findings show that distractions factor is most frequently reported items among all of the respondents ($M = 4.11$). Besides, there are also significant association among the demographic factors such as 'driving experience' and 'vehicle type' with gender of respondents. Meanwhile, there is no significant association between 'accident involvement' with gender of respondents. In terms of driving behaviour comparison, the behaviour among male drivers is significantly different compared to female drivers in all the scores and the constructs 'violations', 'errors and 'lapses' except for the construct 'distractions'. Meanwhile, there is no significant difference between drivers who have and have not possessed valid driving license in all driving behaviour.

1. Introduction

Road traffic accidents have emerged as an important public health issue in the world [1][2]. Road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally, and are predicted to become the seventh leading cause of death by 2030 [3] with 90% of the deaths occurring in low- and middle-income countries even though even though these countries have approximately 54% of the world's vehicles [4]. Comparing road crash deaths across age groups, road crashes are a major cause of both injury and mortality for young adults in many countries as illustrated in Figure 1. From a young age, males are more likely to be involved in road traffic crashes than females [5]. About three quarters (73%) of all road traffic deaths occur among young males under the age of 25 years who are almost 3 times as likely to be killed in a road traffic crash as young females [6].



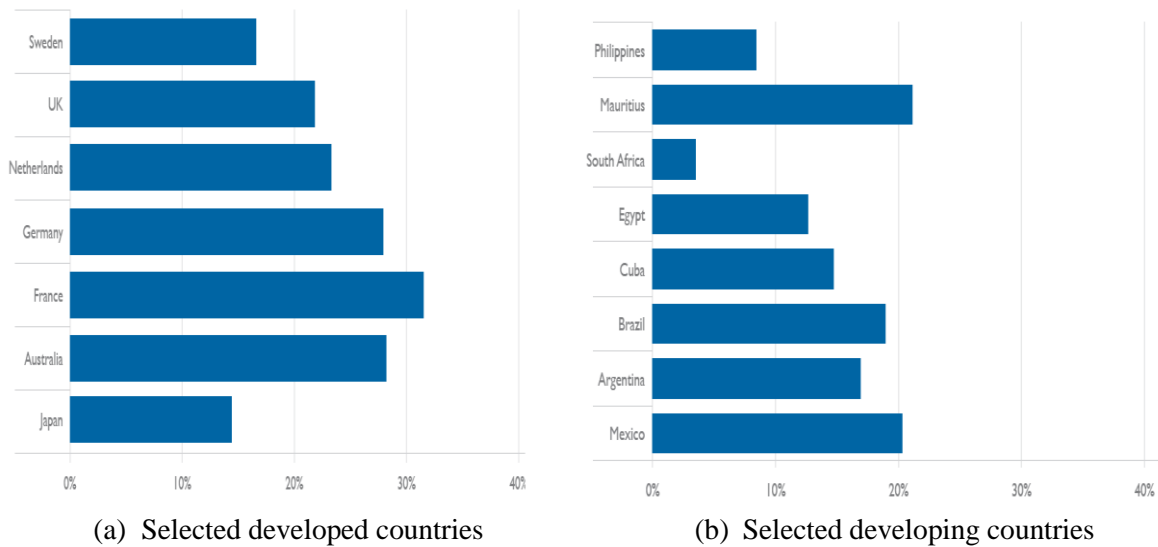


Figure 1. Proportion of all deaths of 15–24 year olds attributed to road crashes in 2008 [7].

Analyses of traffic accidents indicate that human factor are a sole or a contributory factor in road traffic accidents [8]. Human factor in driving can be described as two separate elements, driving skills and driving style [9]. Driving skills means driver is fulfilled with information processing and motor skills. Driving style or driving behaviour related to individual driving habits, the way a driver chooses to drive. Driving style becomes established over a period of years, but does not necessarily get safer with driving experiences. However, it is well understood that the extra risk young people have for crash involvement is due to inexperience, characteristics associated with youthful age, and the interaction between these two factors [10]. Literature on factors influencing driving styles had found evidence that driving styles are potentially determined by a variety of individual and socio-cultural factors including gender, age, driving experience, personality, cognitive style, group and organisation values as well as the general national/regional culture. However, further research is clearly needed to better understand more precisely how these factors shape driving style and how they may interact.

Research on driving styles has been very popular for many decades within traffic research. It has used both self-report methods and observation of actual behaviour [11]. One of the most widely used instruments for measuring driving behaviour is Driver Behaviour Questionnaire (DBQ) [12]. It is a simple way of measuring driver behaviour by conduct survey on drivers who report how they typically behave, experience, and what their attitudes are in driving. The original DBQ by contained 50 items that divided into three descriptive factors which are driving violations, driver error and attentional lapses. Violations are encompassing behaviours which deliberately contravene safe driving practices. An example of a violation would be when drivers disregard the posted speed limit on certain roads. Errors are unintended behaviours for which the planned outcome was different to what was achieved. This may inadvertently expose drivers to risky situations that could lead to crash involvement. For instance, an error would be when a driver brakes too quickly on a slippery road. Lapses are unintentional slips in memory or attention that do not on their own lead to an increased risk of crash involvement. This may include the driver forgetting where they left their car or unintentionally travelling in the wrong lane [13]. In this viewpoints, the present study was undertaken to investigate driving behaviour as indexed in the Driving Behaviour Questionnaire (DBQ) among a group of university students. The objectives of this study are (i) to determine the demographic characteristic and driving behaviour of the driver, (ii) to identify the relationship between gender of respondents and other demographic characteristic such as driving experience, vehicle type and accident involvement, and (iii) to examine the comparison between demographic characteristic of respondent and the four factor scale of driver behaviour.

2. Methodology

This study stands for positivism philosophy, which followed the natural science to answer the research objectives. Hence, the research strategy for this study is quantitative research.

2.1. Materials

The DBQ used in the current study has previously been used by Nazlin and Siti Zawiah [14]. The DBQ contains 7 items of violations, 8 items of errors, 8 items of lapses and 18 items of distraction elements. However, this study only adapted 26 driving behaviour items including distraction (15 items), violations (7 items), errors (7 items) and lapses (7 items). In the DBQ questionnaire survey, participants are asked to indicate how often in the previous year they undertook each of the 26 behaviours. The items were scored on a five-point Likert-type response scale (1 = never, 2 = hardly ever, 3 = occasionally, 4 = frequently, and 5 = nearly all the time). Demographic data, driving experience and crash involvement were also gathered along with the DBQ. For those participants who involved in crashes were asked to indicate the cause of crashes.

2.2. Participants

The results of the study are based on a self-completion questionnaire carried out in 2018 among a random sample of 300 students. Study participants were all full-time undergraduate students from School of Civil Engineering (SKA), Universiti Teknologi Malaysia (UTM). There were around 948 undergraduate students in SKA for the current academic year. The study targeted students from year one to year four who have a valid license. A total of 289 questionnaires were returned, giving a response rate of 96.3%. However, thirteen questionnaires were excluded from the study as they did not have a driving license or due to missing demographic variables. Overall, the study covered more than 29.1% of the SKA undergraduate students. There was no monetary compensation or inducement provided to the participants for responding.

2.3. Procedure

The DBQ was distributed manually to the participants. Data was collected over a two-month period, with the majority completing the survey within the first month. Participants were also informed that submission of completed questionnaires implied their consent to participate in the study. Confidentiality and privacy of information was ensured and the questionnaire was anonymous as and no direct personal information was requested. Data preparation and analysis was carried out using IBM SPSS (Statistical Package for the Social Sciences) Statistics version 22.

3. Results

In this section findings on statistical analysis will be explained. This finding will fulfil the research objective. The findings were divided into four categories which are an analysis of respondent's demographic characteristic, respondents driving behaviour, then followed by relationship between gender of respondents and other demographic characteristic such as driving experience, vehicle type and accident involvement, and lastly comparison between demographic characteristic of respondent and the four factor scale of driver behaviour.

3.1. Demographic

Two hundred and seventy-six (276) participants have taken part in this survey, one hundred and forty-two (142) respondents are male and one hundred thirty-four (134) are female. The fraction of respondent divided by their driving experience. The majority of the respondents have at least 4 years of driving experience (43%), followed by more than 4 years' experience (37%), and less than one-year experience (20%). Table 1 below shows the demographic characteristic and driving behaviour of the driver.

Table 1. Demographic characteristics of the drivers.

Demographic Items	Number	Percentage (%)
Gender		
Male	142	51.4
Female	134	48.6
Year		
1	34	12.3
2	63	22.8
3	65	23.6
4	114	41.3
Possessed Valid Driving License		
Yes	247	89.5
No	29	10.5
Driving experience		
<1 years	55	19.9
1-4 years	120	43.5
>4 years	101	36.6
Driving frequency		
Everyday	79	28.6
Almost everyday	52	18.8
Few days a week	51	18.5
Few days a month	94	34.1
Accident involvement		
Yes	33	12.0
Nearly	40	14.5
No	203	73.6
If yes, the cause of the accident		
Distracted	21	63.6
Fatigue	7	21.2
Weather conditions	5	15.2

3.2. Driving behaviour

In determine the driving behaviours of undergraduate students, 36 items of the driving behaviours have been listed. However, from the compare means analysis top five items of behaviours among all of the respondents have been determining. The findings indicate that distractions, violations and errors are the most repeatable behaviours among undergraduates student in civil faculty. The most frequently reported item was the distraction, where the drivers claimed that they often switch on the radio, CD or cassette while driving. ($M = 4.11$). The results in Table 2 also show that they occasionally check rear view mirror before pulling out, changing lanes and U-turn, occasionally make a distance from the leading vehicle, hardly ever obey the speed limit in a residential area road and hardly ever focused on driving and ignore what is happening outside.

Table 2. Means and standard deviations of top five most frequently reported items among all of the respondents.

No.	All Items	Mean	Std. Deviation
a5.	I switch on the radio, CD or cassette by myself while driving.	4.11	1.01
c1.	Check your rearview mirror before pulling out, changing lanes and U-turn.	3.95	0.96
b7.	Make a distance from the leading vehicle so it is not difficult to stop when in an emergency.	3.74	0.99
b1.	Obey the speed limit in a residential area road.	3.61	0.91
a1.	I was very focused on my driving and ignore what is happening in the outside environment.	3.52	0.94

3.3. Relationship between gender and other demographic characteristic

In order to identify the relationship between gender of respondents and other demographic characteristic such as driving experience, vehicle type and accident involvement, Chi-Square test was performed to determine whether there is an association between categorical variables. Results show in Table 3 indicated that the Pearson Chi-Square value for all cases is in the range of 2.748 to 14.120. Based on the results of Phi and Cramer’s V test, the values for cases 1 and 2 are in the range of 0.20 to 0.25, which categorized as moderate relationship. However, if the value is less than 0.15 which is referring to case 3, it can be categorized as very weak and thus not generally acceptable. The p-value in this table confirm that only cases 1 and 2 have significant relationship ($p < 0.05$).

Table 3. Summary of Chi-Square test.

Cross tabulation	N	Minimum expected count	df	Pearson Chi Square, X^2	Phi and Cramer’s V	Asymp. Sig. (2-sided)
Case 1: Gender vs Driving Experience	276	26.70	2	14.120	0.226	0.001
Case 2: Gender vs Vehicle Type	276	10.68	3	12.617	0.214	0.006
Case 3: Gender vs Accident Involvement	276	16.02	2	2.748	0.100	0.253

3.4. Relationship between demographic characteristic and driving behaviour

As mention earlier, distractions, violations and errors are the most repeatable behaviours among undergraduate student. Hence, in this section, the comparison between the demographic characteristic of the respondent and the four-factor scale of driver behaviour was determined. The nonparametric tests using Mann-Whitney were performed to check for any differences in the response distribution for drivers. Nonparametric tests were chosen due to the four-factor scale of driver behaviour does not meet the requirement for the normality test. In this study, there is two cases to be discussed. First, the driving behaviour comparison among gender. Second, driving behaviour comparison among possessed valid driving license.

Table 4 shows that there is a significant difference between male and female drivers in the mean rank for all of the items ($p < 0.05$), the construct “Violations” ($p < 0.05$), the construct “Errors” ($p < 0.05$), and “Lapses” ($p < 0.05$). However, there was no significant difference found between male and female drivers in the mean rank for the construct “Distraction” ($p = 0.437 > 0.05$). This indicates that the behaviour among male drivers is significantly different compared to female driver in all of the items and the constructs “Violations”, “Errors” and “Lapses” except for the construct “Distractions”.

Table 4. Summary of the Mann Whitney U test (driving behaviour comparison among gender).

Total score	N	Mean Rank		U	Z	p-value
		Male	Female			
All Items	276	151.81	124.40	7624.0	-2.853	0.004
Distractions	276	142.12	134.66	9000.0	-0.777	0.437
Violations	276	149.48	126.87	7955.5	-2.360	0.018
Errors	276	155.32	120.67	7125.0	-3.614	0.0003
Lapses	276	148.21	128.21	8134.5	-2.086	0.037

Meanwhile, Table 5 shows the driving behaviour comparison among possessed valid driving license. The results indicate that there is no significant difference between drivers who have and have not possessed valid driving license in the mean rank for all of the items ($p > 0.05$), the construct “Distractions” ($p > 0.05$), the construct “Violations” ($p > 0.05$), “Errors” ($p > 0.05$) and “Lapses” ($p > 0.05$). This signifies that the behaviour among drivers who possessed valid driving license is no significantly different compared to drivers who have not possessed a valid driving license in all of the items and the constructs “Distractions”, “Violations”, “Errors” and “Lapses”.

Table 5. Summary of Mann Whitney U test (driving behaviour comparison among possessed valid driving license).

Total score	N	Mean Rank		U	Z	p-value
		Yes	No			
All Items	276	138.61	137.57	3554.5	-0.066	0.947
Distractions	276	139.15	132.93	3420.0	-0.398	0.691
Violations	276	137.93	143.36	3440.5	-0.348	0.728
Errors	276	140.21	123.93	3159.0	-1.042	0.298
Lapses	276	137.89	143.72	3430.0	-0.373	0.709

4. Discussion

The aim of this study is to explore driving behaviour among young driver. Thus, the election of respondents from Civil Engineering Student at UTM seen very suitable because most of them have experience in driving a car. Based on the first objective analysed data for the demographic characteristic, most of the respondents are final year student (4th year) as they have their own vehicle and often drive in UTM while the 1st-year student has the least percentage because they not allowed to bring the car in university yet they still have driving experience. Besides, most of the respondents also possessed a valid driving license and have driving experience between 1-4 years. This is a good condition for a young driver. Most of the respondents that answered driving frequency “Few days a month” stated their hometown as the most frequently driving destinations. On the other hand, for the driving behaviour, a descriptive analysis found that the top five most frequently reported items among all of the respondents related to driving distractions, violations and errors. Lapses items have least reported in this study as the maximum mean for the item is ($M = 2.82$). This finding corresponds to a study on normal behaviour and traffic safety which found that violations were a predictor of road crashes [15]. Distraction while driving can also lead to road crashes because any other activity which competes for the driver’s attention while driving can distract the driver and thus have serious repercussions on road safety [16].

In determining the comparison between the demographic characteristic of the respondent and the four-factor scale of driver behaviour. For the driving behaviour comparison among gender, the results found that there is a significant difference between male drivers and female drivers in all of the driving

behaviours except for the construct of “Distractions”. Errors and violations are strong predictors of self-reported accidents [17]. Meanwhile, for driving behaviour comparison among possessed valid driving license, the results found that there is no significant difference between drivers who have and have not possessed valid driving license in all of the driving behaviours.

5. Conclusion

The present study identified detail demographic characteristic of a group of Civil Engineering Students at UTM. The results indicate that there is a significant association between gender with driving experience and gender with vehicle type. Male and female drivers were reported to have significant difference in driving behaviour especially in constructs “Violations”, “Errors” and “Lapses”. In terms of driving licence, analysis indicates that there is no significant difference between drivers who have and have not possessed a valid driving license in all driving behaviour.

6. References

- [1] Gopalakrishnan S 2012 A Public Health Perspective of Road Traffic Accidents *Journal of Family Medicine & Primary Care* **1(2)** 144–150
- [2] Evans L 2004 Traffic Safety [book auth.] Mich Bloomfield *Science Serving Society*
- [3] World Health Organization 2014 Global health estimates. Geneva: World Health Organization
- [4] Peden M, Scurfield R, Sleet D, Mohan D, Hyder A.A., Jerawan E, Mathers C, eds. 2004 World report on road traffic injury prevention World Health Organization, Geneva
- [5] Elvik R 2010 Why some road safety problems are more difficult to solve than others *Accid. Anal Prev.* **42(4)** 1089–1096
- [6] World Health Organization 2018 Road traffic injuries - World Health Organization WHO fact-sheets
- [7] World Health Organization 2008 The global burden of disease: 2004 update Geneva, World Health Organization
- [8] Lewin I 1982 Driver training: A perceptual-motor skill approach. *Ergonomics* **25** 917–924
- [9] Elander J, West R, French D 1993 Behavioral correlates of individual differences in road traffic crash risk: an examination of methods and findings *Psychol. Bull.* **113** 279–294
- [10] Williams A F 2006 Young driver risk factors: successful and unsuccessful approaches for dealing with them and an agenda for the future *Injury Prevention* **12(1)** i4-i8
- [11] Sagberg F, Piccinini G F B, and Engström J, 2015 A review of research on driving styles and road safety *Hum. Factors* **57(7)** 1248–1275
- [12] Wahlberg A E, Dorn L, and Kline T 2011 The Manchester Driver Behaviour Questionnaire as a predictor of road traffic accidents *Theoretical Issues in Ergonomics Science* **12(1)** 66-86.
- [13] Reason J T, Manstead A S R., Stradling S G, Baxter J S, and Campbell K 1990 Errors and violations on the road: a real distinction? *Ergonomics* **33** 1315–1332.
- [14] Nazlin H A and Siti Zawiah M D 2016 The cross cultural study on driving behaviour of Malaysian ageing automobile drivers *Malaysian Journal of Public Health Medicine* **16(2)** 121-127
- [15] Stradling S G, Parker D, Lajunen T, Meadows M L, & Xie C Q 1998 Normal behavior and traffic safety: Violations, errors, lapses and crashes. In H. von Holst, Å. Nygren, & Å. E. Anderson (Eds.) *Transportation, traffic safety, and health. Human behavior* 279–295 Berlin, Heidelberg, New York: Springer-Verlag
- [16] Young K L, Regan M A, and Hammer M 2003 Driver Distraction: A Review of the Literature Report No. 206 Monash University Accident Research Centre, Australia
- [17] Winter J C F and Dodou D 2010 The driver behaviour questionnaire as a predictor of accidents: A meta-analysis *Journal of Safety Research* **41** 463-470

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