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Semiology of highway codes in Techiman

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Abstract
This research work identifies some selected Ghana Highway Codes in Techiman and uses semiotic approach to analyse the components; especially, the non-linguistic sign and symbols used as signifiers of specific information about road usages. It also examines the communication components identified in the Highway Codes to show the synergy between the signs and the linguistic imprints and how they all correlate to make communication effective. The data examined in this research are some of the Highway Codes or traffic signs commonly used on Ghanaian cities and intercity roads. The researcher used hundred (100) respondents who answered the questionnaire sent to them. Both quantitative and qualitative descriptions were used in the analysis. The research work discovered that the Highway Codes are not put into effective use by the road users in Techiman, mostly due to the fact that attention is not paid to the codes as part of the driving philosophy that users must imbibe. It therefore recommends that deliberate efforts must be made by the officials of the road safety commission, Ghana and those in charge of issuance of driving license (DVLA) to ensure that drivers not only pay attention to the Ghana Highway Codes but also religiously adhere to the creeds they represent.

Keywords: Semiotics, highway codes, Techiman, Ghana

Introduction
Highway Codes/Road Signs
Highway Codes are regarded as signs and symbols mounted or drawn on the roads or road sides to direct traffic. These signs and symbols form important aspects of road descriptions and are usually the combination of linguistic and non-linguistic elements, used for the purpose of giving specific instructions and information to road users, with the aim of avoiding incidences of collision of activities on the roads in the course of usage and ultimately, to prevent road mishaps. However, it is discovered that negligence on the part of road users has reduced Highway Codes to mere decorations. Also, it is noted that many road users often assume that they are familiar with the art of driving, and know the roads well enough. Thus, they are nonchalant with driving and pay little or no attention to the Highway Codes, which to them, especially the commercial drivers, in Techiman, are just mere road adornment.

Road
Road is a form of connectivity creation within the vast space that makes up the society. The conception and creation of roads show human ingenuity at maintaining contacts and links. Road is "a path established over land for the passage of vehicles, people, and animals. It provides dependable pathway for moving people and goods from one place to another." The need for connectivity makes the road network so complex, as there exists different types, such as private drive pathways, two-lane highways, dual carriageways, expressways, all having their complexities, such as T-junctions, Y-junctions, roundabouts, interchanges, intercessions, U-turns, etc. One of the ways in which genuine and effective result of the process of interconnectivity is ensured is the use of Highway Codes. In order to make the use of the road so easy therefore, different Highway Codes that form part of the road education are presented in a form of images/signs (semiotics), symbols and signals to serve as road user's guide. Highway Codes or traffic signs are used to provide information to regulate, warn, and guide road users in a traffic system. Dewar and Olson (2002, pp. 421-458). These signs convey messages in words or symbols and are erected to regulate, warn, or guide road users (motorists, and pedestrians e.t.c). Makinde and Opeyemi (2012, p.608). The International Commission of Illumination (CIE) (1988, p. 3) describes sign as a device that

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provides a visual message by virtue of its situation, shape, colour or pattern and sometimes by the use of symbols or alphanumeric characters, which is used to transfer information. Also, sign is defined by the U.K. Department of Transport, (1991, p. 4) as an integral part of the road environment that can include not only upright signs giving warnings and instruction to traffic, speed limits, directions and other information, but also road markings, traffic light signals, motorway matrix signals, zebra and pedestrian crossing and cones and cylinders used at road works.

Signs and Symbols

The term signs and symbols as used in this work refer to an observable substance, the mental image of which is associated in our minds with that of another image or concept. It is a form that is marked by an intention to communicate something meaningful. (Guiraud, 1975) It is for this reason that Wales (1990, p. 419-420) also extrapolates that "signs have no significance unless users recognise them as signs. This means that the meaning of signs has to be learned by the community, and their values can change. Wales observes further that the fact that the values of signs can change over time further indicates the arbitrariness in the relationship between the signifier or significant ("the form or concept") and the signified or signifier (the thing or idea referred to). (p. 420).

The Highway Codes, like any other codes, are forms of social contract, they are set of rules or conventions that members of a group agree to follow for their mutual benefit or convenience. In semiotics, a code is a set of shared understandings among users about the relationship between signifiers and signified. According to Wales (2001), codes are systematic sets of rules that assign meaning to signs, i.e., to "things" that stand for, or refer to other things in meaningful ways. Broadly speaking, semiotic codes may be signifying and /or behavioural, among others, and these include Morse code, secret codes, the binary code of computers (ones and zeros), musical codes, codes of algebra, traffic lights, dress, scents, taste (in culinary practice), gesture, etc. (Eco 1976; Sebeok 1994; Wales 2001). To them, signifying codes may be explained as system of signs governed by rules agreed upon (explicitly or implicitly) between members of the using culture. Semiotics is concerned with the phenomena of signs in all their abundance and variety: acoustic signals, road signs, verbal signs, gestures, - in short, signifying objects and artefacts of virtually every size, shape, colour, and substance. Louis Hébert (2011). It is in this light that this research uses semiotics, as the scientific study of sign for the purpose of communication to the study of the Ghana Highway Codes as signs and symbols used for the purpose of communication to the road users in Techiman Municipality.

Interpreting Signs

How are signs used to signify meanings? Semiotics is the study of meaning making through signs and is premised on the notion that signs have a triadic quality (Danesi and Santeramo, 1999). There is the physical sign itself (e.g., word, gesture); the entity being referred to (e.g., object, idea), and the sign's meaning or signification. Various philosophers and semioticians (Saussure, 1999; Pierce, 1999; Eco, 1976) refer to the sign, its signified, and its signification/meaning by different terms and have

represented this relationship as a triad. The signifier/physical sign/ representation can be words, gestures, physical objects and pictures that call attention to or signify an object, event, idea/concept or being (Pierce, 1999; Saussure, 1999). The signified is also referred to as the referent or object. The process by which the object, event, idea/concept is captured and organised in some way by the sign is a form of representation. Although, not historically accepted as a common view, signs or signifiers are, "seen as suggesting meanings rather than encoding them" (Denesi, 2007, p73). According to Pierce (1999) a sign's meaning arises in its interpretation. Pierce (1999) explains that a sign "addresses somebody, that is, creates in the mind of that person an equivalent sign, or perhaps a more developed sign" (p 72). Furthermore, this mental interpretation includes the emotions, ideas and feelings that the sign evokes for a person at the time. Perce refers to the sign's meaning as the interpretant.

The objective of this research is to find out the semiotic values or implications of road signs, its users and how the signs communicate to the users at large. These aims are captured in the research questions for this work as follows:

➢ Why do we need highway codes in Techiman?
➢ What is the communicative significance of highway codes?
➢ What are the impacts of highway codes on the users?

Literature Review

This section undertakes a review of literature available on the topic of semiotics. It starts with an introduction to the concept of semiotics before identifying the usefulness of semiotics to the highway or roads.

The study and analysis of signs has been theorized and explored at length in discourse and more specifically in light of traditional semiotic theories (de Saussure (1916); Peirce (1955); Barthes (1967); Eco (1976); Sebeok (1977); Morris (1970)). In order to have a sounder understanding of some of the basic elements pertaining to the study of signs and since the present study offers to explore and study road signs, it is necessary to grapple some basic concepts and fundamental notions related to signs. When analyzing signs, it is necessary to draw a distinction between three semiotic categories which have been defined in light of Peircean semiotics (Peirce, 1955; Lyons, p. 106; 1977) *a) the icon:* a representation of an entity in the world which conveys similarity with the actual entity (e.g. a smiley which can be used to represent a smiling person in internet chats); *b) the symbol*: a completely arbitrary and purely conventional representation of an entity in the world where the signifier does not resemble the signified (e.g. a green traffic light means we can continue driving – hence the arbitrary association between the color green and the action of driving is not an inherent quality of the traffic sign 'green'); *c) the index:* a sign which means something because of where and when it is created in the world but also because of how it causally relates to another referent (e.g. an arrow pointing towards one direction down a street showing the direction where traffic should go).

Semiotics

A science that studies the life of signs within society is conceivable. It would be part of social psychology and consequently of general psychology. I shall call it *semiology* (from Greek *semeion* "sign"). Semiology would

show what constitutes signs, what laws govern them.
Ferdinand de Saussure (1 857-1 913)
Semiotics is the study of signs; in layman's terms, it could also be described as the study of 'hidden meanings' or messages. Put in simple terms, when you see a single red rose, or even a picture of a single red rose, you do not merely think of just a flower, the words love, romance, and even engagement spring to mind. This is because the single red rose is a known symbol for these terms; we come to recognise this through the learning process in our culture. The semiotics we study today is a theory that has been developed over a number of years and is derived from the work of Swiss linguist Ferdinand de Saussure and the American philosopher Charles Sanders Peirce. It was at the beginning of the 20th century when Saussure first proposed the concept behind semiotics. At the same time, across the Atlantic in America, Peirce was also developing a model based around the same idea (e.g. Clarke et al, 2000 & Innis, 1985). Due to their differing academic backgrounds, their concepts were not parallel in thought and, because of these differences; elements from both have helped to mould the understanding of present day semiotics.

Ferdinand de Saussure
Saussure, a linguist, developed "his theory focused on language and his model is centred on words as signs" (Crow, 2003, p.17). His term to describe this phenomenon was called 'semiology'. Under his train of thought, a sign comprises of a 'signified' element (usually an object, concept or idea) and a 'signifier', which is the spoken word (Mick, 1986).

The Saussurean Model of the Sign (Ferdinand de Saussure 1857-1913)
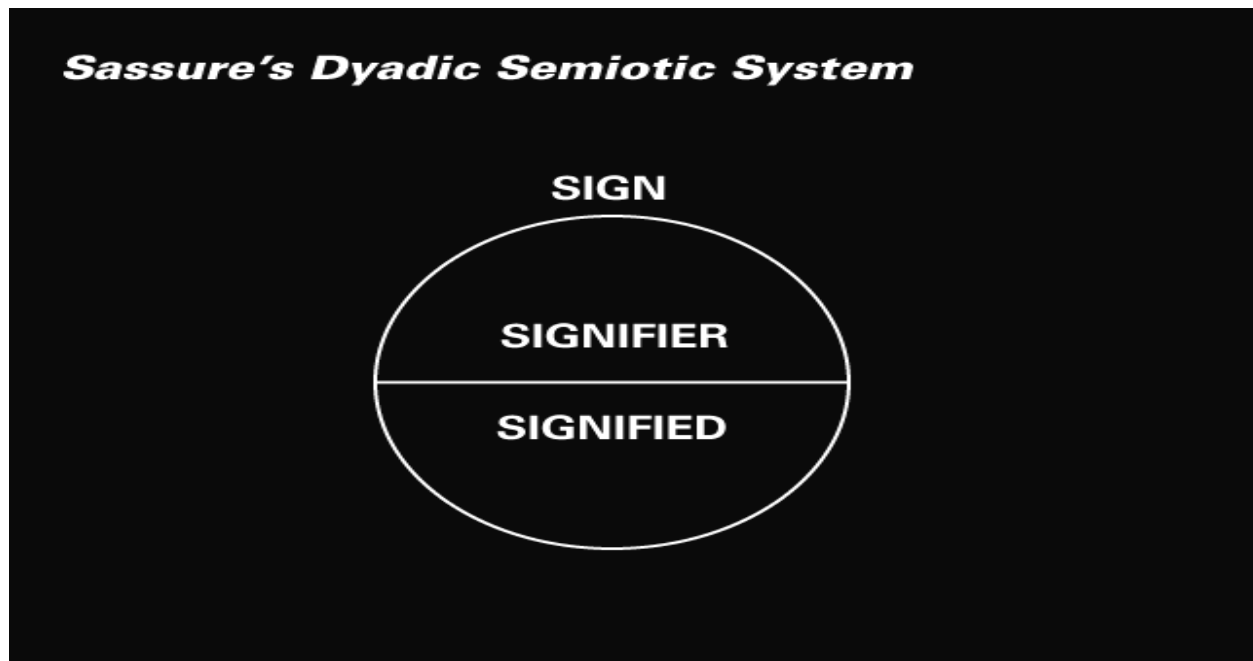

Source: Cobley & Jansz (1997)

Saussure claimed that signs could be classed in one of two categories, either 'iconic' or 'arbitrary'. Iconic signs actually resemble the thing that the sign stands for (this classification is the same as Peirce's 'icon'). Saussure's arbitrary signs are somewhat more complex, that is, they are learned through cultural (or language) norms. For example, a flying creature with feathers is called a 'bird' in English, 'vogel' in German, 'pájaro' in Spanish and 'oiseau' in French. Yet all of these different words are recognised in their respective countries as representing the same animal. Therefore, the signifier that we use depends on which language we are speaking/have learnt, and which culture we come from (Bignell, 1997).
Saussure acknowledges that the value of any given sign is dependent on the relationship it has with other signs in the system. Chandler (2002, p.23) reinforces Saussure's idea with the statement "A sign has no 'absolute' value independent of this concept." Chandler (2002) then gives the example of chess pieces on a chessboard, stating that each individual piece means nothing unless you see its relationship with all the pieces on the board. Thus, we must acknowledge the difference between the signification of a sign (the relationship between signified and signifier) and the value of a sign (the relationship it has with other signs within the system of signs).

Peirce
Peirce coined the term 'semiotics' as his version of Saussure's semiology. However, Peirce's concern was not just with language but also with all types of sign. For him, a sign was "anything that stands for something (its object) to somebody (its interpreter), in some respect (its content)" (Mick, 1986, p.198). Whereas Saussure's model acted as a dyadic relationship, Pierce added a third element to the frame and became a triadic relationship.

The Peircean Model of the sign (Charles Sander Pierce 1839-1914)

Pierce's Tryadic Semiotic System

SIGN

INTERPRETANT   OBJECT
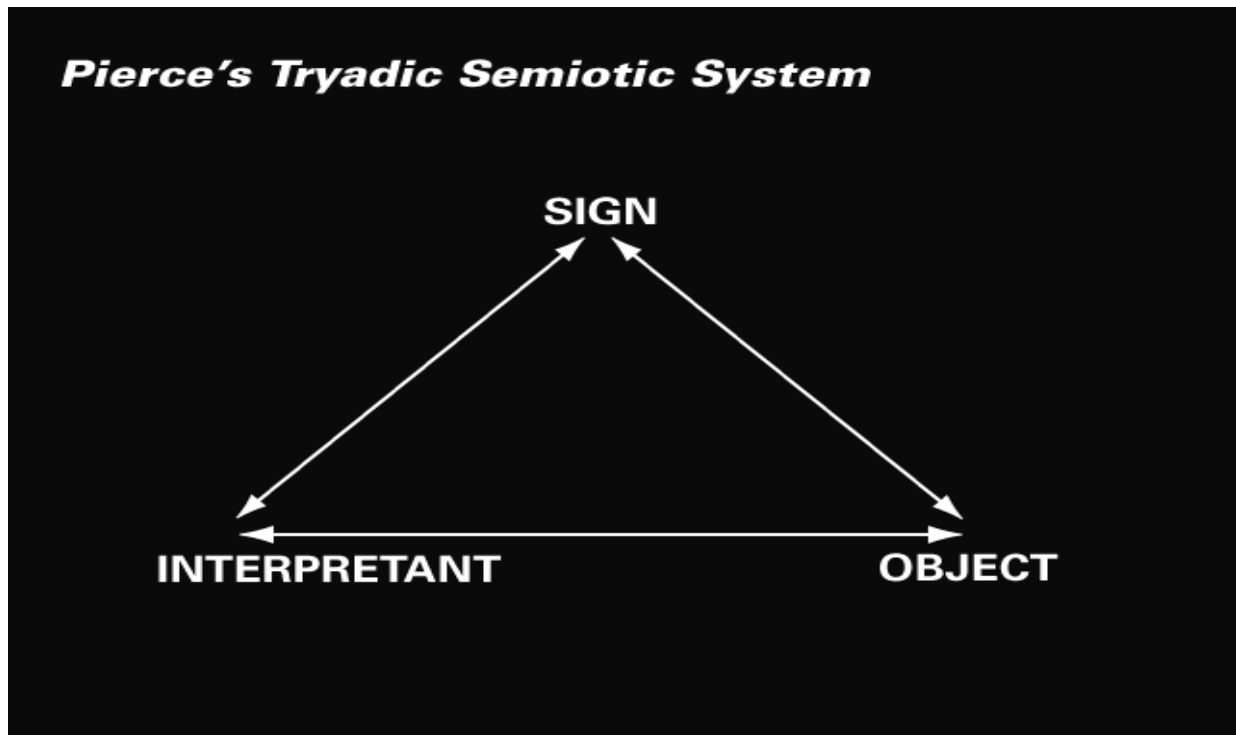
Source: Johansen & Larsen (2002)

Peirce concluded that there were three types of sign namely, an icon, an index or a symbol. An icon resembles the sign and it could take the form of a photograph, television image or map. For a sign to be classed as an index there must be a direct link between the object and that which it represents, for example, smoke is an index of fire. The last category of signs is symbols. A symbol has no logical connection to what it is representing, the meaning must be learnt; a prime example of this is a traffic light, we all know that green indicates 'go' yet there is no logical link as to why this should be so (Hodge & Cress, 1988). However, Crow (2003) urges us to acknowledge the fact that these categories can often work together and are not necessarily exclusive, for example, a road sign indicating traffic lights can be placed in all three categories. It is an icon because the picture resembles the object. It can be an index if placed at a road junction and the red triangle of the sign is a symbol because, through convention, it is known to represent danger.

Not only did Peirce identify three 'types' of sign but he also recognised three 'levels' of sign. He branded these firstness, secondness and thirdness. The level of firstness comes as a feeling or mood in its primitive state, that is just taken as it is, unanalysed; Crow (2003) gives the example of 'feeling blue'. Secondness is the fact of one object's relation to another to complete the whole. Peirce's own illustration of this, which is discussed in Hervey (1982), is of a married couple. The married couple is a fact, but it could not exist without the relationship of husband and wife to complete the pair or whole. This is also an example of a paradigmatic relationship of one sign working with another to create a 'bigger' sign. The opposite of this is a syntagmatic relation, which is where one sign is chosen or used in place of another to create a different meaning (e.g. a person attending an interview would wear a suit rather than jeans and t-shirt, in order to create a professional image). Finally, Peirce's level of thirdness is the mental level, which ties all elements of the sign together and allows the signs to be understood through conventions.

Peirce named the interaction between the three elements of the sign as 'semiosis'. His model of the sign is different from Saussure's in that it includes an 'object'; however, the other elements of the two academics' models have similarities. Peirce's 'representamen' holds a parallel meaning to the 'signifier' in Saussure's model and Peirce's 'interpretant' is comparable to Saussure's 'signified'. Chandler (2002, p.33) notes that "the interpretant has a quality unlike that of the signified: it is itself a sign in the mind of the interpreter". This means that in the mind of any given person, the overall sign could create another interpretant that would lead, in turn, to another sign model; this process is a step further than semiosis and is called unlimited semiosis (Cobley & Jansz, 1997).

Semiotics attempts to answer the following question: What does X mean? The X can be anything from a single word or gesture, to an entire musical composition or film. The "magnitude" of *X* may vary, but the basic nature of the inquiry does not. If we represent the meaning (or meanings) that X encodes with the letter *Y,* then the central task of semiotic analysis can be reduced, essentially, to determining the nature of the relation X = Y: Let's take, as a first case-in-point, the meaning of *red.* In this case, our X constitutes an English color term. As it turns out, there is hardly just one answer to the question of what it means. At a basic level, it refers of course to a primary color located at the lower end of the visible spectrum. However, that very color can have a host of other me\

anings. Here are few of them:

➢ If it appears as a traffic signal, it means "stop" to anyone facing the signal at an intersection.
➢ If it is the armband color worn by someone at a political rally, then the wearer is perceived to be an individual who espouses a particular lung of political ideology, often labeled as "left-wing" or "radical."

> If it is the color of the flag used by someone at a construction site, then it is a signal of "danger."
> If it is used in an expression such as "turning red," then it is a figure of speech that allows people to refer to emotional states without naming them precisely.

In sum, *red* is an example of a *sign.* It is something, *X* (a color), that stands for something else, *Y* (a traffic signal, a political ideology and so on). Describing and investigating the nature of the X = Y relation constitutes, *tout court,* the subject matter of semiotics. The distinguishing characteristic of our species is its remarkable ability to portray the world in this way-that is, to use *X's* such as colors, pictures, vocal sounds, hand gestures, and the like to refer to things. This ability is the reason why, over time, the human species has come to be regulated not by force of natural selection, but by "force of history," that is, by the accumulated meanings that previous generations have captured, preserved, and passed on in the form of signs. As opposed to Nature,

Culture is everywhere "meaningful," everywhere the result of an innate need to seek meaning to existence.

Since the middle part of the twentieth century, semiotics has grown into a truly enormous field of study, encompassing, among other endeavors, the study of body language, art forms, rhetorical discourse, visual communication, media, myths, narratives, language, artifacts, gesture, eye contact, clothing, advertising, cuisine, rituals-in a phrase, anything that is used, invented, or adopted by human beings to produce meaning. Thus from the literature, it is fairly obvious that such study of semiotics has not been done on highway codes in Techiman and for that matter Ghana in general. The purpose of this work is to sketch a general picture of what semiotics is and purports to do and introduce semiology to the field of road, thereby introducing its fundamental notions and principles to the readers.

Conceptual Framework/ Theory/ Methodology
Since the element of study in this work is semiology (signs), that is, the highway codes, mounted, pasted or drawn on different parts of the road; it is important to know the interrelationship of the signs on the road and the road users and the intended meaning. To be able to achieve this, it is equally important to use a methodology that allows for relating the images and pictures used or assigned to the intended meaning. This is because; the signs are not just there, but for the purpose of communicating with teeming road users, in order to make road usage effective and road safety achievable. To carry out this study, the methodological technique of semiotic analysis is employed. This is because of the need to determine the meaning of the various signs and the importance of the use of the signs for the road users. Using semiotics approach to the study of signs and symbols, the selected highway codes are analysed to relate the signs and symbols as effective signifiers to the information that the highway codes are meant to give. It also examines the linguistic elements imprinted on some of the signs, where they occur, the colour, the shape and the images used in the selected symbols and their linguistic correlates. The data examined in this research are some of the Highway Codes or traffic signs commonly used on Ghanaian cities and intercity roads. Other linguistic texts that sometimes accompany these signs and symbols, normally written at the base or imprinted on the symbols, have also been observed as they provide useful contextual information on the Highway Codes. This is important because the signs so selected are those that can easily be seen by road users on daily basis in the course of road usage either as a driver, a commuter, motorcyclists, riders or a pedestrian.

Data Presentation and Analysis
The study involved data collected from (a) some selected road signs or highway codes in Techiman Municipality and (b) the use of questionnaire. The sample population in this work is hundred (100) respondents within Techiman Municipality. The study finds out the need for road signs, the communicative importance of road signs as well as the impacts of the road signs. Of the hundred (100) respondents, 20 participants were from Ghana Highway Authority (GHA), 20 participants were from Driver and Vehicle Licensing Authority (DVLA), 20 participants from Ghana Private Road Transport Union (GPRTU), 20 participants from Drivers and 20 participants from Pedestrians in Techiman Municipality. The participants were purposively selected, because they have been observing road signs advertently for several years in Techiman and therefore possess the information the researcher wanted. The road signs used as data were collected from the Driver and Vehicle Licensing Authority in Techiman. This work is both objective and subjective because the researcher had to saturate answers from people who are within the ambiance of the road usage. Therefore the data analysis involved both quantitative and qualitative descriptions. The quantitative analysis was used for the data collected from the questionnaire. The respondents were asked to fill in a detailed questionnaire. Data from the highway codes was also qualitatively analysed. The frameworks of Ferdinand de Saussure and Charles Sanders Peirce on semiotics theory were employed in this work.

Discussions and Findings
The result of this study is based on the analysis of the data collected. The result is presented on the three main research questions asked at the initial stage of the study. The analysis was done in two forms, quantitative description and qualitative description. The analysis is as follows:

Quantitative Presentation of the Data
This section of the study addressed the first research question on the need for highway codes in Techiman, virtually all the hundred (100) respondents answered "Yes". This is represented diagrammatically below:

Table 1: Shows Whether There Is the Need for Highway Codes In Techiman And Grading

RESPONDENTS	NUMBER	RESPONSE		PERCENTAGE	
		YES	NO	YES	NO
GHA	20	20	-	20%	-
DVLA	20	20	-	20%	-
GPRTU	20	20	-	20%	-

DRIVERS	20	16	4	16%	4%
PEDESTRIANS	20	18	2	18%	2%
TOTAL	100	94	6	94%	6%
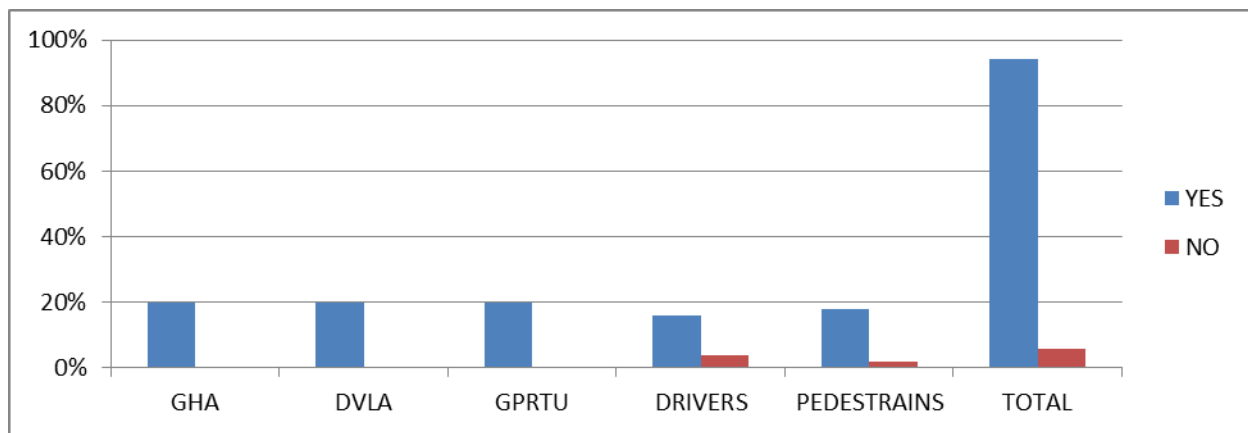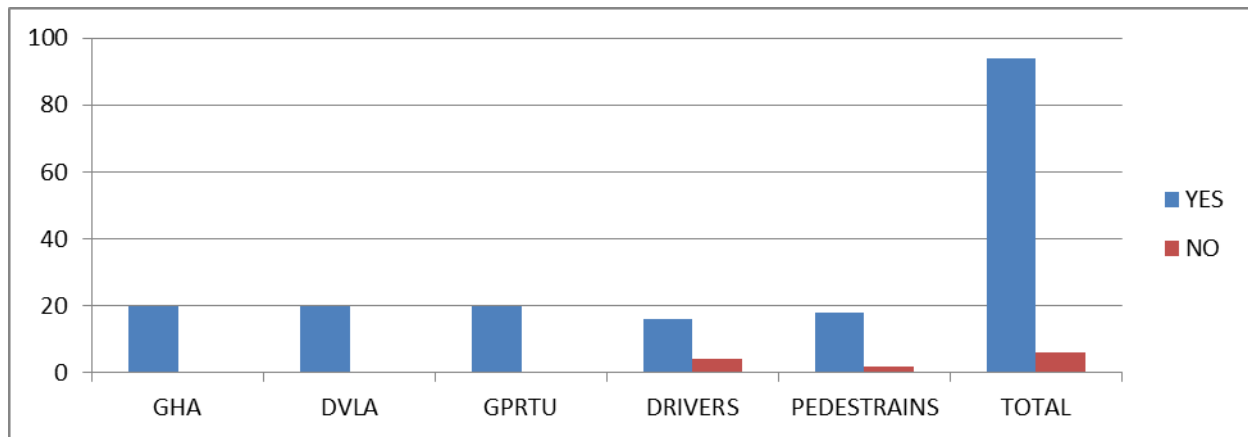
The data collected in table 1 indicate that 94 of the respondents agree to a very large extent that there is the need for road signs or highway codes in Techiman. The result indicate that 94% of the respondents from GHA, DVLA, GPRTU, DRIVERS, and PERDISTRANS were the majority with all the respondents answering "Yes" on the need to have road signs or highway codes. It was further shown that 6 of the respondents answered "No" representing 6% of the respondents only from the DRIVERS, and PERDISTRANS. This has also been shown on the bar graph.

Table 2 indicates response to research question two, that is; what is the communicative significance of highway codes?

The respondents gave varied reasons which have been compressed as follows: the upsilon "ʊ" sign has been used in front of each reason.

ʊa. It depends on the Sense Relation (SR) of the user

ʊb. It depends on the Domain Region (DR) of the user

ʊc. It depends on the Experience Response (ER) of the user

ʊd. It depends on the Stimulus Reaction (SR2) of the user

ʊe. It depends on the Consistent Reason Response (CRR) of the user

ʊf. It depends on the Familiarity Response (FR) of the user

ʊg. It depends on the Perception Relevancy (PR) of the user

Table 2: Communicative Significance (CM) Of Highway Codes

CM / Respondents	ʊa SR	ʊb DR	ʊc ER	ʊd SR2	ʊe CRR	ʊf FR	ʊg PR	Total no. of respondents	Total percentage of respondents
GHA	8	2	2	2	3	2	1	20	20%
DVLA	10	3	3	4	-	-	-	20	20%
GPRTU	7	2	2	2	3	2	2	20	20%
DRIVERS	8	2	1	4	2	1	2	20	20%
PEDESTRIANS	11	2	2	-	1	2	2	20	20%
Percentage for each Reason	44%	11%	10%	12%	9%	7%	7%	100	100%
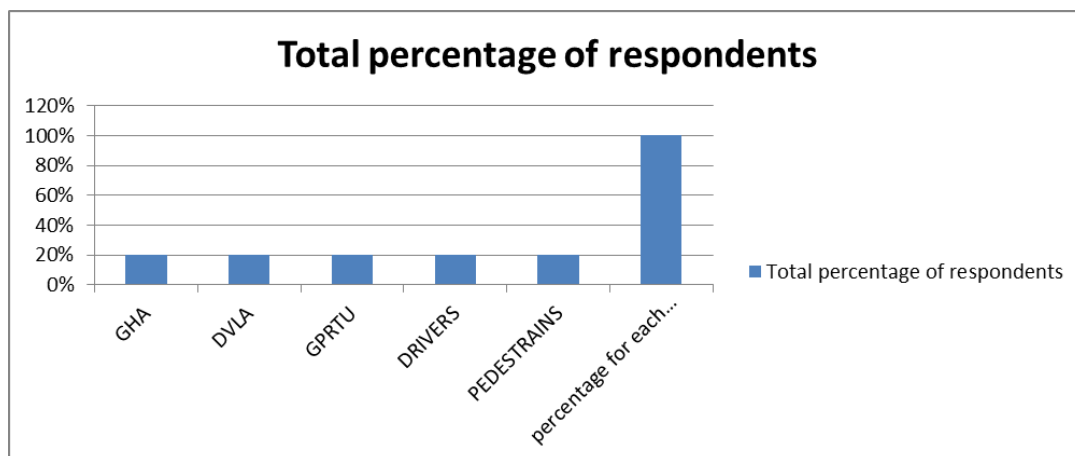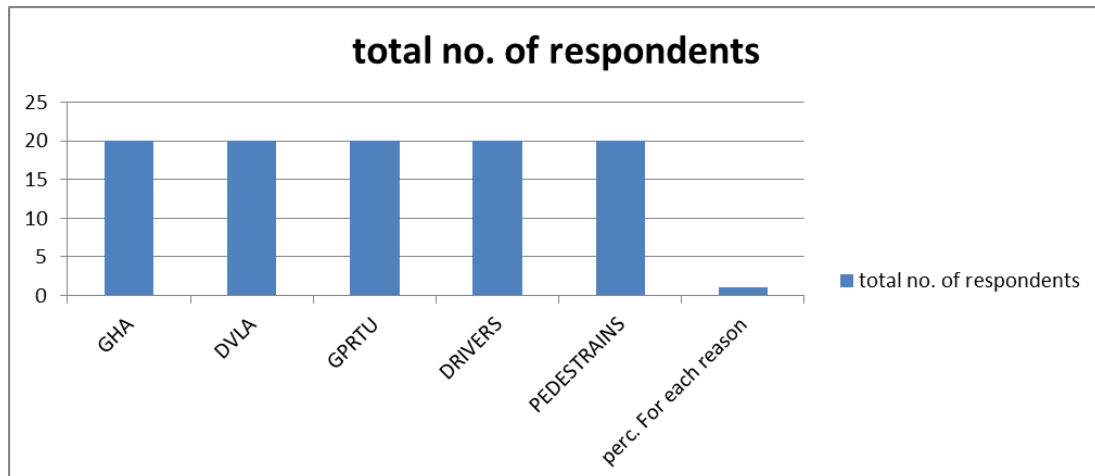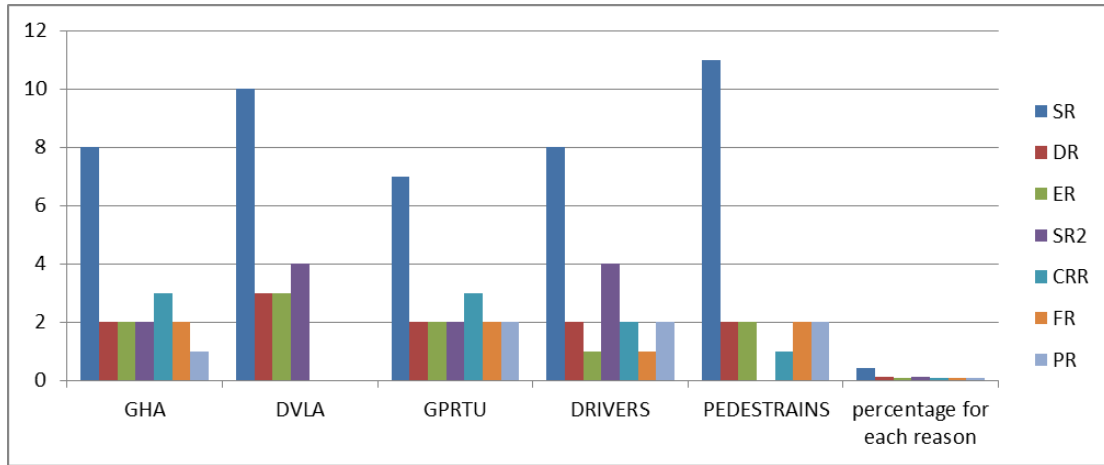
From the table, the responses of the hundred (100) respondents in the questionnaire point to the fact that road signs or highway codes primarily communicate to the road users make them extrapolate or understand better when using the road. Communication is effective only if it is well understood by the one decoding the given information. Hence, semiology makes road users accentuate communicative value of a particular sign for effective communication. This might have been the basis for the responses given by the forty-four (44) respondents in favour of reason "Ʊa" this has also been represented on the bar graph.

For research question three in this study; what are the impacts of highway codes on the users? The hundred respondents gave various impacts which have been rundown to include the following five: The Glagolitic "Ⰳ" sign is used to begin each letter of the alphabet.

Ⰳ a. It creates retro-reflectivity during the night (RF)

Ⰳ b. some of the road signs create no communicative effect. (CE)

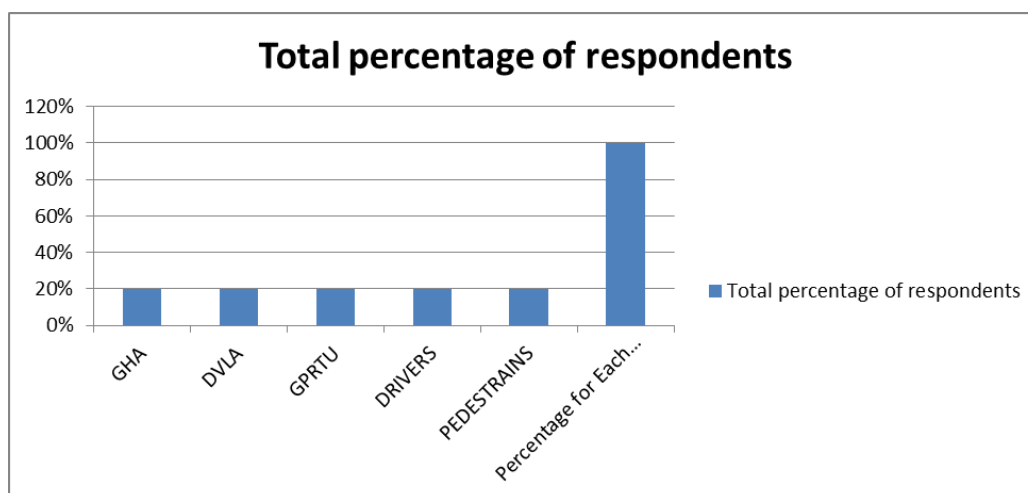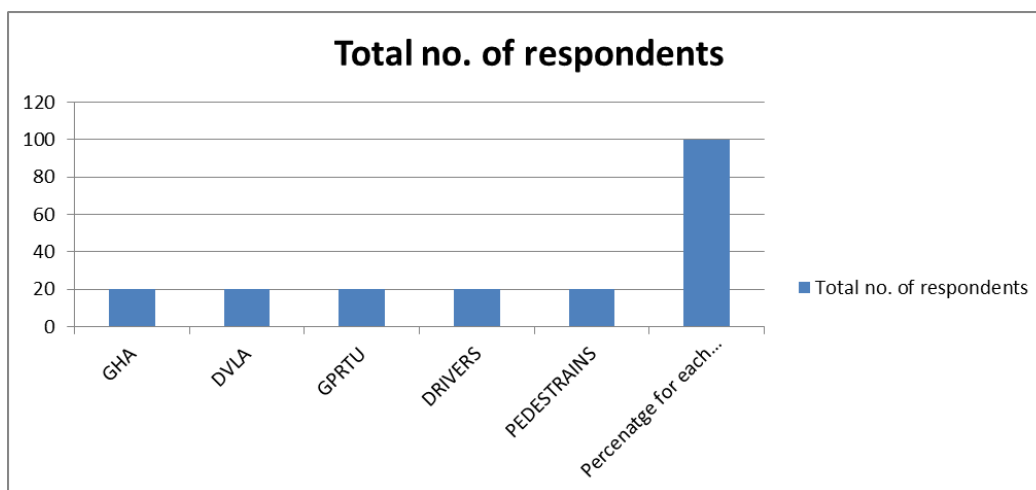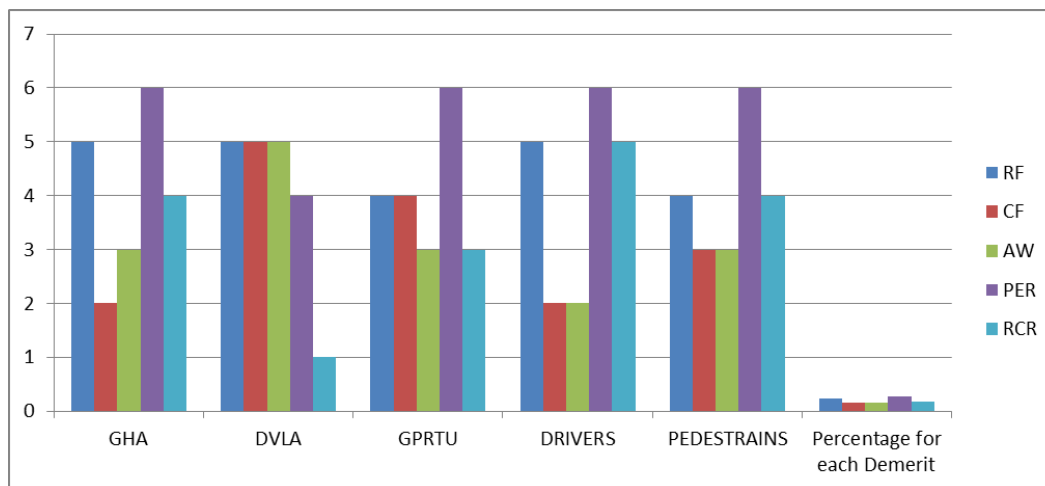Ⰳ c. it provide appropriate warning to all the users (AW)

Ⰳ d. it creates prohibition an emergency restriction (PER)

Ⰳ e. they really are effective in reducing crash rates.(RCR)

The table 3 below shows the distribution of respondents over the impact of road signs or highway codes given above.

Table 3: The Distribution of Respondents over the Impact of Road Signs or Highway Codes

IMPACTS \ RESPONDENTS	₵ a RF	₵b CF	₵c AW	₵d PER	₵e RCR	Total no. of respondents	Total percentage of respondents
GHA	5	2	3	6	4	20	20%
DVLA	5	5	5	4	1	20	20%
GPRTU	4	4	3	6	3	20	20%
DRIVERS	5	2	2	6	5	20	20%
PERDISTRIANS	4	3	3	6	4	20	20%
Percentage for the impacts	23%	16%	16%	28%	17%	100	100%

From the table above, the respondents fairly indicate factors or impacts associated with Highway Code. These are: retro-reflectivity during the night (RF) 23%, no communicative effect (CF) 16%, appropriate warning to all the users (AW) 16%, prohibition an emergency restriction (PER) 28% and effective in reducing crash rates (RCR)

17%. This implies that the respondents are aware of the highway codes any way they might or might not accept it fully as a code.

Qualitative Description

This section of the data analysis sought to answer the first and the second research questions "Why do we need highway codes in Techiman?" and "What is the communicative significance of highway codes?"

Highway Code and Their Communicative Significance

The respondents affirmed that we have Highway Codes in Techiman. The study discovers that even though, Highway Codes do not have general meaning, they mostly have specific meanings and this meanings are usually instructional and they are learned over a period of time long enough for them to be part of the linguistic knowledge representation of the road users. Highway codes, just like the road monuments, are basically iconic signifiers. Although, they may include some linguistic symbols, which Bathes (1979, p. 39) describes as a form of anchorage, in the case of the relationship between pictures and words. It is also discovered that the linguistic correlates of some of the highway codes identified in this study are learned by road users so that overtime, the mental images are imprinted in their minds. This is because the signs and symbols used as road signs are capable of being suggestive as they have no direct cultural or social correlates, yet, they are capable of displaying connections to social, cultural and natural structures. The Highway Code is an institutional object, regulated (and usually 'owned') by officials/authorities whose role will very often be clearest in the restrictions they impose on the use of the road (prohibitions, speed limits, warnings, and so on). Kress (2009) consistently calls this a social semiotics. Social semiotics deals with observable actions and object that have been drawn into the domain of social communication (Halliday, 1978, Van Laureeen & Thibault, 1991). They are signs and symbols though, but they are signifiers and the road users are consciously, culturally and socially bound to them. The signifier is the physical form of an object; what we see, touch and smell in the objective and shared reality. The signified is the content, the meaning of the object; what we experience, think and feel when we interact with theatre fact. Sara (2002, P. 4). Signs in social space tell us a lot about the users of the space; how users interact with signs, how users influence and are influenced by them and how they help to tell stories about the cultural, historical, political and social backgrounds of a certain space. One of the recent branches of scholarship that has taken signs in public space as their object is the Linguistic Landscape studies (Landry & Bourhis 1997; Gorter 2006; Backhaus 2007); Linguistic Landscape is concerned with languages being used on signs in public space. Signs in social space tell us a lot about the users of the space, how users interacts with signs, how users influence and are influenced by them. The Highway Code is situated within the road which can be described as a public space meant or designed for connectivity. Highway codes reflect and regulate the structure of the space in which they operate. Sociological, cultural, sociolinguistic and topological features of the space will determine how signs look and work, and signs will contribute to the organization and regulation of that space by defining addressees and selecting users and by

imposing particular restrictions, articulating norms of conduct and so on to the selected users. Traffic signs tell about traffic regulations, special hazards and other road conditions, construction areas speed limits, etc. The highway codes are never neutral; they always display connections to social structure, power and hierarchies. The reason for that is that public space itself is an area (and instrument) of regulation and control, of surveillance and power and its neglect may attract punishment and sanctions.

Every sign tells a story about who produced it, and about who is selected to consume it. In that sense, every Highway Code points backwards to its creator, and forward to its addressees. The social and political class, in the quest to ensure control on the space as a social value, creates codes which select audience thereby organizes an interaction between the road and the users. Kress' work consistently pushes this agenda, and the fundamental impact of his work is that he brought signs and the study of signs into another theoretical field of force than that of mainstream semiotics. To him, signs should be looked at, not for themselves, but for what they teach about the social processes in which they are embedded and in which they play a vital role. In line with this, Van Leuween sees sign as semiotic resources. semiotics resources are signifiers, observable actions and objects that have been drawn into the domain of social communication and that have a theoretical semiotic potential constituted by all of their past uses and all their potential uses and an actual semiotic potential constituted by those past uses that are known and considered relevant by the users of the resource (Van Leeuwen 2005:4).

Communication in the public space, consequently, is communication in a field of power and authority. In this regard, this research sees semiotics or signs as constructive of social reality, subject to and reflective of conditions of creation and as, real social agents having real effects in social life. Although the images and the roads are two different forms of values, both must be synchronised by the users in order to make the use of the roads effective.

Highway codes are usually signs encoded in colours, shapes, symbols used as semiotic elements. These signs are subdivided into information, facility, or service signs; direction, position, or indication signs. The sign systems generate meanings and their intricate networks encode all aspects of social life (Doubravová 2002). (Fiske 1989), identifies four numbers of codes: the regulatory codes, analogue codes and digital codes, presentational codes, denotational codes and connotational codes. He describes the regulatory codes as the one controlling behaviour, such as traffic code, and signifying (communicative) codes. The signs examined are categorised into types: the regulatory, informative, warning, and the stop signs. The signs are in different shapes and colour demarcations to depict specific message or give specific information or instruction and they are divided into priority signs, prohibitory or restrictive signs, and special regulation signs. Also, informative signs guide road users while they are travelling or provide them with other useful information. Shapes are attached to specific peculiar level of meaning which users will have to learn and take into their consciousness.

Semiotics is concerned with everything that can be taken as sign. According to Umberto Eco (1979, p. 7), semiotics is concerned with everything that can be taken as a sign. Semiotics therefore studies not only "signs" in everyday

speech such as traffic signs, symbols or pictures but everything, which "stands for" something else. This also includes our material culture such as buildings, furniture and products. The signs and shape has information about the function or functions attached to each of the codes. Answering the question on how does space organize regimes of language, (Blommaert, Collins & Slembrouck (2005, p.198) observe that semiotically, we just have to replace 'language' by 'signs'. For example, shapes like circle, rectangle, octagon, lines etc and they all give specific information/instructions. Also, danger warning signs warn road users of a danger on the road and notify them of its nature while regulatory signs notify road users of specific notifications, restrictions or prohibitions with which they must comply.

The framework of semiotics can be summarised into the following three fields of study which are the master piece of this work:

The sign: this entails the study of the various types of signs, and the different ways they have of conveying meaning, and the way they relate to the people who use them.

That to which the sign refers: In other words, the codes or systems into which signs are organised. This includes the ways that various codes have developed to meet the needs of a society or culture, or to exploit the channels of communication available for their transmission.

The users of the sign: In other words, the culture within which these codes and signs operate. Semiology would show what constitutes signs, what laws govern them.

Some of the Ghanaian Highway Codes and the meaning(s) attached to them are shown below: here we have the signifier which is the physical form of the (road sign) or an object; what we see, touch and smell in the objective and shared reality, and the signified which is the content, the meaning of the object or what we experience.

~ 23 ~
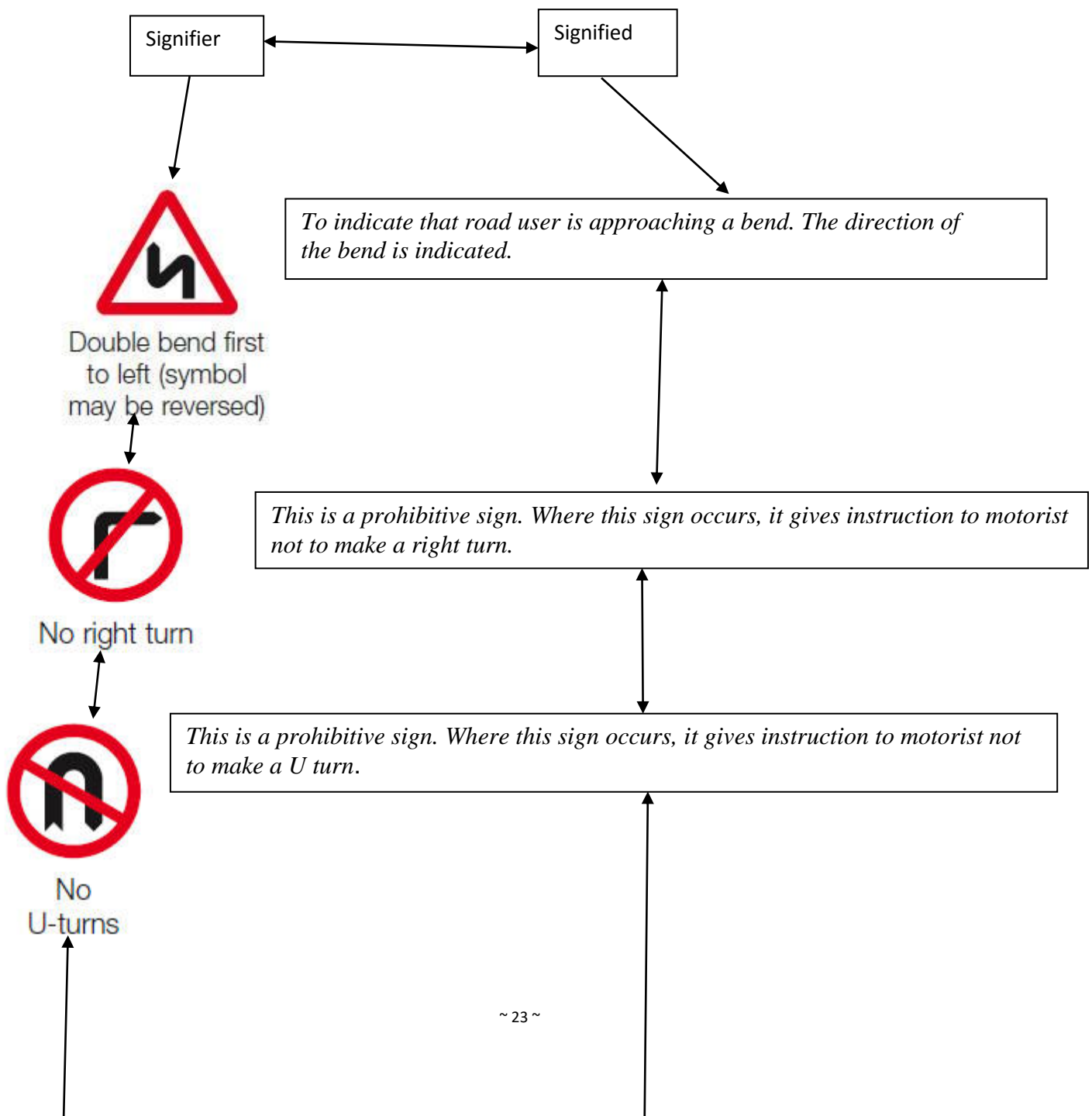
This is a warning sign usually mounted at intersections. Where this sign occurs, it gives instruction to motorist that they must stop at the intersection.
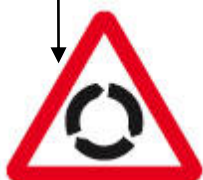
Stop and give way

This is a prohibitive sign. Where this sign occurs, it gives instruction to motorist not to make a complete stop.

This is a warning sign. Where this sign occurs, it gives instruction to motorist on their speed limit of 80km/hour.

This is a warning sign. Where this sign occurs, it gives instruction to motorist that vehicles cannot be parked in the area.

Roundabout

This is a warning sign. Where this sign occurs, it alerts motorist that they are approaching a roundabout.

Uneven road

This is a warning sign. Where this sign occurs, it alerts motorist that they are approaching unlevered portion of the road.

This is a warning sign. Where this sign occurs, it alerts motorist that they are approaching a pedestrian crossing lane.

This is a mark on the road to indicate the pedestrian crossing. This is the only point where pedestrians are allowed to cross the road. Motorists must give way to pedestrian at this point. Department of the Environment Northern Ireland (2008).

Road works

This is a road work alert. Where this sign occurs, it alerts motorist that they are approaching road construction point.

Traffic lights are <u>instruments</u> for controlling traffic by using changing lights. They are signaling devices positioned at road intersections, <u>pedestrian crossings</u> and other locations to control competing flows of traffic

Signifier   **Signified**

Road signs typically have a vast scope but sometimes have restrictions in spatial and semiotic scope. The meaning and effect of signs, in actual social life, is unlimited or unrestricted; it is specific to the space in which they are emplaced and to the addressees they select. This means that the shapes will select audiences in relationship to the professions of the users. For example, the use of triangles and circles as shown above will generate different meaning and idea to a mathematician, different completely from what it means when used as road signs. At the same time, the same person may have to interpret the signs differently depending on the mode in which he is operating, either on his professional desk as a mathematician or as a driver on the road. People who are not familiar or not well read enough to decipher the meaning of written texts and images that go along with these representations will not understand what they mean even when they co-occur with the signs. Thus, as earlier observed in this work, the different modalities appear to have a different semiotic scope: they both reach (and select) different audiences. While everyone is the addressee of the visual sign, not everyone is an addressee of the text. The level of education, social, religious and professional background, for examples, may affect the inability to interpret or cause misinterpretation due to pre knowledge.

Also, the space where signs occur will determine the interpretation it is capable of being given. For example, a sign mounted in a specific location may have its meaning specific to that physical location. The (STOP sign, for example, only applies at an intersection). Also, a sign announcing a speed limit of 80km/hour as shown above will have no relevance to the pedestrians and, thus, does not select pedestrians as their addressees. This shows the fact that most signs have a specific meaning, not a general one. Also, the STOP sign as shown above will only be seen as prohibited within that part and not a continuous order for other parts of the road. Violation of the rule therefore, only applies when it is broken within the speculated area. Scollon & Scollon (2003) provide the term 'emplacement' for this: signs are placed in a specific space, and their emplacement defines their effects. In their book *Discourses in Place* (2003), the term is coined 'Place semiotics' to explore the ways in which the meanings of language are activated by their placement in the world. Here they draw attention to the ways in which interaction, language and space intermingle to make meaning. Signs, consequently, not only have a semiotic scope (as in point above), but also a spatial scope: they operate in particular, identified spaces, and define such spaces. Sociological, cultural, topographic features of the space will determine how signs look and work, and signs will contribute to the organization and regulation of that space by defining addressees and imposing particular restrictions, articulating norms of conduct and so on.

Scholars like Jacob et al. (1975); Ellis and Dewar (1979); MacDonald and Hoffmann (1991); Laughery and Young (1991); Edworthy and Adams (1996) have argued that the symbolic images have tremendous advantages over test-based signs. They based their argument on the fact that symbolic signs can be recognised by those who do not or cannot read the language and can easily be recognised more quickly and accurately than words. This opinion is not shared in this work because, where text co-occurs with visual shapes, we can infer, from the co-occurrence that one has to do with the other: the text supports, emphasises or repeats the information contained in the non-textual, visual sign, and vice versa. Emerson and Linfield (1986) examine factors as determinants of traffic sign legibility: first were factors related to the design variables of the sign (such as character size, spacing between characters, character form, matrix format, light output, contrast, sign's conspicuity, and amount of information displayed); second

were human factors (such as visual acuity and age); and last were environmental factors (e.g. night viewing, fog, and dusk). Even when the words, colours and shapes co-occur and interact as shown above, the different elements still appear to operate in different ways. They are different entities capable of different social and cultural interpretations. Kress & Van Leeuwen (1996) defined such co-occurrences as multimodal signs and showed that the different 'modalities' (words versus shapes ,colours etc) have different 'affordances'. One can do different things with different modalities, and constructing a multimodal sign often revolves around combining the affordances of the different modalities. According to Kress (2010), affordances is what it is possible to express and represent or communicate easily with the resources of a mode, and what is less straightforward or even impossible – and this is subject to constant social work. From this perspective, the term 'affordance' is not a matter of perception, but rather refers to the materially, culturally, socially and historically developed ways in which meaning is made with particular semiotic resources. The affordance of a mode is shaped by its materiality, by what it has been repeatedly used to mean and do (its 'provenance'), and by the social norms and conventions that inform its use in context – and this may shift, as well as through timescales and spatial trajectories (Lemke, 2000; Massey, 2005).

Thus, while the visual shape of the sign is quite generally understood (the sign can be found all over the world, with the same meaning), there could also be cases where text and images are imprinted on the shape to communicate specific messages. Through these co-occurrences, we can infer the interrelationship of the entire concept that makes up the codes: the text supports, emphasises or repeats the information contained in the non-textual, visual sign, and vice versa. This work shows the way the signs and text co-occur and the way in which such co-occurrences actually function. In the examples above, images, text, signs etc. all co-occur to make the Highway Codes more instructional.

The visuals, texts and colours are used to make the Highway Codes effective by being conspicuous, thereby catching the attention of road users. It is very important that sign used on the road have to be visible objects that can easily be seen, identified and deciphered. Engel (1971) operationally defined visual conspicuity as the combination of properties of a visible object in its background that attracts attention via the visual system and is seen as a consequence. Cole and Jenkins (1982) and Cole and Hughes (1990) redefined conspicuity of the sign as the probability that the sign will be noticed by an observer within fixed time or, conversely, as the time that an observer needs to notice the sign. In line with this, Hughes and Cole (1986) stated that driver's visual attention is often attracted by advertisement and other "irrelevant" objects in those sections of the route where advertising frequency is low.

From the ongoing, the perception and comprehension of a road sign/semiotic can be broken down into three stages. The first stage comprises the perceptual processes by which the text on the road sign is encoded. The second stage is termed mental representation whereby the words in the message are transformed or combined to form meaning of the words. The third stage is the utilization stage, in which drivers actually use the mental representation of the sentence's

meaning. If the message is an assertion, the drivers may simply store the meaning in memory, they may obey. This has been represented in a triadic diagram below.
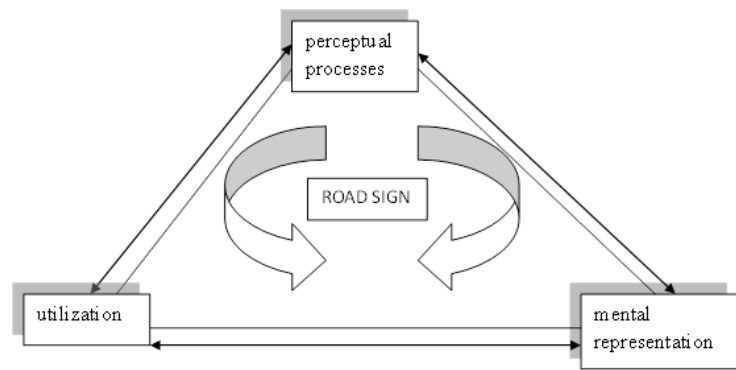
The triadic diagram above represents the semiotic representation of the road sign: the road sign is perceived with the eyes, it is then represented in the mind and then you take an action or follow the instruction.

Many studies of visual information processing have involved determining what can be extracted from a brief visual presentation and the resulting memory for this information (e.g. Sperling 1960). Displays of letters are presented briefly to participate who are then asked to recall as many as possible. Usually they are able to recall between three and six items, although they report they saw more, but could not identify them, i.e. they faded away. These basic perceptual experiments demonstrate that visual information presented to drivers should be in a relatively uncluttered environment.

Conclusion and Recommendation
In relation to road usage, signs direct, inform, locate, advertise, and even entertain people. Without road signs, people would not know how to move around and avoidable accidents could occur. Signs attract attention through the use of symbols, pictures and sometimes words or combination of all. Signs are interesting, not only because of the creativity of their design, but also because they have meaning.

This study concludes that the Highway Codes are very effective information for road users. It noted that the selected Highway Codes are effectively displayed in our intercity and city roads and are bold enough to attract the attention of the road users. This means that, as well as being comprehensible, a sign must be legible. A sign must be credible and accurate; the message conveyed in it should be credible and convincing to the readers so that he will act upon it (Wogalter et al., 1994; Edworthy and Adams, 1996). The message displayed in the sign, whether made up of alphabetic character or symbolic pictures must be legible at the minimum distance from which it is to be read.

The study finds that the Highway Codes used in the Ghanaian roads are a combination of linguistic and nonlinguistic elements, mostly non-linguistic and they are interpretative, attractive, and evocative enough to make effective, the rules guiding the use of the road for road users. The Ghanaian Highway Code, like in any part of the world, is well designed and its components, made up of signs, symbols and lexical items, communicate effectively to give information that will guide the road users.

This research work therefore recommends the following:
➤ That the road safety commission, Ghana should ensure

that all drivers have access to the Highway Codes free of charge, or at affordable price.

➢ This research work discovers that the Ghanaian Highway Code is not available on the internet and libraries. In this world of internet study and education, it is strongly recommended that the appropriate authority make it available on the internet, so that, as it is the case in other countries like Ireland, etc., it will be available for road users and others that might want to use it for research purposes.

➢ The creation of the Highway Code is a very ingenious act that will go a long way in ensuring sanity in the Ghanaian roads. The mounting of these signs on the road and their consistency will create lasting impression, impressions which differ only slightly from one another, impressions which take a regular and habitual course and stays permanently in the consciousness of the road users, than does the rapid crowding of changing images. It is therefore important that there should be proper training of the road users on the meaning of the highway codes used in Ghana.

➢ It also discovers that, with the effective provision of the Highway Codes, the enlightenment of all road users on their meaning and the religious study and adherence to the instruction these Highway Codes are meant to give, will go a long way in reducing, if not stop completely, the high rate of accidents on the Ghanaian roads.

➢ Also, it is not enough for each driver on the Ghanaian roads to have the Highway Codes, but the adequate interpretation of the codes should be a criterion for issuing license to drivers, either private or professional.

➢ The Highway Code test should not be limited to the first timer only but there should be a refresher's course each time the license is to be renewed.

➢ The Highway codes should be easily recognizable and located within a complex visual scene.

➢ Clearly indicate the status of the message (legal, warning or information) becomes a problem to the road users so they should be learner friendly.

➢ The message should be conveyed effectively and efficiently thereby minimizing visual destruction.

➢ Road signs should be comprehensible so that derivers can recognise the action (or choice) to be taken.

➢ Be located such that the driver has sufficient time to act on the message.

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