
DESIGN AND IMPLEMENTATION OF GRAPHIC ILLUSTRATION FOR THE MANAGEMENT OF TRAFFIC BY THE ROAD USERS (A CASE STUDY KAMPALA CAPITAL CITY)

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ABSTRACT: *Road transport is a major dominant mode of transport in Uganda and is associated with traffic congestion which disrupts business activities and reduces productivity level, costs live of the people and damages environment inform of pollution all over the world. Research indicates that it may also be a symbol of growth of economy. When economy grows and real income of household increases, vehicle population also increase, contributing to traffic congestion within cities. Given the critical importance of productivity on (GDP) growth, cost of treating people involved in accidents and compensation, cost of travel time per year as result of delays in congestion and finally social cost of polluting environment, this impedes economic growth and development of the country. This study attempted to develop and implement graphic illustration for the management of traffic congestion by the road users in Kampala Capital City. This study focused on the Traffic congestion in Kampala Capital City. The results from the analysis indicated that mobility in Kampala Capital City is restricted due to congestion, causing excessive travel delays, particularly, during peak hours. Therefore, expanding transport infrastructure as well as improvement in the traffic management and control system should be given attention to improve the transportation system in the metropolis. This will reduce fatal accidents, government expenditure, Productivity in production (GDP) and finally Clean and smart mobility in the Kampala Capital City.*

Key words: graphic illustration, management and traffic

Background of the study

Roads are among the conduits for transporting goods and services (Cornish & Mugova, 2014; Dewar, 2011; Gollin & Rogerson, 2010; Uganda National Road Fund [UNRF], 2010b). Road transport is major dominant mode of transport in Uganda, with over 90 per

cent of (Users) passengers and freight traffic. According to recent study, the total vehicle population in Uganda is about 450,000. An estimated 50% of all the vehicles are in the Greater Kampala Metropolitan Area.

The Kampala area is composed of Kampala City and its neighbouring urban centres which include mukono, Entebbe, Nansana town councils and wakiso district. The Government is taking Kampala area as one unit in planning Uganda's strategy for urban transport development (Uganda National Road Fund, 2010).

Road traffic management is undeniably significant for road safety because it is essential for improved road use (De Souza et al., 2017). Such a significance will however be reflected in practice only when traffic management strategies designed to affect the road safety policy are effectively implemented (Tiwari, G, 2012). This is possible but could also be hardly consistent in contexts like Kampala Capital City where road transport appears complex.

The Government of Uganda (GoU) has invested in the use of modern Information and Communications Technology (ICT) in addressing myriad crime and traffic management through the Kampala Capital City Authority (KCCA) Smart City Vision 2040 project for safe city (KCCA, 2015), and installation of Closed-Circuit Television (CCTV) cameras.

It is a demand-oriented approach to passenger and freight transport involving new partnerships and set of tools to support and encourage changes in attitude and behavior in both more sustainable modes of transport and alternatives to travel. A central idea in the development of the transport management practice is the integrated approach to transport planning and policy making with emphases on accessibility alongside mobility and on the potential of soft measures to enhance the effectiveness of hard measures (Uganda National Road Fund, 2011).

Statement of the problem

In an effort to improve traffic in Kampala and ensure an efficient transport system, KCCA through this department, installed traffic lights on junctions, put road marks, demarcated parking for vehicles along the streets, put in place guidelines for all drivers to acquire driving permits and also put in place traffic guides. All these were done to ensure that, traffic

congestion is reduced, road accidents as well as congestion and traffic offences are reduced in Kampala Capital City. Despite putting these initiatives in place to manage and control poor road transport usage and traffic congestion, Kampala Capital City roads continue to be congested. This is drawn from the fact that many road users continue to experience the worst forms of traffic congestion almost all day (United States Department of the Treasury, 2012). The continuation of such situation has caused a lot of public cry due to dire consequences like loss of lives in traffic accidents, slowed down economic activities as the result of poor management of traffic. It is upon this background that the researcher tends to develop graphic illustration for the management of traffic by the road users in Kampala Capital City with an aim of reducing Traffic congestion.

Objectives of the study

1. To determine areas where road users are mostly injured and killed due to Traffic congestion on the roads with in Kampala Capital City.
2. To examine the causes of traffic congestion in Kampala Capital City.
3. To examine the effect of traffic congestion to the road users in Kampala Capital City.

Studio guiding questions

1. In what areas are road users mostly injured and killed on the roads within Kampala Capital City.
2. What are the causes of traffic congestion by road users in Kampala Capital City.
3. What are the effects of traffic congestion to the road users in Kampala Capital City.

Methodology

Research Design

(Tellis, 2014) says that, a research design involves a discussion of when, where, how and why the research is going to be started and accomplished. The research design used both qualitative and quantitative approaches to allow the researcher to concentrate on the specific area and identify the various interactive processes at work.

Population of the Study

(Farrar, 2010) says that population comprises of a predetermined size of 50 respondents who were purposively collected because of the limited time and funds. The examples included the police persons, motorists, pedestrians and KCCA officials who are presumed to be directly affected by traffic congestion in the Kampala Capital city

Sampling Techniques

In this method, respondents were purely picked randomly without any other influence. This method ensured that each member of the target population had an equal and independent chance of being included in a sample. Number of respondents included; Police officials 08 Motorists 18, Pedestrians 17, KCC officials 07, Total 50

Data Source

The research used both primary and secondary data. The researcher got information from reading journals, text books, goggle scholars, publications, magazines related to this topic available in libraries.

Primary Data

The researcher used primary data which was collected from the field using the questionnaires and interview guides.

Secondary Data

The researcher got secondary data from use data from the literature review to the study and various libraries, other books and other scholars in regard to strategies for the management of traffic congestion

Data Collection Methods

Questionnaire method

(Daniel, 2018) described a questionnaire as a predetermined list of questions which are answered by a subject respondent without supervision or explanation by the interviewer. This was used by the researcher to get Information especially from the administrators. Both open and closed questions were sent to widen the chances of response.

Open ended questions enabled respondents to express themselves as they answered the set questions. Closed ended questions enabled the respondents to choose the right answer of their choice to questions.

Interviewing:

(Kelly, 2007) defines an interview as a face-to-face conversation between an interviewer and respondents conducted for the purpose of obtaining Information. The researcher used the interview method and this involved face to face encounter between the researcher and all targeted respondents like include the police persons, motorists, pedestrians and KCCA officials This method was based on personal contact where by the interviewer was engaged in question answer talk with the respondents and the researcher be given immediate answers.

RESULTS

Respondents Rate

The study was comprised of 50 respondents who were selected from different levels basing on the grouping of the researcher. However from the questionnaires distributed by the researcher, 50 questionnaires were returned and out of these, all the 50 were filled. With this therefore the researcher used the 50 questionnaires and the interviews done on selected section of the respondents to carry out the analysis of the findings.

The Demographic Characteristics of the Respondents

Distribution of Respondents by Gender

The researcher was interested in determining the gender of the respondents in order to examine the extent to which male and female got involved in the study. The information obtained was indicated as in the table below;-

Table 1: Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	23	46
Female	27	54
Total	50	100

Source: Primary Data, November, 2022

Findings in table 1 above showed that majority of the respondents were female indicated by 54 % out of the total number of respondents. The minority however were male because they

were not easily accessible, may be where busy or workers therefore were not part of the questionnaire or interview processes. This was indicated by 46 % out of the total number of respondents. In advance the results showed that the research was dominated by female than male.

Distribution of Respondents by Age

Here the researcher wanted to determine the age of the respondents in order to identify the validity of the responses given in advance. In this case therefore, the findings obtained were as demonstrated in the table below;

Table 2: Distribution of Respondents by Age

Age bracket	Frequency	Percentages
20-30	13	26
31-40	25	50
45-60	12	24
Total	50	100

Source: Primary Data, November, 2022

From the findings in table 2 above, the dominant respondents were from age category 31-40. This was represented by 50% of the total number of respondents followed by respondents from age category 20-30 with 26 % out of the total number of the respondents. The minority of the respondents however, were from age 45-60 with 24% out of the total number of respondents. This was interesting because the age groups that the researcher targeted were of marriage brackets and as such therefore were at least knowledgeable on some of the issues regarding traffic congestion.

Distribution of the Respondents by Level of Education

The researcher was interested in determining the level of education of the respondents in order to identify the validity of the responses given. The information obtained was indicated as in the table below.

Table 3: Distribution of Respondents by Level of Education

Education level	Frequency	Percentages
Primary	05	10
Secondary	10	20

Bachelors	30	60
Masters	05	10
Others	00	00
Total	50	100

Source: Primary Data, November, 2022

Findings in the table above indicated that respondents with bachelors were the many with 60% out of the total number of respondents. These were followed by respondents with master taking 20% followed by respondents with secondary level education with 20% and the minority on the other hand were primary level of education with 10%. This showed a great extent to which the respondents were educated. In this matter, the responses were taken to be valid because the respondents could read and interpret questionnaires as they were distributed. Also this meant that the level of understanding the key issues raised by the research and ability relate them to real life situation was critical and shaped the research direction.

Distribution of the Respondents by Work Experience

The researcher was interested in determining the work experience of the respondents in order to identify the validity of the responses given. The information obtained was indicated as in the table below.

Table 4: Distribution of Respondents by Work Experience

Work experience	Frequency	Percentages
Less than 1 year	08	16
1-5 years	20	40
5-10 years	12	24
More than 10 years	10	20
Total	50	100

Source: Primary Data, November, 2022

Findings from the research as represented in the table above indicated that majority of the respondents had at least spent 1-5 years working with an organization an agency or government. This was represents 40% out of the total number of respondents. These were followed by respondents who had at least worked for 5 -10 years indicated by 24 % out of

the total number of respondents. 16% has worked for less than 1 year while 20% respectively had also worked for 10 and above years.

Table 5: Distribution of Respondents by Marital Status

Education level	Frequency	Percentages
Single	07	14
Married	23	46
Divorced	09	18
Widow	11	22
Total	50	100

Source: Primary Data, November, 2022

Findings in the table above indicated that respondents who were single were 14% out of the total number of respondents. Those who were married were 46% followed by respondents who were widows with 22% and the minority on the other had divorced with 18 %. This showed a great extent that respondents were at least married. In this matter therefore, the responses were taken to be valid because the respondents could clearly traffic issues around them.

Factors of traffic jam in Kampala Capital city

Table 6: Factors of traffic jam in Kampala Capital city

Factors	Frequency	Percentages
Ignorance	07	14
Lack of traffic signs	20	40
Government policies	09	18
Resource management factors	14	28
Educational status of road users	03	06
Total	50	100

Source: Primary Data, November, 2022

In the above table, 20 (40%) of the respondents indicated that Lack of traffic signs is the major factor in traffic management, this topped the list of factors which was strongly agreed and agreed upon by most respondents who answered the questionnaire and were

interviewed. it's evident that Resource management factors came second with 14(28%), One can notice from the table above that Government policies scored 9 (18%) which meant that it came third in the respondents view and opinion comprise of road safety rules. Educational status of road users was yet another factor which was put on test before respondents and scored 7 (14%).

The knowledge of traffic management by respondents

Knowledge of traffic management by respondents

Here the respondents were asked to had knowledge about traffic management activities. The information obtained was indicated as below;

Table 7: knowledge of traffic management by respondents

Response	Frequency	Percentage
Strongly agree	10	20
Agree	20	40
Not sure	15	30
Disagree	05	10
Strongly disagree	00	00
TOTAL	50	100

Source: Primary Data, November, 2022

Findings in table 7 above indicated that majority of the respondents agreed to factors of traffic management. This was indicated by (20)40% out of the total number of respondents this research sampled. These were followed by respondents who were not sure with 30% followed by strongly agreed with 20%. However, minority of the respondents disagreed with statements and totalled 10 % out of the total number of the respondents.

The Causes of traffic jam in Kampala Capital city

This objective was to establish the causes of Causes of traffic jam in Kampala Capital city. The information obtained was indicated as below;

Respondents were asked whether, the causes of traffic jam in Kampala Capital city as represented in the table below,

Table 8: The Causes of traffic jam in Kampala Capital city

Causes of traffic congestion	Frequency	Percentage
Poor pavement	08	16
Too many vehicles	25	50
Land use patterns	10	20
Employment patterns	05	10
Others	02	04
TOTAL	50	100

Source: Primary Data, November, 2022

Findings in the table above indicates that majority of the respondents agreed with the statement that too many vehicles was major cause of traffic congestion with 25 (50%). This was indicated by 50% well an average out of the total number of the respondents. Followed by respondents who attributed it to land use patterns with 10 (20%), It should be noted that some respondents agreed with poor pavements with 8 (16%), employment pattern had 5 (10%) of the respondents and others scored 2 (04%) respectively.

The Effects of traffic jam in Kampala Capital city

Table 9: The Effects of traffic jam in Kampala Capital city

Effects of traffic jam in Kampala city	Frequency	Percentage
Fatal accidents	08	16
Injuries and death	20	40
High travel costs	10	20
Negative attitude	05	10
prosecutions	05	10
Other	02	04
TOTAL	50	50

Source: Primary Data, November,2022

The study notes that in traffic management, 20 (40%) indicated fatal accidents as the major effect followed by 10 (20%) the respondents strongly agreed that as many get injuries , others even die, 8 (16%) of the respondents indicated high travel costs as the effect, 5 (10%) of the respondents indicated negative attitude and also 5 (10%) of the other respondents

indicated prosecution as an effect while 2 (04%) of the respondents indicated other effects of traffic congestion.

Production of graphic illustration for the management of traffic by the road users in Kampala Capital City

The study findings here indicates that the researcher produced graphics illustrations to be installed for public viewing. The illustration included traffic road signs for the management of traffic by the road users in Kampala Capital City. This is evidenced in the developmental stages show in figures 9-11. The graphic illustrations were installed in Kamwokya in Kampala city.



Figure:9 2D graphics dev't stage

Source: researcher, November,2022

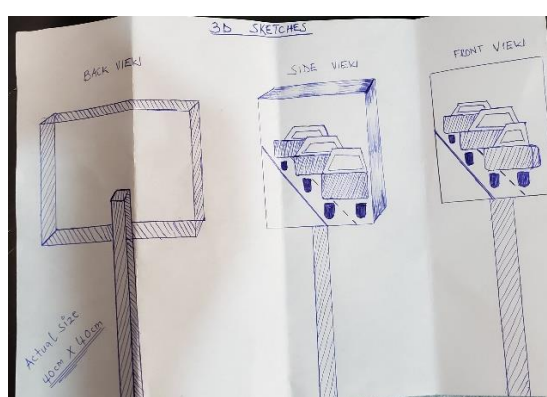


Figure: 10 3D graphics dev't stage

Source: researcher, November,2022



Figure: 11 3D prototype graphics illustration

Source: researcher, November, 2022

Conclusions

The study was carried out with the view to develop and implement graphic illustration for the management of traffic congestion by the road users in Kampala Capital City. The study was based on three research objectives that included to determine areas where road users are mostly injured and killed due to traffic congestion on the roads with in Kampala Capital City, examine the causes of traffic congestion in Kampala Capital City, examine the effect of traffic congestion to the road users in Kampala Capital City for socio-economic development of the city.

Recommendations

There is need to sensitize the causes of traffic congestion to the city users so as to widen their knowledge and policy interventions for equity responsibility and community levels. The policy should call for a well packaged, pro-active information, education and communication activities to be carried out to inform the public of the causes of traffic congestion. It should call for immediate restrictions on road safety rules and through promotional programming in the mass media, business premises, sporting events, billboards that expose the road safety measures to the general public.

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