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Review Article

The influence of social variables in the interpretation of messages used to campaign against improper disposal of waste: a case study of Kayole, Nairobi City

Christine Khakasa Wekesa

Department of Education, Presbyterian University of East Africa, Kenya

Abstract: The challenge of waste management in Nairobi City has been aggravated by the fact that being the capital city of Kenya, it is heavily populated with almost half of its population living in informal settlements, most of which are located along the river banks. The city also has to contend with untreated industrial effluents, residential waste and waste from commercial activities. This has led to health problems associated with water borne diseases, respiratory complications, reduction of the economic value of premises in the affected areas and the reduction of natural beauty of Nairobi area (NEMA 1999, 2007). It is against this backdrop that NEMA and the Nairobi City Council have embarked on aggressive campaigns to sensitize people against improper disposal of waste. The study sought to evaluate the effectiveness of the messages used to campaign against improper disposal of waste. The study employed Austin's Speech Act Theory (1962) to analyse data. Austin's theory was appropriate because it helped identify the meaning of utterances, the intention of the speakers and the interpretation of the hearers. Both secondary and primary data were used in the study. The study adopted a qualitative research design. This study was carried out in Nairobi, in the low-income residential area of Kayole. Data was collected from 32 respondents using an interview schedule. Using Chi-square, the variation between the meaning intended by the originators of the messages and the meaning given by the respondents was determined. The study found out that social variables (age, gender and educational level) were not significant in the interpretation of the messages.

Keywords: aggravated, maxims, implicature, waste, management, industrial effluents, settlements.

INTRODUCTION

Garang (2015) postulates that the rise in population, urbanization and consumerism globally is to blame for waste generation. This thought is shared by Eisa (2002) who argues that the rise in population worldwide accompanied by the ever-increasing demand for manufactured goods leads to increase in the production of waste. Scholars have classified waste in different ways. Some have based their classification on the source of the waste while others on the physical states (Otieno *et al.*, 2006; Omwoyo *et al.*, 2006; NEMA, 2005). This study adopted the classification of waste based on physical states because it is broader than the one based on their sources. Moreover, the study has confined itself to messages on solid waste since it is what most people handle.

Ferronato and Toretta (2019) argue that there is a strong link between poor solid waste management and environmental, health issues. The rapid increase in population, economic growth, urbanization and industrialization promotes the generation of solid waste at global level, leading to environmental contamination when such waste is not managed. Indeed, in many developing countries waste is scattered in urban centers or disposed of in open dump sites. The lack of infrastructure for collection, transportation, treatment and final disposal, management planning, financial resources, know-how and public attitude reduces the chances of improvement. Collaborative Working Group on Solid Waste Management (2008) support the assertion made by Ferronato and Toretta (2019) and opines that management of solid waste is one of the major challenges worldwide. Inadequate collection, recycling or treatment and uncontrolled disposal of waste in dumps lead to severe hazards, such as health risks and environmental pollution. Modak, Wilson and Velis (as cited in Ferronato & Toretta, 2019) posit that the situation is dire in low- and middle-income countries which face challenges such as low collection coverage, unavailable transport services, lack of suitable treatment and disposal facilities leading to poor management of waste. Consequently, water, land and air are polluted thereby putting people and the environment at risk.

Sanneh *et al.* (as cited in Ferronato & Toretta, 2019) note that the management of solid waste is worsened by unsustainable practices that promote environmental contamination and spread of diseases. Some of these practices are open dumping in uncontrolled sites. For instance, in Banjul (Gambia) the dump site is located in a densely populated area, thus it has a negative visible impact on inhabitants and tourists visiting the country. The smoke, emitted from burning debris, and the smell of decomposing waste are the main problems affecting the quality of life of the population. The situation is made worse during the rainy season as the areas become infested with flies and insects. Moreover, run-off from the dump site with contaminants dissolved inflow into water bodies, while the leachate

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contaminates the soil and groundwater leading to numerous health challenges.

As the population of a country grows, so do the activities that release waste into the environment. In Kenya, and more so in Nairobi, this has resulted in heaps of garbage and consequently pollution. The environment is an important ecosystem in which all forms of life on earth are dependent upon. Hence, there is need to conserve it for posterity. Given the important role of the environment to all living organisms, Nairobi City Council (NCC) and National Environmental Management Authority (NEMA) have had rigorous campaigns to sensitize people against improper disposal of waste. This initiative has been taken in order to reduce the adverse effects of mismanagement of waste in the environment. To be able to manage waste effectively, citizens have to be sensitized on the need to do so. This therefore brings to perspective the essence of communication and the role that campaigns play in effective waste disposal. Campaign is a vital tool in disseminating information on appropriate waste disposal because it is geared towards enhancing the role of citizens in waste management.

A major tool employed in this campaign is the use of language and by extension relevant communication strategies. Diamond (as cited in Orwa & Anudo, 2019) posits that language is an important tool in the society and this is best captured in Malinowski's assertion that 'language is the necessary means of communion: it is one indispensable instrument for creating the ties of the moment without which unified social action is impossible.' The use of communication material in environmental conservation is quite relevant. Waswala et. al. (2023) opine that Environmentally conscious East African musicians are increasingly embracing music as an innovative way to mainstream social and environmental education and building competencies for addressing the myriad of current and emerging socio-ecological concerns, most of which are anthropogenic in nature. Lumwamu (1991) corroborates the notion that language is a tool for communication. According to him, it is a tool by which a communicator sends information to the receiver to fulfil a certain goal. Nelson *et al.* (1994) supports this by noting that communication is the process of understanding and sharing meaning. They further assert that understanding or grasping the meaning of a message does not occur unless the two (communicator and receiver) elicit common meaning for the words or phrases used. They argue that communication also involves others in the sense that a competent communicator considers the other person's needs and expectations as he /she selects appropriate and effective messages to share.

According to the Climate and Clean Air Coalition (2015), communication plays a fundamental role in the social process of environmental education. Without this indispensable tool, citizens have no access to information that may foster attitude changes and the full exercise of citizen participation. Since language is pivotal in message conveyance, the people given the responsibility of drafting the messages used to campaign against improper disposal of waste, should put in mind the expectations and needs of the audience before constructing such messages. They should also try to make sure that their intended meaning is what reaches the recipients of the messages.

The words used to convey information either in the written or spoken form influences the way that message is received by recipients. Hayes (1998) says that words have great impact upon listeners for they provoke a reaction in them and if they are effectively chosen, they can remain in one's consciousness for a long time and influence one's attitude. Words can also act as a barrier to communication. This is because sometimes people use language in an unusual way and clear communication is almost impossible when language conventions are not followed. Hayes (1998) says that people sometimes use semantic and syntactic rules unconventionally and sometimes replace cultural language rules with those of a co-culture thereby hindering communication. Therefore, campaigners should make sure that the words used to communicate the messages are carefully chosen so as to communicate the intended meaning. This study thus argues that effective communication, done through various channels, plays a pivotal role in ensuring that waste is adequately managed. It is against this backdrop that this study sought to find out whether the messages used in campaigns against improper disposal cut across the social variables of age, sex and educational level.

Specific objective

This study sought to address the following objective:
- To find out if the messages used to campaign against improper disposal of waste cut across age, gender and educational level.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Waste has been classified into several categories. Otieno *et al.* (2006) classify waste according to physical states. According to them, there are liquid, solid and gaseous wastes. Omwoyo *et al.* (2006) support this classification and note that the pollutants may be any liquid, solid or gaseous material that is disposed of into the environment by human beings. NEMA (2005) on the other hand, classifies waste according to its source. Based on this classification, there is municipal, industrial, agricultural, mining and transport waste. This study adopted the classification of waste based on physical states because it is broader than the one based on their sources. Moreover, the study has confined itself to solid waste since it is what most people handle.

According to Otieno *et al.* (2006), solid waste refers to waste materials which have adequate shape and

form. Examples include garbage or refuse and any other material resulting from industrial, commercial, mining operations, agricultural and community activities. Solid waste consists of both biodegradable and non-biodegradable substances. These waste products are generated almost daily. Omwoyo *et al.* (2006) say that solid waste has led to the deterioration of the state of land through the addition of harmful and poisonous wastes. This has occurred when solid waste matter like polythene paper, glass, metal, plastics and food remains are carelessly dumped on the ground. The presence of garbage heaps makes the environment ugly and dirty. Moreover, dumping sites become breeding grounds for diseases as well as disease transmitting agents such as rats, cockroaches, flies, mosquitoes and snails.

Varied measures have been taken by various firms and organisations in Kenya to help in the disposal of solid waste. Omwoyo *et al.* (2006) opine that some of the local authorities have contracted garbage collection services to ease congestion and garbage heaps. According to them, NCC has contracted garbage collection from central business district to private firms. Other private firms have also been allowed to collect garbage from residential areas. However, most of these entities hardly follow the laid down regulations by NEMA.

Despite the significance of appropriate water disposal, studies (NEMA, 2006; Ferronato & Toretta, 2019) show that waste disposal services are not rendered to most of the low-income areas in the country. This is corroborated by NEMA (2006), who note that low-income areas, where 55-60% of Nairobi residents live, receive limited waste collection services save for localized intervention by community-based organizations. They posit that no waste collection service is received by 75% of the households in low-income areas.

Theoretical framework
This study employed Austin's (1975) the speech act theory.

Speech Act Theory
Austin (1962) says that language comes into existence only because someone performs an act of speaking or writing. In every utterance, a speaker performs an act such as stating a fact, an opinion, confirming or denying something, making a prediction or a request. Austin further notes that an utterance, in addition to meaning, performs action by having specific forces, as outlined below:

Loctutionary act: This is the conventional meaning associated with the words in an utterance without context. For example, the slogan "our environment, our life, preserve it" used to campaign against improper disposal of waste, can have more than one meaning. It may mean planting trees or dumping waste responsibly.

(b) Illocutionary act: This is the speaker's intention in his/her utterance by virtue of the conventional sense or meaning associated with it. He suggests that this is absolutely essential in any discussion of speech act. In the slogan "Do not litter," the speaker intends that the intention of the utterance is known. Thus, waste should only be disposed of appropriately at designated places.

(c) Perlocutionary act: This is the effect on the listener of an iIlocutionary act. For instance, the slogan, "Do not litter" cautions the recipient of the message. He or she can respond by dumping waste appropriately. Austin also came up with what he called felicity conditions according to which the speaker's intention may be sincere or not. For example, when a speaker says, "I promise to take Max to a movie tomorrow" he might mean it, in which case his/her utterance would be felicitous but if he/she secretly intends not to carry out the promise, his/her utterance would be infelicitous.

The question of the speaker's sincerity is not the only felicity condition. Another one is preparatory condition. This establishes whether or not the circumstances of speech act and the participants in it are appropriate for the act to be performed successfully. This means that there must exist an accepted conventional procedure having a certain conventional effect. That procedure should include the uttering of certain words by certain persons in certain circumstances. Further, the participants and circumstances in a given case must be appropriate for the invocation of the particular procedure invoked. This theory touches on the meaning of the utterances, the originators, intended message and the responses to the messages. However, it has not shown why some messages could be misinterpreted. This explains why Grice's theory (1975) is relevant in this study.

METHODOLOGY
This study adopted a qualitative research design. Mugenda *et al.* (1999) state that this design is best suited in explaining human behaviour. It's appropriate for this study because it aims at evaluating the effectiveness of the language used to campaign against improper disposal of waste. Data for this study was collected in Nairobi area specifically the low-income area of Kayole. Social variables of age, gender and educational level of the respondents were factored in (see Table 1 below). This was to determine how these variables influence language interpretation of the respondents. Kayole was chosen because of two reasons: firstly, it has a high population level which translates to a high amount of waste generated. Secondly, being a low-income area, the residents cannot afford the services of the companies contracted to collect garbage as such, there is improper disposal of waste.

This study used both secondary and primary data. The secondary data was sampled from already existing items used to campaign against improper disposal of waste. This kind of data was in two forms, that is, spoken and written discourse. With regard to the spoken discourse, two public baraza sessions were recorded. Two items were sampled to ensure that the two languages (Kiswahili and English) in which data was collected are catered for. The written data was in three categories: sign posts, posters and pamphlets. Of each category, two items were sampled (one in English and the other in Kiswahili). Beginning with the posters, stratified sampling was used to obtain 5 posters written in English and 5 in Kiswahili. The same procedure was applied for the pamphlets which were labelled A and B. When it came to the signposts, the procedure was similar to the two categories except for the fact that after stratified sampling, the sampled signposts were photographed and pictures developed. Thereafter, random sampling was carried out as was the case with the posters and pamphlets and the selected pictures labelled A for English and B for Kiswahili. Primary data on the other hand, was obtained from the answers the originators of the sampled messages gave as their intended meaning and the answers of the sampled respondents. Table 1 shows how the respondents were sampled.

Table 1: Sampling of respondents

Gender	Age (years)	Education level	Number per category
Male	10-20	Primary-secondary	6
Male	35-40	Post secondary	6
Female	10-20	Primary-secondary	6
Female	35-45	Post secondary	6
TOTAL			**24**

The first variable to be factored in the study was the gender of respondents. This was done to ensure that half of the respondents were female and the remaining half were male. The females were further divided into the youth (l0-20) years and the middle aged (35-45) years. Ten years was chosen as the lowest limit because this is the age a school going child can successfully grant an interview. Twenty years was deemed favourable because this is the time most students complete their secondary education. The second category had the lower limit of thirty-five years. This is the period when middle age sets in. The upper limit was settled on so that we have a ten year's gap.

To arrive at the actual respondents, the researcher first stratified them according to the social variables of age, gender and education level. Using a friend of a friend approach, the respondents were sampled. Finally, eight originators of messages used in this study who are employees of NEMA and NCC were purposively sampled thereby bringing the number of respondents to 32.

The data collection instrument used was an interview schedule. In the analysis of data, the researcher evaluated the interpretation(s) by the respondents against the intention(s) of the originators of the messages. Additionally, the Chi-square test was used to show the level of significance and degree of freedom. A 5% level of significance and a degree of freedom of 1 was used. Mugenda *et al.* (1999) states that this technique compares what is observed in each category with what is expected. Data presentation was done by computing the total number of responses against the total number of message items interpreted correctly. The researcher then contrasted the effectiveness of written discourse with the spoken one.

DISCUSSION

Both secondary and primary data were analysed. The secondary data are the already existing messages while primary data on the other hand, are the respondents' interpretations of the messages. These interpretations were then compared to the originators' intended meaning. The Chi -square test (X^2) was also employed. Hinkle (1998) states that Chi-square is used in nominal data in which case the observed and what Hinkle calls theoretical or expected frequencies are compared. He gives the formula as:

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where O = Observed frequency

E = Expected frequency

$\sum$ = Sum of

In using x^2, one has to determine the degree of freedom and the level of significance. In this study, 5% or 0.05 level of significance and degree of freedom of 1 was employed. In general, determining the degree of freedom (df) associated with X^2 is calculated by (number of Rows-I)(number of columns-I), Thus, (R-I)(C-I). Since we have two rows and two columns, we end up with df of (2-1)(2-1)= 1. Hinkle states that at the level of significance of 5% and degree of freedom of 1, our critical value for X^2 is 3.841. In the table of two rows and two columns, he notes that the computation formula can be simplified as follows:

$$X^2 = \frac{N(AD-BC)^2}{(A+B)(C+D)(A+C)(B+D)}$$

Where A, B, C and D are the cell frequency of a 2x2 table.

*Corresponding Author: Christine Khakasa Wekesa

The study considered six message items half of which were written in English and the other half in Kiswahili. The messages were in the form of signposts, pamphlets and posters. Posters were from the City Council of Nairobi while pamphlets and signposts were from NEMA. These message items were given to the respondents for interpretation. The findings have been presented in the Table 2 below according to the social variables of age, education level and gender of the respondents. C.I stands for correct interpretation while W.I stands for wrong interpretation. For each variable, the first table shows the interpretation of the English messages while the second shows that of Kiswahili messages.

SIGNPOSTS

The study looked at two signposts. One was written in Kiswahili and the other in English. The one written in English was labelled SP_A while the one written in Kiswahili was labelled SP_B. Signpost SP_A had the words "PLEASE KEEP YOUR ENVIRONMENT CLEAN, NEVER DUMP HERE." The designer of the signpost was NEMA through the Ministry of Environment and Mineral Resources. NEMA set out to inform the public and especially those living along the river not to use the river as dumping ground.

Signpost SP_B was also designed by NEMA. It read "Huduma Bora ni Haki Yako, Mazingira Safi ni Haki Yako." The words "Kenya Public Service Week" appeared at the top of the signpost. NEMA aimed at informing the public that staying in a clean environment is a right of every Kenyan. The institution was ready to work closely with Kenyans to achieve a clean environment. However, achieving the above-mentioned goal required combining efforts. This means that while NEMA has a duty of ensuring that the citizens stay in a clean environment, the public has to play its part by disposing waste responsibly. The respondents' interpretations of the signposts labelled A are presented in Table 2.

Table 2: Age variable in the interpretation of SP_A.

Social variable	C.I	W. I	Total
Youth	12	0	12
Middle age	12	0	12
Total	24	0	24

Using the computation formula, the result was analysed as follows:

$$x^2 = \frac{24(0-0)^2}{24 \times 0 \times 12 \times 12} = 0$$

At the level of 5% significance, and degree of freedom of 1, age is not significant in the interpretation of signpost SP_A.

Using the same social variable of age, the respondents' interpretations of the signposts labelled B are presented in Table 3.

Table 3: Age variable in the interpretation of SP_B

Social variable	C.I	W. I	Total
Youth	8	4	12
Middle age	9	3	12
Total	17	7	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(36-24)^2}{17 \times 7 \times 12 \times 12} = 0.0168$$

Since the critical value for X^2 is 3.841 and the computed value for signpost SP_B is 0.0168, age is not significant in the interpretation of the signpost.

Using the social variable of education level, the respondents' interpretations of the signposts labelled A are presented in Table 4.

Table 4: Education variable in the interpretation of SP_A

Social variable	C.I	W. I	Total
Post secondary	12	0	12
Primary-secondary	12	0	12
Total	24	0	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(0-0)^2}{24 \times 0 \times 12 \times 12} = 0$$

From the results of the analysis above, it is evident that the education level of the respondents is not significant in the interpretation of signpost SP_A.

Using the same social variable of education level, the respondents' interpretations of the signposts labelled B are presented in Table 5.

Table 5: Education variable in the interpretation SP_B

Social variable	C.I	W. I	Total
Post secondary	10	2	12
Primary-secondary	11	1	12
Total	21	3	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(22-10)^2}{21 \times 3 \times 12 \times 12} = 0.3809$$

Given the above results, it is evident that education level is not significant in the interpretation of signpost SP_B.

Using the social variable of gender, the respondents' interpretations of the signposts labelled A are presented in Table 6.

Table 6: Gender variable in the interpretation of SP_A

Social variable	C.I	W. I	Total
Male	12	0	12
Female	12	0	12
Total	24	0	24

$$X^2 = \frac{24(0-0)^2}{24 \times 0 \times 12 \times 12} \qquad X^2 = 0$$

The results gotten from the analysis above shows that the gender of the respondent was not significant in the interpretation of signpost SP_A.

Using the same social variable of gender, the respondents' interpretations of the signposts labelled B are presented in Table 7.

Table 7: Gender variable in the interpretation of signpost SP_B

Social variable	C.I	W. I	Total
Male	8	4	12
Female	6	6	12
Total	14	10	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(24-48)^2}{14 \times 10 \times 12 \times 12} = 0.02857$$

PAMPHLETS

The study had two pamphlets one in English and another in Kiswahili. The English pamphlet was labelled PL_A while the Kiswahili one was labelled PL_B. Both pamphlets were from NEMA. Pamphlet PL_A, was about the environment and coordination (waste management) regulations act. It was meant for waste transporters and it contained the conditions which should be adhered to by licensed waste transporters. One of the requirements by NEMA was that those with the responsibility of collecting waste should not cause any further littering. Further, no stench should be emitted by the waste during transportation and the vehicles transporting waste should only follow the routes approved by the government from the point of collection to the point of disposal. The pamphlet also sought to inform the transporters to collect waste from a designated area of operation and deliver such waste to the designated sites. The same pamphlet had the picture of a truck carrying waste and yet another picture of the same truck offloading waste in an open site.

Pamphlet PL_B which was in Kiswahili aimed at enlightening the public about the roles of NEMA. NEMA seeks to ensure that there is minimal destruction of the environment. Therefore, any organisation which engages in activities that directly or indirectly destroy the environment should make sure that such activities do not cause major destructions to the environment. An alert should also be given to the public in advance of such effects. NEMA also seeks to liaise with other organizations to sensitize the public on the importance of a clean environment. Further, the organisation encourages public participation on matters concerning the environment. Finally, NEMA gives an annual report on the state of environment and allows any organisation that concerns itself with the environment to do the same. Below is a presentation of the respondents' interpretation of the messages in pamphlets in relation to the social variables of age, education level and gender. Table 8 shows the Age variable in the interpretation of PL_A.

Table 8: Age variable in the interpretation of PL_A

Social variable	C.I	W. I	Total
Youth	10	2	12
Middle age	9	3	12
Total	19	5	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(18-30)^2}{19 \times 5 \times 12 \times 12} = 0.2526$$

Given that the computed value of chi-square does not exceed the critical value (3.841), age is not significant in the interpretation of pamphlet PL_A.

Using the same social variable of age, the respondents' interpretations of the pamphlet labelled B are presented in Table 9.

Table 9: Age variable in the interpretation of PL_B

Social variable	C.I	W. I	Total
Youth	6	6	12
Middle age	8	4	12
Total	14	10	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(48-36)^2}{14 \times 10 \times 12 \times 12} = 0.01904$$

The results of the analysis indicate that at 5% level of significance and degree of freedom of 1, age is not significant in the interpretation of signpost PL_B.

The variable of education level was also used in the interpretation of the pamphlet labelled A and the results presented in Table 10.

Table 10: Education level variable in the interpretation of PL_A

Social variable	C.I	W. I	Total
Post secondary	9	3	12
Primary-secondary	8	4	12
Total	17	7	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(24-36)^2}{17 \times 7 \times 12 \times 12} = 0.20168$$

From the results obtained, it is evident that the level of education of the respondents was not significant in the interpretation of pamphlet labelled PL_A. The social variable of education was also used in the interpretation of the pamphlet labelled PL_B and the results presented in Table 11.

Table 11: Education level variable in the interpretation of PL_B

Social variable	C.I	W. I	Total
Post secondary	9	3	12
Primary-secondary	6	6	12
Total	15	9	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(18-54)^2}{15 \times 9 \times 12 \times 12} = 1.6$$

The value of X^2 at 5% level of significance and degree of freedom of 1 is 3.841. This means that educational level is not significant in the interpretation of the message.

The gender variable was used in the interpretation of the pamphlet labelled A and the result presented in Table 12.

Table 12: gender variable in the interpretation of PL_A

Social variable	C.I	W. I	Total
Male	10	2	12
Female	11	1	12
Total	21	3	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(22-10)^2}{21 \times 3 \times 12 \times 12} = 0.3809$$

The critical value for the study was 3.841. Since the computed value is below this value, gender of the respondents was not significant in the interpretation of pamphlet PL_A.

The gender variable was also used in the interpretation of the pamphlet labelled B and the result presented in Table 13.

Table 13: gender variable in the interpretation of PL_B

Social variable	C.I	W. I	Total
Male	9	3	12
Female	6	6	12
Total	15	9	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(18-54)^2}{15 \times 9 \times 12 \times 12} = 1.6$$

From the analysis, the value of X^2 at 5% level of significance and degree of freedom of 1 is 3.841. It is thus evident that gender is not significant in the interpretation of pamphlet PL_B.

POSTERS

The study had two posters which were from NCC. The poster written in English was labelled P_A and had the words "our environment our life, preserve it." Several pictures accompanied the words. Empty packets, tins and boxes could be seen littered all over in one of the pictures. There were pictures of rats, possibly as a result of an unclean environment. A sad looking lady could be seen lying down. The assumption was that she had fallen sick because of the dirty environment. The designer of the poster set to inform the public that our lives depend on the environment and if we destroy it, we destroy our lives too.

Poster P_B was written in Kiswahili. It had the words "*usitupe takataka ovyo*." Accompanying the words were pictures of waste littered all over. A picture of a person emptying a dustbin in an open field could be seen. There was another picture of a person emptying waste in a dust bin. The designers of the poster set out to communicate to the public to throw waste in designated places for easier management.

The finding on the age variable in the interpretation of posters labelled A is presented in Table 14.

Table 14: Age variable in the interpretation of P_A

Social variable	C.I	W. I	Total
Youth	10	2	12
Middle age	11	1	12
Total	21	3	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(22-10)^2}{21 \times 3 \times 12 \times 12}$$

$$= 0.3809$$

The results revealed that the critical value exceeds the computed value as such, age is not significant in interpretation of posters labelled P_A.

The age variable was also used in the interpretation of the poster labelled P_B and the result presented in Table 15.

Table 15: Age variable in the interpretation of P_B

Social variable	C.I	W. I	Total
Youth	11	1	12
Middle age	9	3	12
Total	20	4	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(9-33)^2}{20 \times 4 \times 12 \times 12} = 0.4083$$

It was revealed that at the level of significance of 5% and degree of freedom of 1, education was not significant in the interpretation of poster P_B.

The other variable that was used in the interpretation of the posters labelled P_B was the education variable whose result is presented in Table 16.

Table 16: Education variable in the interpretation of P_A

Social variable	C.I	W. I	Total
Post secondary	10	2	12
Primary-secondary	9	3	12
Total	19	5	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{20(24-14)}{16 \times 4 \times 10 \times 10}$$

$$= 0.2526$$

The findings reveal that education level of the respondents was not significant in the interpretation of posters labelled P_A. The education level variable was also

used in the interpretation of the poster labelled P_B and the result presented in Table 17.

Table 17: Education variable in the interpretation of P_B

Social variable	C.I	W. I	Total
Post secondary	11	1	12
Primary-secondary	9	3	12
Total	20	4	24

$$X^2 = \frac{24(33-9)^2}{20 \times 4 \times 12 \times 12}$$

$$= 0.4083$$

The findings reveal that education level of the respondents was not significant in the interpretation of posters labelled P_B. The social variable of gender was also used in the interpretation of the poster labelled P_A and the result presented in Table 18.

Table 18: gender variable in the interpretation of P_A

Social variable	C.I	W. I	Total
Male	9	3	12
Female	10	2	12
Total	19	5	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(33-9)^2}{20 \times 4 \times 12 \times 12}$$

$$= 0.4083$$

Since the critical value for X^2 is 3.841 and the computed value for poster P_A is 0.4082, gender is not significant in the interpretation of poster P_A.

The gender variable was also used in the interpretation of the poster labelled P_B and the result presented in Table 19

Table 19: gender variable in the interpretation of P_B

Social variable	C.I	W. I	Total
Male	9	3	12
Female	10	2	12
Total	19	5	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(30-18)^2}{19 \times 5 \times 12 \times 12} = 0.2526$$

The findings reveal that at the level of 5% significance and degree of freedom of 1, gender is not significant in the interpretation of poster P_B.

In sum, this study revealed that there were varying percentages in relation to how the respondents interpreted the messages on signposts, posters and pamphlets. As for the signposts, there was an average of 86.11% accuracy; posters followed closely with an average of 82.63% accuracy and the pamphlets came last with an average of 70.13% accuracy.

SPOKEN MESSAGES

The spoken messages in the form of two public barazas sessions were also analysed taking into account the social variables of age, education level and gender. Half of these messages were in English and the other half Kiswahili. The findings are revealed in the discussions that follow.

PUBLIC BARAZA

The public baraza sessions were conducted in English and Kiswahili languages. The former was labelled PB_A while the latter PB_B respectively. The English session sought to sensitise people on the dangers of improper disposal of plastic bags. The Kiswahili session aimed at educating the people on recycling of waste materials. Some of the wastes mentioned were plastic containers, broken bottles and paper. The speakers in both sessions used simple language that was easily understood. Below is a presentation of the respondents' interpretation of the messages relayed in English during the public baraza sessions. The social variables of age, education level and gender have been taken into account. Table 20 shows the age variable in the interpretation of session PB_A.

Table 20: Age variable in the interpretation of session PB_A

Social variable	C.I	W. I	Total
Youth	11	1	12
Middle age	12	0	12
Total	23	1	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(12-0)^2}{23 \times 1 \times 12 \times 12} = 1.0437$$

The findings reveal that at the level of significance of 5% and degree of freedom of 1, age is not significant in the interpretation of public baraza messages labelled PB_A. Table 21 shows how the age variable was used in the interpretation of session PB_B.

Table 21: Age variable in the interpretation of session PB_B

Social variable	C.I	W. I	Total
Youth	12	0	12
Middle age	12	0	12
Total	24	0	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24 (0-0)^2}{24 \times 0 \times 12 \times 12} = 0$$

From the findings, it is clear that the computed value is below the critical value, this means that age was not significant in the interpretation of the message labelled PB_B.

The education level variable was also used in the interpretation of public baraza messages labelled PB_A and the result presented in Table 22.

Table 22: Education variable in the interpretation of session PB_A

Social variable	C.I	W. I	Total
Post secondary	12	0	12
Primary-secondary	11	1	12
Total	23	1	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(11-0)^2}{23 \times 1 \times 12 \times 12} = 1.0437$$

Since the critical value for chi-square exceeds the computed value, education is not significant in the interpretation of public baraza PB_A. Table 23 shows how the education level variable was used in the interpretation of session PB_B.

Table 23: Education variable in the interpretation of session PB_B

Social variable	C.I	W. I	Total
Post secondary	12	0	12
Primary-secondary	12	0	12
Total	24	0	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(0-0)^2}{24 \times 0 \times 12 \times 12} = 0$$

The findings reveal that at the level of significance of 5% and degree of freedom of 1, education is not significant in the interpretation of public baraza messages labelled PB_B.

The variable of gender was also used in the interpretation of public baraza messages labelled PB_A and the result presented in Table 24.

Table 24: gender variable in the interpretation of session PB_A

Social variable	C.I	W. I	Total
Male	10	2	12
Female	11	1	12
Total	21	3	24

*Corresponding Author: Christine Khakasa Wekesa

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(22-10)^2}{21 \times 3 \times 12 \times 12} = 0.3809$$

The value 0.3809 reveals that the interpretation of the public baraza message for both male and female respondents was not significantly different. Table 25 shows how the gender variable was used in the interpretation of session PB_B.

Table 25: gender variable in the interpretation of session PB_B

Social variable	C.I	W. I	Total
Male	12	0	12
Female	12	0	12
Total	24	0	24

Using the computation formula, the result was analysed as follows:

$$X^2 = \frac{24(0-0)^2}{24 \times 0 \times 12 \times 12} = 0$$

It is evident from the findings that the gender of the respondent was not significant in the interpretation of public baraza session labelled PB_B.

CONCLUSION

The study concluded that social variables (education level, age and gender) do not influence the interpretation of messages. The study revealed that spoken messages were favoured by the respondents as compared to the written ones. The argument behind this was that the language used in spoken messages was simpler than the one in the written version. Moreover, spoken version provided room for clarification as compared to the written form. The study attributed poor disposal of waste to attitude. The researcher posits that for the battle against poor waste disposal to be won, there has to be change of attitude among citizens especially those who reside in low-income areas.

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