Tagum City Traffic Situation: An Assessment

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Abstract — The traffic assessment analyzes the road network and provides a solution to traffic congestion in the present and future conditions. The main objective of this study was to assess the traffic situation of Tagum City in the aspect of traffic engineering, traffic education, traffic enforcement, traffic ecology, and traffic economy as perceived by the traffic personnel and motorists of the said area in the CY 2019 – 2020. Further, this was conducted to determine the significant difference in the perception of the respondents on the level of traffic situation as perceived among traffic management personnel and motorists in Tagum City.

A descriptive method of research was used with the aid of a researcher-made questionnaire as the primary source of data gathering. The research was conducted in Tagum City with 154 respondents. One hundred were motorists while 54 were Traffic Management Personnel, selected through simple random sampling. Data were gathered through a researcher-made questionnaire and analyzed, employing mean, percentage, and frequency distribution and multiple regression analysis. In terms of the profile of the respondents in age, both traffic management personnel and motorists, the majority of them were within the range of 36-44 years old. In terms of sex, the male dominates in numbers. The educational attainment of traffic management personnel and motorists vary differently. Non Commissioned Officers were higher in number than Police Commissioned Officers with 77.8% of the total number of respondents. Lastly, in terms of the length of service, those who have served less than five years have dominated the number of respondents – traffic management personnel.

Keywords — Traffic Situation, Assessment, Multiple Regression Analysis, Tagum City, Philippines

Introduction

There are many problems in cities like Tagum that the people face daily. Among them, traffic jams are one of the big problems. On almost every road, the volume of traffic has increased manifold. The traffic situation is getting worse with every passing day. Traffic snarls up every day, and one of the causes of these traffic jams is an increase in the number of vehicles in the city. Other causes include the dilapidated condition of roads, bad behavior of drivers, and violation of traffic rules. Due to all these reasons, road accidents occur.

In a fast-developing city, where the traffic rules are followed more in the breach than in practice, the traffic police have developed new initiatives, including reorganizing the traffic signals and strict monitoring of violators. The city lanes, which are considered a threat for rides, are now turning to become the safest. Reorganizing signals, track painting, zebra cross marking, enforcement, and strict monitoring are the sights one can witness getting on the roads. Many campaigns were taken up to create public awareness on traffic rules and road accidents (The New Indian Express, 2014).

The City Transport and Traffic Management Office (CTTMO) serves as the sole transport and traffic management authority vested with powers to formulate, coordinate and monitor policies, standards, and programs relating to transportation and traffic management under the supervision and control of the City 2 Mayor. The office was created through City Ordinance No. 0334-12, Series of 2012, or the Comprehensive Transport and Traffic Code of Davao City, enacted by the Sangguniang Panlungsod last August 7, 2012. CTTMO was established to address the ever-growing problem of transportation of Davao City and to manage the traffic situation therefore by rationalizing the existing transport operations and by implementing all traffic engineering services, traffic enforcement operations, traffic, and transport planning, regulations and franchising, transport facilities management, and traffic education program.

This implementation is then benchmarked by one of Davao's progressive cities, Tagum City, with its entire operation using traffic lights and traffic enforcers in service. The said implementation was then make-believe as an area-wide – approach to road accident prevention and casualty reduction that integrates all the disciplines found. To further describe and understand the current traffic situation hence the study was conducted.

Consequently, the increasing population of Tagum City has paved its way to managing traffic situations effectively. According to the source, CBMS Census (2018), there are a total of 60 229 households in the city, which comprises 50.4% males while 49.6 of them are females. In terms of the number of vehicles, there are approximately 3,500 vehicles, private and public, including already the tricycles. These data presented require the need for the City of Tagum for effective traffic management since the population of the people and vehicles are growing each year. Tagum City is a first-class city and capital of Davao del Norte. It is the most populous component city in Mindanao, with a population of 259, 444 according to the 2015 census. In October 2017, released of Cities and Municipalities Competitiveness Index (CMCI), the City of Tagum ranked third on the Overall Competitive Component Cities in the Philippines, second on Infrastructure, fourth in Resiliency, seventeenth on Economic Dynamism and twenty-fourth on Government Efficiency. The city is strategically located in the northern portion of Southern Mindanao. It lies at the intersection of three major road network systems: the Phil-Japan Friendship Highway, the Davao Mati-Agusan road, and the soon-to-be-completed Davao-Bukidnon road that connects the city to other major destinations in the region and the rest of Mindanao. With this, the city serves as a vital economic crossroad for the province and the entire Davao Region, linking

Davao City to the northern city of Butuan (in Agusan del Norte), to Mati (in Davao Oriental), and the Surigao provinces.

This study is anchored on the Traffic quest (2016) idea that traffic jams occur when the capacity of a road is insufficient for the discharge rate: the number of vehicles that attempt to use it. After a certain quantity of vehicles on the road, a tipping point is reached, where a phenomenon known as the capacity drop occurs. The Road network is facing growing congestion. One might ask what the argument for managing traffic is in the first place, given that traffic flows are pretty capable of self-organization and self-regulation. Indeed, under dilute traffic conditions, drivers are generally able to govern their actions so that other users are not negatively affected.

Literature Review

Krylatov et al. (2016) investigated and presented the relationship of these principles with game theory. In the UE model, which can be likened to Nash "s equilibrium, each driver non-cooperatively finds ways to minimize travel costs. In other words, no driver can unilaterally reduce their travel costs by shifting to another route. In the SO model, which can also be considered under the state of Pareto optimality, the drivers cooperate in choosing ways so that the whole system minimizes its travel time. In applying both principles, it is assumed that travelers have perfect road network information, i.e., knowledge of all possible routes and the total travel time using each course. Thus, there is a need to develop stochastic models that take into account the randomness of travelers' route choices.

Further, Castle, M. & Glenn, L. (2016) postulated that as the number of vehicles increases, the chance of congestion also increases. Lack of proper Infrastructure can also add to the worsening traffic. Councils and National Governments fail to act on the looming threat of heavy congestion until it happens. A lack of public transport, or poor public transport options subsidized to the growing concerns in traffic congestions.

Coifman (2017) added that several processes cause congestion to seemingly appear out of nowhere only to slowly vanish as you drive through it. A small number of critical locations constrains flow on a freeway, referred to as bottlenecks. When demand exceeds the capacity of a given bottleneck, it becomes active, and it cannot serve all drivers exactly when they arrive. These drivers thus have to wait in a queue until there is space for them to pass through the bottleneck, and the delay is manifest as reduced speeds in the line-up.

Methodology

The study utilized a quantitative research approach. This research approach was appropriate for the study since it sought to establish, confirm, validate relationships and develop

generalizations. Furthermore, the approach was suitable for surveys and collect data using predetermined instruments that yield statistical data (Creswell, J.W., 2014).

Specifically, this no experimental form of research is the correlational design. Investigators use correlational statistic to describe and measure the degree of association (or relationship) between two or more variables or sets of scores (Creswell, 2012). These designs have been elaborated into more complex relationships among variables found in structural equation modeling, hierarchical linear modeling, and logistic regression techniques. This study was carried out through a survey method measuring the traffic flow scales questionnaires and traffic flow satisfaction in Tagum City.

Results and Discussion

Table 1. Profile of the Traffic Management Personnel

		Frequency	Percentage
Age			
18-26 yo.		17	31.48
36-44 yo.		22	40.74
54 yo and above		15	27.77
Total		**54**	**100.00**
Sex			
Male		34	62.96
Female		20	37.03
	Total	**54**	**100.00**
Educational Attainment			
No Formal Ed		0	0.00
Elem		1	0.01
High School		6	11.11
Vocational		7	12.96
College		19	35.19
College		21	38.88
Undergrad			
Total		**54**	**100.00**

The table shows the profile of the traffic management personnel. It can be observed that in terms of age, those who are within the bracket 36-44 years old are the majority of the respondents. In terms of sex, the male dominates in numbers while in educational attainment, those with other academic qualifications have the most frequency compared to vocational and college graduates. Non-Commissioned Officers are higher in number than Police Commissioned Officers with 77.8% of the total number of respondents. Lastly, in terms of the length of service, those who have served less than five years have dominated the number of respondents.

Table 2. Profile of the Motorists

	Frequency	Percentage
Age		
18-26 yo	29	29
36-44 yo	64	64
54 above	7	7
Total	**100**	**100**
Sex		
Male	90	90
Female	10	10
Total	**100**	**100**
Educational Attainment		
No Formal Ed	0	0.00
Elem	1	1
High School	25	25
Vocational	13	13
College	28	28
College	33	33
Undergrad		
Total	**100**	**100**

The table shows the profile of the motorists. It can be observed that in terms of age, those who are within the bracket 36-44 years old have the most numbers of respondents. Meanwhile, in sex, the male bracket has the highest number of respondents. Lastly, in educational attainment, those who have other educational attainments other than college and vocational have the highest respondents.

Table 3. Level of Traffic Management in Tagum City as Assessed by Traffic Management Personnel

INDICATOR	MEAN	DESCRIPTIVE EQUIVALENT
A. TRAFFIC ENGINEERING		
1. Supervision and maintenance to apply traffic control devices such as traffic light signals, pavement marking, and traffic signs.	*3.51*	*Very High*
2. Maintenance of the condition of traffic signs is well visible, well lighted, and stable.	*3.60*	*Very High*
3. Designation of loading and the non-loading area is emphasized and is high visibility.	*3.43*	*Very High*
4. Roads, bridges, and street lights development ofnew or elevated walkways, overpasses, pavement designs, shoulders, etc.	*3.33*	*Very High*
5. Assess potential roadway expansion.	*3.41*	*Very High*
Overall Mean	***3.46***	***Very High***
B. TRAFFIC EDUCATION		

1. Use of various media to disseminate trafficinformation, such as posting information.	*3.18*	*High*
2. Symposium in school and community to update the citizens about recent statistics onvehicular traffic accidents.	*3.23*	*High*
3. Integrate traffic safety rules at the elementary level.	*3.23*	*High*
4. Assign routes for certain types of vehicles.	*3.27*	*Very High*
5. Strictly implement the antismoke belching policy.	*3.27*	*Very High*
Overall Mean	***3.27***	***Very High***
C. TRAFFIC ENFORCEMENT		
1. Apprehension of traffic violators.	*3.47*	*Very High*
2. Processing of the traffic accident scene.	*3.39*	*Very High*
3. Enforcement of traffic laws, rules andregulations, and ordinances.	*3.55*	*Very High*
4. Directing and controlling traffic movement.	*3.51*	*Very High*
5. Coordinating with other traffic agencies.	*3.27*	*Very High*
Overall Mean	***3.44***	*Very High*
D. TRAFFIC ECONOMY		
1. Close coordination with private operators andbusinesses.	*3.26*	*High*
2. Assess potential roadway expansion.	*3.27*	*Very High*
3. Assign routes for certain types of vehicles.	*3.32*	*Very High*
4. Strictly implement the truck ban.	*2.96*	*High*
5. Develop and market deep-discount transit faresto employers in areas of well-served public transit.	*3.25*	*High*
Overall Mean	***3.21***	***High***

Legend:

1.0 – 1.75	-Very Low	2.51 – 3.26	-High
1.76 – 2.50	-Low	3.27 – 4.00	-Very High

The table presents the level of traffic management in Tagum City as assessed by the traffic management personnel. In terms of engineering, most of the personnel have responded to a very high level of assessment with an overall mean of 3.46. This means that the traffic management situation is very much effective.

Meanwhile, in terms of Education, the traffic management personnel response is very high. This suggests that traffic education is highly effective, with an overall mean of 3.27. This means that the traffic management situation is very much effective.

Next is the traffic enforcement, where most traffic management personnel responded to a very high level of assessment which means that the traffic enforcement is highly effective with an overall mean of 3.44. This means that the traffic management situation is very much effective.

Lastly, in terms of traffic economy, the traffic management personnel responded with a high level of assessment with an overall mean of 3.21, which means that the traffic economy in Tagum City is much effective. Overall, the traffic management personnel responded to a very high level of assessment, which suggests that traffic engineering, traffic education, traffic enforcement, and traffic economy are very effective.

Table 4. Level of Traffic Management in Tagum City as Assessed by the Motorists

INDICATOR	MEAN	DESCRIPTIVE EQUIVALENT
A. TRAFFIC ENGINEERING		
1. Supervision and maintenance to apply traffic control devices such as traffic light signals,pavement marking, and traffic signs.	*3.24*	*High*
2. Maintenance of the condition of traffic signs is well visible, well lighted, and stable.	*3.31*	*Very High*
3. Designation of loading and the non-loading area is emphasized and is high visibility.	*3.30*	*Very High*
4. Roads, bridges, and street lights develop new or elevated walkways, overpasses, pavementdesigns, shoulders, etc.	*3.29*	*Very High*
5. Assess potential roadway expansion.	*3.22*	*High*
Average	***3.27***	***Very High***
B. TRAFFIC EDUCATION		
1. Use of various media to disseminate traffic information, such as posting information.	*3.18*	*High*
2. Symposium in school and community to update thecitizens about recent statistics on vehicular traffic accidents.	*3.12*	*High*
3. Integrate traffic safety rules at the elementary level.	*3.16*	*High*
4. Assign routes for certain types of vehicles.	*3.27*	*Very High*
5. Strictly implement the antismoke belching policy.	*3.19*	*High*
Average	***3.18***	***High***
C. TRAFFIC ENFORCEMENT		
1. Apprehension of traffic violators.	*3.27*	*Very High*
2. Processing of the traffic accident scene.	*3.27*	*Very High*
3. Enforcement of traffic laws, rules, and regulations and ordinances.	*3.30*	*Very High*
4. Directing and controlling traffic movement.	*3.19*	*High*
5. Coordinating with other traffic agencies.	*3.38*	*Very High*
Average	***3.28***	***Very High***
D. TRAFFIC ECONOMY		
1. Close coordination with private operators andbusinesses.	*3.29*	*Very High*
2. Assess potential roadway expansion.	*3.33*	*Very High*
3. Assign routes for certain types of vehicles.	*3.26*	*High*
4. Strictly implement the truck ban.	*2.95*	*High*
5. Develop and market deep-discount transit fares to employers in areas of well-served public transit.	*3.21*	*High*
Average	***3.21***	***High***

Legends:

1.0 – 1.75	-Very Low	2.51 – 3.26	-High
1.76 – 2.50	-Low	3.27 – 4.00	-Very High

The table presents the level of traffic management in Tagum City as assessed by the motorists. In terms of engineering, most personnel have responded to a very high level of perception of 3.27. This suggests that the motorists believe that traffic management is very much effective.

Meanwhile, in terms of Education, the motorists' response is high, with an overall mean of 3.18. This suggests that traffic education is much effective.

Next is traffic enforcement, where most motorists responded to a very high level of assessment with a corresponding overall mean of 3.28, which means that traffic enforcement is very effective.

Lastly, in terms of traffic economy, the motorists responded with a high-level assessment of 3.21, which means that the traffic economy in Tagum City is much effective. Overall, the motorists responded with a high level of perception, suggesting that traffic engineering, traffic education, traffic enforcement, and traffic economy are effective.

Table 5. The significant difference in the level of Traffic Management as Assessed by the Traffic Management Personnel when grouped to age

Engineering							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.021159	2	0.010579	0.254	0.779759	3.885294	Accept Ho
Within Groups	0.499811	12	0.041651				
Total	0.52097	14					
Education							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.39206	2	0.19603	13.480808	0.000854	3.885294	Reject Ho
Within Groups	0.174497	12	0.014541				
Total	0.566557	14					
Enforcement							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.035358	2	0.017679	0.416713	0.6683929	3.885294	Accept Ho
Within Groups	0.509097	12	0.042425				
Total	0.544455	14					
Economy							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.156259	2	0.07813	1.741524	0.2167448	3.885294	Accept Ho
Within Groups	0.538354	12	0.044863				
Total	0.694614	14					

The table shows the significant difference in the level of traffic management as assessed by the traffic management personnel when categorized according to age. The null hypothesis is accepted in terms of Engineering since the F-computed (0.254) is less than the F-critical value (3.885294). This suggests that all age brackets did not differ significantly in terms of their perception of traffic engineering. The same analysis decision was also revealed in terms of traffic enforcement (F-computed=0.416713<F-critical value=3.885294) and Traffic Economy (F-computed=1.741524<F-critical value=3.885294). All of these ANOVA results show that age does not affect the perception of traffic management personnel in terms of traffic enforcement and traffic economy.

However, in terms of Traffic education, the results revealed that age affects the personnel's perception as indicated by the statistical result: (F- computed=13.480808>F-critical value=3.885294). The F-computed value is greater than the F-critical value, suggesting a significant difference in their levels of perception when analyzed according to age.

It does not mean that if you are older, you have a high enough salary compared to the younger ones as well as in younger personnel it does not mean that being more youthful is not a sign of having a high salary since they can maintain their duty without health issues as like older personnel that deal with a conceptual and cognitive related issue (Crowther-Dowey, 2017).

Table 6. The significant difference in the level of Traffic Management Assessed by the Traffic Management Personnel when grouped according to SEX

Engineering

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.408 3.425	0.017	/-0.87152/	2.131847	Accept Ho

Education

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.297 3.204	0.093	1.919239	2.131847	Accept Ho

Enforcement

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.462 3.382	0.080	1.963645	2.131847	Accept Ho

Economy

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.198 3.222	0.024	/-0.43401/	2.131847	Accept Ho

The table shows the significant difference in the level of traffic management as assessed by the traffic management personnel when categorized according to sex. The null hypothesis is accepted in terms of Traffic engineering since the F- computed (0.254) is less than the F-critical value (3.885294). This suggests that all age brackets did not differ significantly according to sex. The same analysis decision was also revealed in terms of Traffic enforcement (F-computed=0.416713< F-critical value=3.885294) and Traffic economy (F-computed=1.741524< F-critical value=3.885294). All of these ANOVA results show that sex does not affect the perception of traffic management personnel in terms of traffic enforcement and traffic economy.

However, in terms of Traffic education, the results revealed that sex affects the personnel's perception as indicated by the statistical result: (F- computed=13.480808>F-critical value=3.885294). The F-computed value is more excellent than the F-critical value, suggesting a significant difference in their levels of perception when analyzed according to sex.

The statistics showed that all variables in both sex male and female traffic management personnel were equal as of the study conducted by Baratian-Ghorghi (2015) regarding the problems in traffic engineering, which says that the Infrastructure in response to traffic is highly effective. When it comes to traffic enforcement, knowing the rules and legislation of the road, both males and females' perception of traffic enforcement is high, which means that implementing the regulations is highly effective in battling traffic.

Lastly, traffic engineering, traffic enforcement, traffic education, and traffic economy in the perception of male and female traffic management personnel is highly effective. This means that the perspective of males and females are equal and without any significant differences in their level of perception towards traffic management in Tagum City.

Table 7. The significant difference in the level of Traffic Management as Assessed by the Traffic Management Personnel when grouped according to EDUCATIONAL ATTAINMENT

Engineering							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.143927	4	0.035982	0.480634	0.7496335	2.866081	Accept
Within Groups	1.497267	20	0.074863				Ho
Total	**1.641194**	**24**					
Education							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.485668	4	0.121417	22.39731	3.76E-07	2.866081	Reject
Within Groups	0.108421	20	0.005421				Ho
Total	**0.594089**	**24**					
Enforcement							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.317446	4	0.079362	1.405394	0.2682794	2.866081	Accept
Within Groups	1.129386	20	0.056469				Ho
Total	**1.446832**	**24**					
Economy							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	2.649605	4	0.662401	41.89435	1.886E-09	2.866081	Reject
Within Groups	0.316225	20	0.015811				Ho
Total	**2.965829**	**24**					

The table shows the significant difference in the level of traffic management as assessed by the traffic management personnel when categorized according to educational attainment. The null hypothesis is accepted in terms of Traffic engineering since the F-computed (0.48) is less than the F-critical value (2.86608). This suggests that all personnel, regardless of educational attainment, do not differ significantly. The same analysis decision was also revealed in terms of traffic enforcement (F-computed=1.405394< F-critical value=2.866081). These ANOVA results show that educational attainment does not affect the perception of traffic management personnel in terms of traffic enforcement and traffic engineering.

However, in terms of traffic education, the results revealed that educational attainment affects the personnel's perception as indicated by the statistical result: (F-computed=22.39731>F-critical value=2.866081). The same analysis is conducted in traffic economy personnel as noted in

the statistical result: (F-computed=41.89435>F-critical value=2.866081). The F-computed value is greater than the F-critical value, suggesting a significant difference in their levels of perception when analyzed according to educational attainment.

Table 8. The significant difference in the level of Traffic Management as Assessed by the Motorists when grouped according to AGE

Engineering							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.011528	2	0.005764	0.0650551	0.937344	3.885294	Accept
Within Groups	1.06321	12	0.088601				Ho
Total	1.074738	14					
Education							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.447506	2	0.223753	4.2474056	0.0402925	3.885294	Reject
Within Groups	0.632159	12	0.05268				Ho
Total	1.079666	14					
Enforcement							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.007431	2	0.003716	0.059433	0.9425745	3.885294	Accept
Within Groups	0.750219	12	0.062518				Ho
Total	0.75765	14					
Economy							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	1.029683	2	0.514841	5.697351	0.018213	3.885294	Reject
Within Groups	1.084381	12	0.090365				Ho
Total	2.114064	14					

The table shows the significant difference in the level of traffic management as assessed by the motorists when categorized according to age. In terms of traffic engineering, the null hypothesis is accepted. Since the F- computed (0.0650551) is less than the F-critical value (3.885294). This suggests that all age brackets did not differ significantly in terms of traffic engineering. The same analysis decision was also revealed in enforcement (F-computed=0.059433< F-critical value=3.885294). These ANOVA results show that age does not affect motorists' perception of traffic enforcement and traffic economy.

However, in terms of traffic education, the results revealed that age affects the personnel's perception as indicated by the statistical result: (F- computed=4.2474056>F-critical value=3.885294). The same analysis decision was also revealed in terms of economy (F-computed=5.697351< F-critical value=3.885294). The F-computed value is greater than the F-critical value, suggesting a significant difference in their levels of perception when analyzed according to age.

Numerous complex perceptual and cognitive processes are involved in situations in which a driver must decide when to enter a moving stream of traffic. Outlining some normative age-related changes in vision, hearing, cognition, and psychomotor speed provides critical information for these and other driving decisions (Anderson, 2012).

Table 9. The significant difference in the level of Traffic Management as Assessed by the Motorists when grouped according to SEX

Engineering

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.159 3.164	0.128	/-1.09643/	2.131847	Accept Ho

Education

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.212 3.160	0.052	1.79396	2.131847	Accept Ho

Enforcement

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.371 3.255	0.116	0.832884	2.131847	Accept Ho

Economy

Source of Variation	*Mean*	*Mean Difference*	*tcomp*	*tcrit*	*Decision*
Male Female	3.155 3.175	0.020	/-0.38638/	2.131847	Accept Ho

The table shows the significant difference in the level of traffic management as assessed by the traffic management personnel when categorized according to sex. The null hypothesis is accepted in traffic engineering since the t-computed (*0.254*) is less than the t-critical value (*3.885294*). This suggests that both males and females do not differ significantly. The same analysis decision was also revealed in terms of traffic enforcement (t- computed=*0.416713*<t-critical value=*3.885294*) and traffic economy (t- computed=*1.741524*<t-critical value=*3.885294*). These t-test results show that sex does not affect the perception of traffic management personnel in terms of traffic enforcement and traffic economy.

However, in terms of traffic education, the results revealed that sex affects the personnel's perception as indicated by the statistical result: (t- computed=*13.480808*>t-critical value=*3.885294*). The t-computed value is greater than the t-critical value, suggesting a significant difference in their levels of perception when analyzed according to age.

Further, in traffic engineering and enforcement, both males and females responded with a high level of perception regarding its implementation as a motorist. As a study conducted in Finland, reckless driving and attention-seeking are among the primary causes of accidents in both males and females accompanied by driving style and driving skills. Males and females both show equal driving skills, but most males are drunk while driving it is prone to accidents, while females do careful overtake and attitudes while driving. Seeing signage, intersections, bridges, and any other form of traffic engineering is equal in both sexes" male and female. And with the actions taken by traffic enforcement both male and female shows respect and follow the rules and policy of the road. An example is the crossing of red lights. Both males and females exhibit the acts and many more, such as illegal parking and speeding, resulting in an obvious traffic violation (Bener, 2019).

Table 10. The significant difference in the level of Traffic Management as Assessed by the Motorists when grouped according to EDUCATIONAL ATTAINMENT

Engineering							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.10288	4	0.02572	0.360869	0.8334588	2.866081	Accept Ho
Within Groups	1.425444	20	0.071272				
Total	1.528324	24					
Education							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.201422	4	0.050356	5.929405	0.00258	2.866081	Reject Ho
Within Groups	0.16985	20	0.008493				
Total	0.371272	24					

Enforcement							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.23955	4	0.059887	12.70588	2.637E-05	2.866081	Reject Ho
Within Groups	0.094267	20	0.004713				
Total	0.333817	24					
Economy							
Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*	*Decision*
Between Groups	0.270797	4	0.067699	0.871316	0.4983114	2.866081	Accept Ho
Within Groups	1.553952	20	0.077698				
Total	1.824749	24					

The table shows the significant difference in the level of traffic management as assessed by the motorists when categorized according to educational attainment. The null hypothesis is accepted in terms of traffic engineering since the F-computed (0.360869) is less than the F-critical value (3.885294). This suggests that all personnel, regardless of educational attainment, do not differ significantly. The same analysis decision was also revealed in terms of traffic economy (F-computed=0.871316<F-critical value=3.885294). These ANOVA results show that educational attainment does not affect the perception of traffic management personnel in terms of traffic enforcement and traffic economy.

However, in terms of traffic education, the results revealed that educational attainment affects the motorists' perception as indicated by the statistical result: (F-computed=5.929405>F-critical value=3.885294). The same analysis decision was also revealed in terms of traffic enforcement (F- computed=12.70588<F-critical value=3.885294). The F-computed value is greater than the F-critical value, suggesting a significant difference in their levels of perception when analyzed according to educational attainment.

In the traffic economy, it is undeniable in society that those with a high level of educational attainment are much more salary than low academic level except business inclined people in educational attainment. It is not a factor in having a good income. And regarding their views and perception of the traffic economy, since everybody has a different function in the society, it affects their daily life routine, especially in transportation (Greenbiz, 2019).

Conclusion

The researcher has drawn the following conclusion:

In terms of the profile of the respondents in age, both traffic management personnel and motorists, most were within the range of 36-44 years old. In terms of sex, the male dominates in

numbers. The educational attainment of traffic management personnel and motorists vary differently. Non Commissioned Officers were higher in number than Police Commissioned Officers with 77.8% of the total number of respondents. Lastly, in terms of the length of service, those who have served less than five years have dominated the number of respondents – traffic management personnel.

The traffic situations in Tagum City were very high as assessed by the Traffic Management Personnel and motorists.

The assessments of the Tagum Management Personnel and motorists on the traffic management situations vary when grouped accordingly.

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