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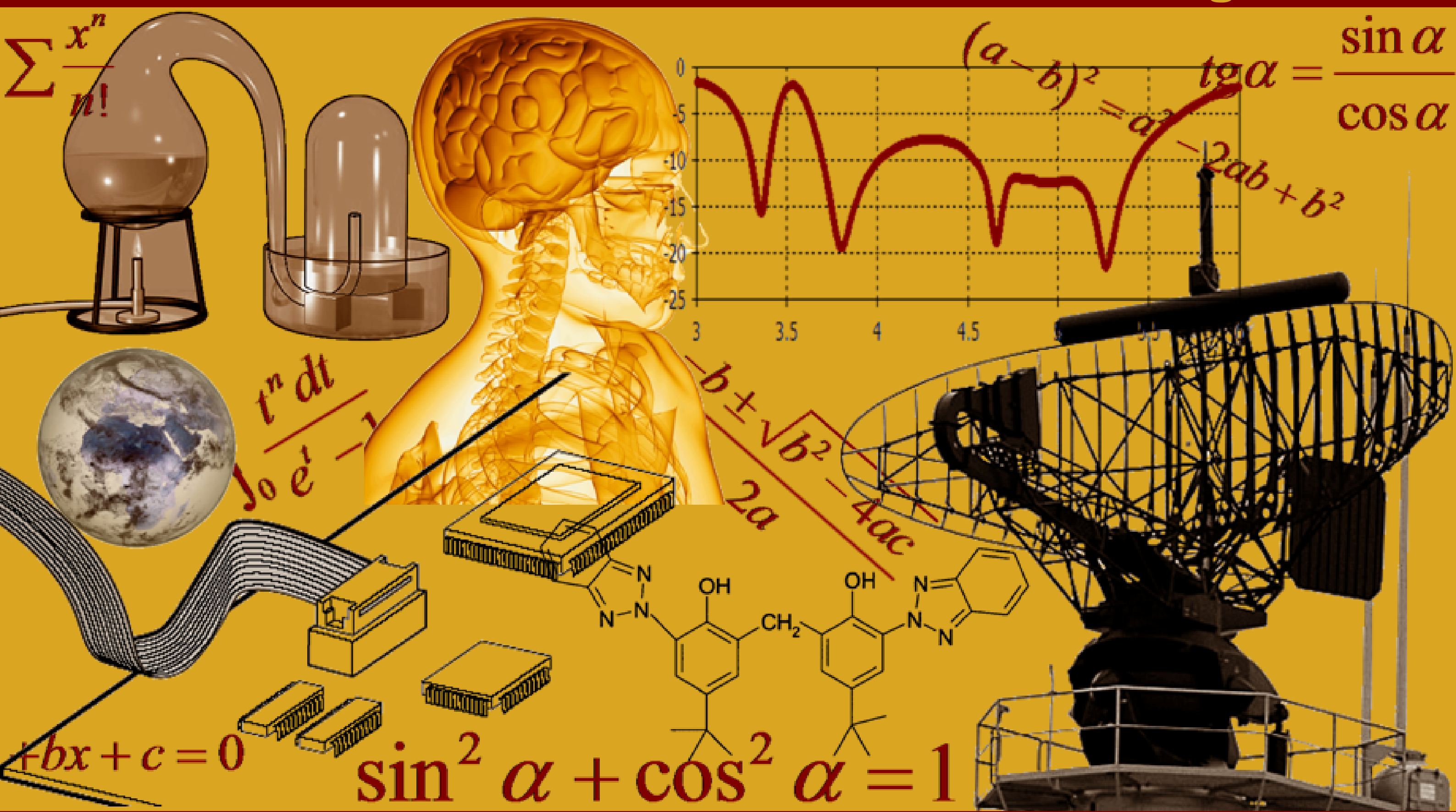

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The Design of Gear Hobs Construction

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ABSTRACT: In the gear production area there are developed the new constructional solutions which shorten production time, improve quality of produced gears and increase productivity. Every solution is based on traditional constructional solutions which offer good and long time verified base. The contribution describe of distribution of present types of gear hobs which are offered for the current gear producers by the world developers which develop these tools long time. Their product fulfil the conditions of traditional the gear producers. In the specified cases the gear producers need to work with special tools which are based on traditional construction base and provide a starting point for their realization. Because of there is described procedure of a calculation for gear hob construction which can be used for their special conditions or develop of new type of gear hob. On the based the general calculation every producer can to improve the gear production.

KEYWORDS: Gear hobs, hobs construction, geometry, hob design, gear production.

1 INTRODUCTION

Recently, the trends in the field of gearing making by using selfgenerating method are focused on increasing of quality demands, costs lowering and selection of an appropriate way of gear wheels making. Regarding to the fact that the area of gear wheels making is wide, it enables to fulfil these requirements in a positive way. New approaches in this field are appearing in a very short time periods. The basic trends in gear wheels making can be divided into three basic courses: The first course is concentrated on in hobs material changes. Another course deals especially with tool construction developing itself, i. e. the hob. The last group is an area of gear wheel making general machine and machine systems constructions.

In this paper, we deal with design of construction gear hobs in generally. There are introduced current types of gear hob construction which are presented on the present manufacturing processes by world-wide companies, which are the main providers. The paper is divided to two main parts. In the first part of the paper we introduce present types of gear hobs construction. In the next part is described procedure of design elements of gear hob.

2 FRONT INVOLUTE GEARING CONSTRUCTION DESIGN SOLUTIONS

A small revolution arose in years 2002 to 2005 within development of high-performance tools for gear wheels roughing at mass production. Also speed-cutting hobs showed very high productivity. However, toolmakers have developed self-generating all-carbide coated hobs. Their operating life in short time since introducing on the market has been doubled. Those tools enable also hard cutting of backed-off hardened wheels, so called peeling.

2.1 SOLID HOBS

The solid hobs basic shape is of involute helix which is divided by grooves for chip removal from working area. The helix can be simple or multi-path. The chip grooves create the cutting edge of the tool. Tooth faces are formed by surface of the helix. They are usually backed-off so that the back-off angle was formed.

The hobs are divided into tools for roughing and tools for finishing. The hobs for roughing are simple (Fig. 1a) or multi-path (Fig. 1 b, c) and they are less accurate. The finishing hobs are simple and tooth faces are always backed-off. The profile of a hob tooth is derived from required tooth profile of cut gear wheel.

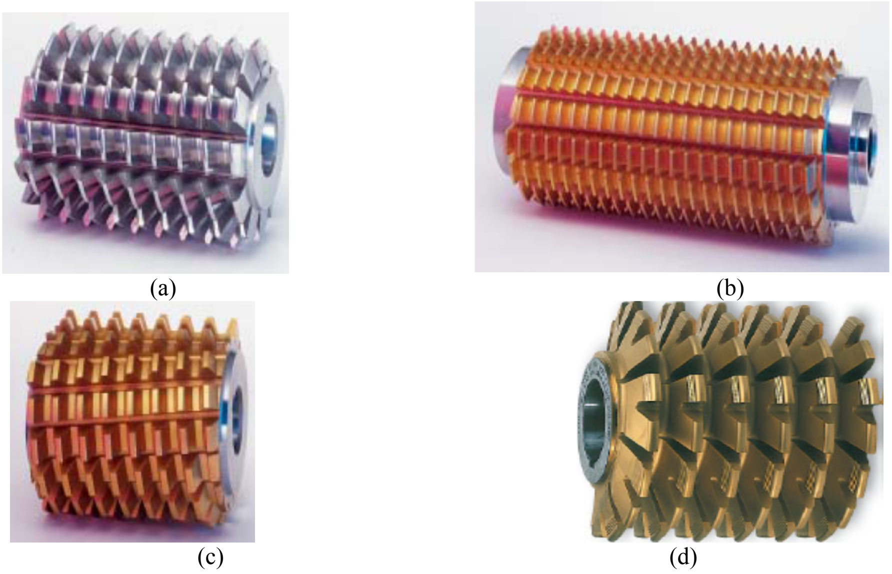


Fig. 1. Selected types of in-feed bobs with solid cutters.

The hobs are usually manufactured as push hobs secured against clockwise turning by a standard tight key. They can be both clockwise and anticlockwise and backed-off. The grooves for chips removal are cut by the angle cutter 18° to 30°. The grooves can be mostly perpendicular to the helix (Fig 1. a, b) cut at an angles 18° to 45° (Fig 1. c) or special combined grooves with high material removal and quieter working during hobbing (Fig 1. d). The cutting length of the hob is equal to the distance of the outer generating gears enlarged by one tooth spacing for the tool reset after its partial blunting.

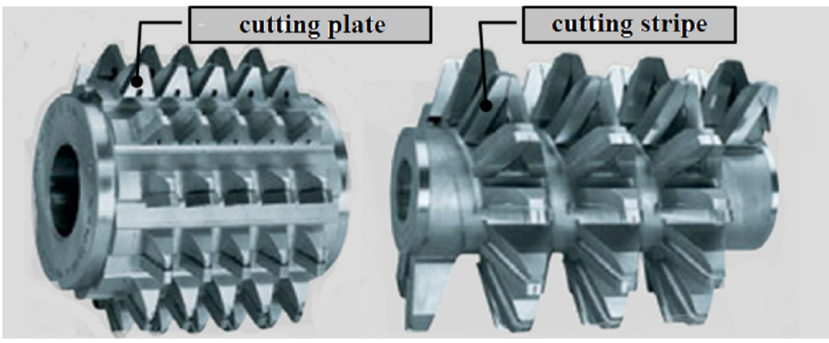
2.2 Gear hobs with cutting elements

Unlike the solid knives of the gear hobs, gear hobs with inserted plates are commonly used for generating larger gears with module bigger than 4 mm. The gear hobs with cutting elements are most made in two basic models (see Fig. 2):

- with cutting plates fixed on the hob tooth frontal area,

- with cutting stripes fixed on the sides of the hob tooth frontal area profile.

Those gear hobs are suitable for roughing. The sharpening of tooth side area is not necessary, which is their advantage.



(a) gear hob with cutting plates (b) gear hob with cutting stripes

Fig. 2. The gear hobs with cutting elements

2.3 STACKED HOBS WITH CUTTING ELEMENTS

The hobs with inserted plates made of cemented carbides, which are manufactured for roughing and finishing, consist of high-quality five or six segments. These segments are inserted into each of the hob body slots with very high precision. The segments are placed one next to another with precise cross openings which provide a large area for mounting and they do not weaken the hob body.

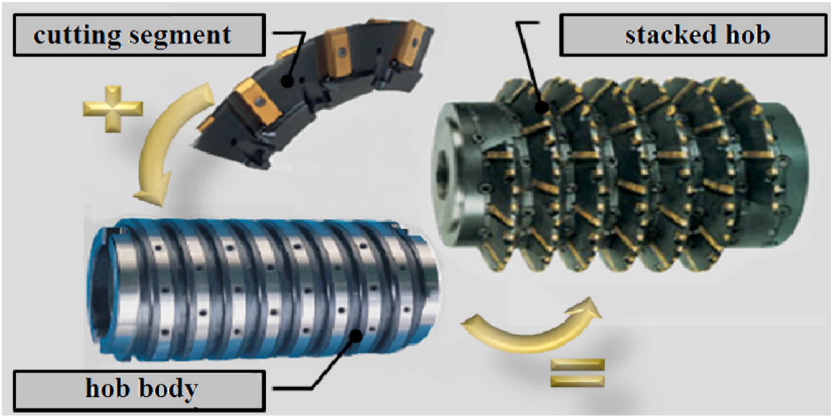


Fig. 3. Construction of stacked hob

Those gear hobs provide a simply structural solution to perform simple and precise assembly and disassembly. The segments are joined with bolts going through the segment to the hob body. To lengthen the hob it is necessary to add just another segment. The individual inserts can be replaced without demounting the hob. Just a screwdriver is needed.

2.4 TOOL SYSTEMS FOR GEARING

The manufacturing of gearing does not consist of only one operation. One of others steps is also gear bevelling. Each operation requires using another tool which means time consuming for manufacturing and economical loss. The Fette company developed a unique tool system which performs hobbing-roughing and bevelling by one tool system called CHAMFER CUT (Fig. 4). The tool system saves time needed for a tool replacement. All the system consisting of the gear hobs and tools for burring is placed on one shaft.

Advantages of the tool system:

- Manufacturing of gearing and burring on one machine,
- The tools are fixed on one shaft,
- The manufacturing of gearing is controlled by software support,
- Burring possible also on helical gearing.

Fig. 4. Fette CHAMFER CUT tool system

The tool system CHAMFER CUT is manufactured in two models, i. e. with one or two tools for burring. The advantage of the double tool is the fact that the first part removes sharp edges on the surface and forms uniform burring on the upper frontal area. The other part burs the edges on the lower side of the gear frontal area. The result is gearing which does not need any additional machining.

3 GEAR HOB DESIGN AND CALCULATION

The typical part of the calculation and structure is original tool surface.

3.1 IN-FEED STRUCTURAL ELEMENT DESIGN PROCEDURE

The transformation of the gear hob original surface into a cutting tool is done as follows: on that surface cutting parts with cutting features are formed. The original surface is milled, i. e. grooves for chips removal are formed and in the same time the frontal part of the tool is made. The back areas are formed by cutting edge along a curve. In the next step it is necessary to make mounting, control, setting and other areas.

1. Making tooth front and cutting edge. The gear hob front can be a surface both planar and helical. The planar area can be in several positions. For zero front angle which intersects the axis of the tool, for the positive and negative front angle which is skew to the axis. Similarly, it can be realized at gear hobs with helical surface. The helix of the groove is perpendicular to the helix of the hob gears. Technologically, the easiest way is to manufacture the front in the plannar area shape. When the frontal part is parallel to the hob axis, the front angle of one of the side part is positive and on the other side negative, so it is good to choose the planar front for small angles of the helix pitch. The intersection of the front and the original surface is a profile of the gear hob cutting edge. Thus, the profile of the cutting edge depends on the groove shape.

2. Tooth back area manufacturing. Commonly, the back areas of a tool are manufactured by means of a certain movement. The cutting edge profiles the back surface in space, its shape has to meet the following requirements:

a) back angles have to be created in all points of the cutting edge,

b) all cutting edges of the hob have to be situated on the original surface or on the surface of the basic helix,

c) technological requirements have to be met.

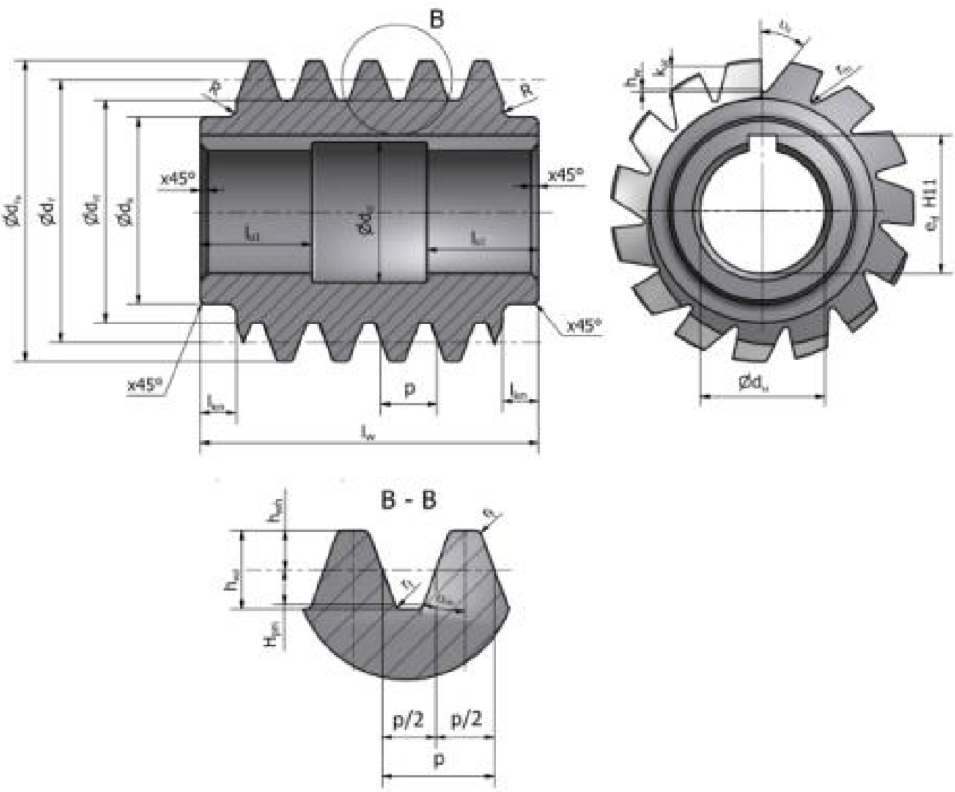


Fig. 5. Description of the gear hob structural elements

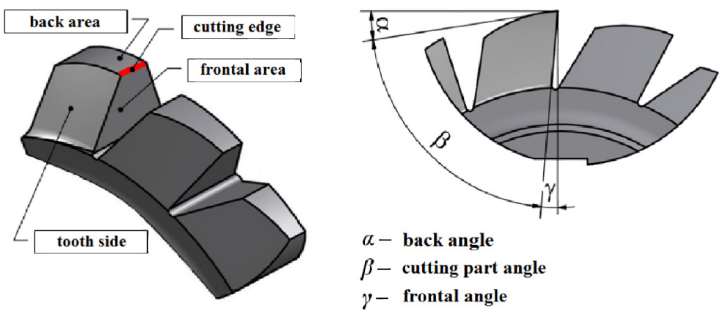


Fig. 6. Description of the hob gearing

The attitude to the hob back shape designing depends on the fact whether it is possible to set the cutting edge position after tooth sharpening or not. For the former possibility the surface of the tooth has to be such so that the shape of the groove stays without any changes after sharpening. To fulfill that requirement, the surface of the tooth back should allow mutual movement. In most cases, however, the hob design does not allow tooth adjustment and that is why the outer pitch cylinder is reduced after every sharpening.

3. Cutting part geometry. The cutting edge of the gear hob consists of three parts. Each of them fills different position, i. e. is different.

4. Hob diameter. It is appropriate to select as biggest diameter as possible because it leads to increasing accuracy of the gearing and durability of the cutting part. The bigger diameter of the hob allows to enlarge the chuck opening and thus the firmness of the mounting is increased and vibration reduced. By enlarging the mounting hole diameter the number of cutting racks can be increased, the tooth shift is reduced and the cutting part durability is increased.

5. Longitudinal groove dedendum diameter d_{ff} – it is chosen depending on the machining device and an arbor diameter.

$$d_{ff} = (1{,}4 up 2{,}0)d_{fa} \qquad (1)$$

6. Longitudinal tooth rack fillet radius - it is chosen in range

$$r_m = (1{,}5up3{,}5)mm \qquad (2)$$

or can be calculated as follows:

$$r_m = \frac{\pi(d_a - 2h_w)}{10z_w} \qquad (3)$$

7. Mounting hole diameter. The hole serves for mounting the hob on the arbor. Approximate value for sizing:

$$d_u = (0{,}20up0{,}45)d_a \qquad (4)$$

8. Strength of the body. The minimal thickness between the hole and the bottom of the groove can be $0{,}3d_u$. When it is less, a hob with a stem should be designed.

9. Key groove – it is usually placed either in the hole opposite the tooth gap or in the front of the hob. It is sized according the standards.

10. Number of tooth racks – it influences roughness of the surface along the teeth and also thickenss of chips. The number of the racks can be calculated as follows:

$$z_w = \frac{360°}{\varphi_z} \qquad (5)$$

$$\cos\varphi_z = (1{,}0up4{,}5)\frac{d_{ff}}{d_{fa}} \qquad (6)$$

11. Tooth groove shape and dimensions – the grooves serves for runout of machining tools during the manufacturing and during milling for chips removal. Those purposes are taken in the account during designing.

Tooth groove depth:

$$h_w = \frac{d_{fa} - d_{ff}}{2} \qquad (7)$$

Groove span angle υ_d depends on accuracy of a manufactured hob. For sharpened tools and number of the racks:

$$\begin{aligned} z_w &\geq 12 \quad \text{is} \quad \upsilon_d = 18^\circ, \\ z_w &= 9up10 \quad \text{is} \quad \upsilon_d = 22^\circ, \qquad (8) \\ z_w &\leq 8 \quad \text{is} \quad \upsilon_d = 25up30^\circ. \end{aligned}$$

12. Foot rack tooth width:

$$S_p = \frac{r_j \varphi_z}{z_w} \qquad (9)$$

13. Strength of the foot. The checking footh rack tooth width substitutes a stregth control and is recommended to be in the range (0,5 - 1)h_w

14. Control shoulder dimensions

Length:

$$l_{kn} = 2{,}5up5mm \qquad (10)$$

Diameter:

$$d_k = (1{,}5up1{,}7)d_u \qquad (11)$$

Chamfering:

$$(0{,}5up\,2)x45^\circ \qquad (12)$$

15. Cutting part length – it should correspond with the length of the hob total working range l_c. However, it is necessary to add several threads for stepping, i. e. hob moving in the axis direction to lengthen its lifetime.

$$l_{zn} = (4up5)\pi m + (10up15)mm \qquad (13)$$

16. Hob total length – it is formed by the length of the thread part and control shoulders for flapping control. It is valid that:

$$l_w = l_{zn} + 2l_{kn} \qquad (14)$$

The length twice longer than the thread part is recommended. By means of lengthened hob a triple machining performance can be reached with slightly grown expenses.

17. Hob pitch diameter – is a basic calculating hob diameter. Other parameters are related to it: pitch thread and groove. The pitch diameter can be calculated as follows:

$$d_f = d_{fa} - 2h_{wh} - \frac{k_{az}}{2} \qquad (15)$$

where h_{wh} is a hob tooth head height.

The helix lead angle is changed with change of span circle λ_{zn}:

$$\sin\gamma = \frac{m}{d'_f} \qquad (16)$$

Pitch diameter of a new hob:

$$d'_f = d_{fa} - 2h_{wh} \qquad (17)$$

18. Normal pitch:

$$p_n = \pi . m \qquad (18)$$

19. Axis pitch:

$$p = \frac{p_n}{cos\gamma} \qquad (19)$$

20. Pitch roll climbing angle:

$$tg\gamma = \frac{m}{d_f} \qquad (20)$$

For gear manufacturing it is necessary to set the gear hob so as the hob axis would be positioned in the given distance from the frontal plane of the machined part and in the same time in the shortest distance from the hob axis and from machined part. The gear hob should have a definite value of the onset angle. It consists of hob slope length l_n and from safe distance at hob sloping l_{nb} (1-7). Similarly, for manufacturing the gearing, the so called run consisting of hob course length l_p and from safe distance of hob run l_{pb} should be taken into account. Ten minimal length of milling is:

$$L_a = l_{nb} + l_n + b_{fo} + l_p + l_{pb} \qquad (21)$$

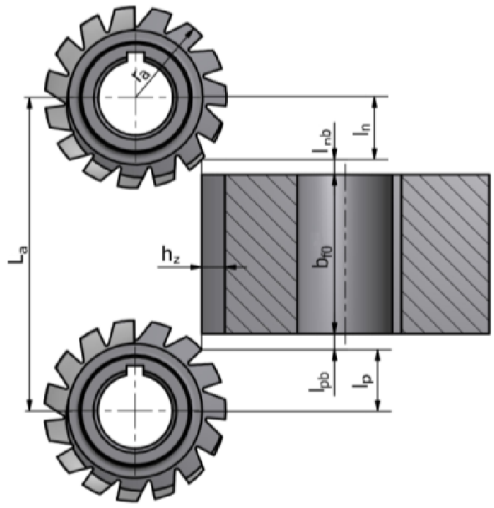


Fig. 7. Slope and run-out of the gear hob

4 CONCLUSIONS

From the analysis of present types of gear hobs, which are produced by world producers, we can to observe that every offered type is suitable for different type of produced gear. The suitable choice of used tool for gear production is depended on type of produced gear, module size, number of teeth etc. The tools can be produced like solid hobs or stacked hobs which are suitable for mass production.

For the specially develop of new constructional solution of gear hobs we can use the designed calculation of basic gear hob features. The design is based on the transformation of the gear hob original surface into a cutting tool which is done on that surface cutting parts with cutting features are formed.

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Effects of Initiation Rituals to Primary and Secondary School Girls in Morogoro Rural District

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ABSTRACT: In spite of its usefulness, initiation rituals in Lugurus have been blamed to impede girls' education. In a research conducted in Morogoro rural district between April and June 2011 with the aim of investigating the effects of initiation rituals to primary and secondary school girls, a sample of 74 respondents were involved of which 46 were girls from Mkambarani ward and from both primary and secondary schools. From the research it was found out that girls attend initiation ceremonies as early as they reach puberty be eleven or twelve years. Further it was established that the girls who attend the ceremonies encounter mistreatments, abuse and sometimes they miss their precious school time. Complementing that it was learnt that after the ceremonies, girls change their behavior and thus some of them feel they cannot cope with formal education. As a result of the change of behavior the girls reported dropping out of school to pursue other womanly responsibilities of getting married and having families.

KEYWORDS: Ceremonies, Girl, Initiation, Rituals, Education.

INTRODUCTION

Anthropologist worldwide has commended initiation rituals as being a sturdy tool which has often played an important role in transferring cultural norms of appropriate sexuality across generation and making individual transition to sexual maturity (Herdt, 1987). Complementing these it also has been reported that the rituals provide young people with instructions on gender roles and family life, including the details of sexual activities and reproduction.

In spite of its usefulness in society, the same rituals are criticized by different intellectuals as being a reason for girls' dropout from school as they are reported to be unfit for academic cycle since the rituals only prepares them to become better wives and mothers. This has been reported in different studies done in Tanzania and elsewhere i.e. Mrotto, 2011; Haki elimu, 2010; Helgesson, 2001 and Mtewele, 2012). Supplementing this argument, the Ministry of Education (URT, 1995) also states that certain traditions, customs and practices including initiation rituals hinder girls' education in Tanzania. Coclough (2003) and Mtewele (2012) also support this from evidence on the study done in Tanzania, Guinea and Ethiopia.

According to Hari (2009) these rituals are further blamed to be a cause of girl dropout since they are none educative and are often held during the school term and result in girls missing a considerable amount of school time. Additionally, participation in these rituals generally does affect girls' participation in education in two major perspectives namely attendance and performance. This happens due to the fact that time spent at these rites is at the expense of precious school time. When these girls eventually return to school, teachers find it difficult to find the time to give them the individual attention required to help them catch up with the others. Another reason is that these rituals encourage girls who are initiated to regard themselves as adults and ready for marriage hence they no longer concentrate on their school endeavors since they feel that it would be of little use to them in their future roles as mothers and wives. It is from this concern that this research embarked on a journey to find out the effects of initiation rituals to girls enrolled in primary and secondary schools.

STATEMENT OF THE PROBLEM

In recent years, education for both girls and boys has been emphasized through primary and secondary education development programs initiated by the Government of Tanzania. Through these efforts, it has been observed that the gross enrolment ratio has been improving tremendously from 50% in 1990/ 91 to about 104.9% in 2011/12 (UNDP, 2005, 2011) and gender parity has been achieved.

Despite these achievements in education, it has also been reported that the dropout rate is high as enrolled students encounter variety of challenges and hence they end up withdrawing from school. Of the enrolled students more girls are said to leave school as compared to boys due to early pregnancies, early marriages, traditional and cultural reasons. For instance in 2009 about 300 girls dropped out of school in Tanga Region due to different reasons; in 2010 about 880 girls dropped out in Kagera Region and 500 girls dropped out of school between 2005 and 2009 due to pregnancies (Haki Elimu, 2010). In Morogoro Region, the situation has been the same as between 2007 and 2009 about 331 girls had to leave school due to pregnancy. This situation in Morogoro is reported to be perpetuated by different cultural practices including initiation rituals done to girls throughout the region. The rituals which are conducted immediately on the onset of puberty are reported to have an impact to girls since what they learn does not encourage them to study but rather encourages them to become good wives and mothers.

RESEARCH OBJECTIVES

The main objective of the study was to investigate the effects of initiation rituals to primary and secondary school girls in Morogoro Rural District.

EMPIRICAL REVIEW

INITIATION RITUALS IN AFRICA

Female African initiation ceremonies or rites as other tribes will call them are celebrated by many ethnic groups though not all. The rights are regarded as a passage rite from childhood to adulthood to both boys and girls. To girls they extend from simple words of wisdom from mature women, to infliction of extreme pain on women in the form of genital mutilation and sometimes it involves extreme tattooing.

In some tribes in Malawi, as soon as a girl reaches puberty, she is taught the norms and values of her society in order to maintain and develop it. These instructions are considered directly relevant to a girl, preparing her for life as a wife and mother in a village. 'Sometimes conflict arises between what is taught at home (in initiation ceremonies) and at school which may lead to parents opposing girls' continued attendance at school' (ODA, 1996). Indeed, girls' behaviour is often directly related to the many tribal and traditional taboos which dictate what and what not to do at the various stages of their development which may conflict with the demands of schooling.

In Zambia different tribes conduct initiation ceremonies to girls on their onset of puberty. Among other tribes the *Ngonis, Chewe, Nsenga* and *Kunda* do practice these. Diverse kinds of initiation ceremonies are performed but mainly when the girls reach puberty stage she is normally kept in house and taught variety of things by much older women. Explicitly, the girls are taught how to handle men during sex, child birth and motherhood (Powersistas, 2012). Further, from a study done in Sierra Leone (Ahmadu, 2000) reports that, initiation ceremonies involve variety of practices but mainly the physical removal of clitoris. It is estimated that about 94% of girls were initiated by January 2010. The girls as part of the rite are initiated through FGM which prepares the girl for adulthood through singing, dancing and teaching domestic skills. The removal of the clitoris to them symbolizes the physical, psychological and separation of women from men. Through this transformation, women achieve, "a negation of masculine in feminine creative potential".

INITIATION RITUALS IN TANZANIA

With 120 tribes, Tanzania has got a variety of gender differentiated socialization which differs from tribe to tribe. Initiation rituals are offered once boys and girls had reached puberty. Boys and girls are separated for these rites. Boys' initiation is called (in Kiswahili) *jando* and that for girls is referred to as *unyago* (Ntukula 1994). Among the Zaramo, for example, the *jando* curriculum for boys include good manners, bravery, the secrets of life, marriage, death, the responsibilities a man has to carry, and the customs and taboos to be observed. Girls were taught about male physiology, sexual intercourse, pregnancy, childbirth, and responsibilities of a good wife and mother in their *unyago* 'schools" (Mbunda 1991)

Traditionally in Ngoni culture, when a girl has her first monthly period, she must tell her grandmother or aunt. The elder woman then shares the news with the rest of the community, and women are called upon to perform the initiation ceremony. The young girl is placed in an isolated hut for the duration of the initiation, which can take up to one month. At night, the women crowd into the girl's hut to teach her about womanhood. An elaborate "cleansing" ritual takes place where the girl is symbolically "washed down" by an elder woman. She is told how to look after herself physically, how to behave with men, and how to be a good wife to her future husband. The most important thing she learns, however, is how to have sex, which is demonstrated through dance (Kenny, 2005).

In case of Luguru people from Morogoro region, the initiation rite is conducted immediately at the onset of puberty. A series of rites are done including the *Mwali* and *Mkole* rites. After the girl sees her first menstrual she is supposed to report to her maternal grandmother who is responsible for the process. The granny then immediately reports to several women including the girl's aunts. Then the girl is transferred from her parents place to her granny's place where she is fit into a special room. In the room the girl is provided with a bed which is made specific for that reason. The bed is created in such a way that the girl does not fit into it so she is forced to lie down bending her legs towards her chest since the bed is made short. The time spent in that particular confinement room ranges from few months to several years (Mtewele, 2012 and Hamdani, 2012).

During the confinement period the girl is not allowed to do heavy domestic chores but rather helping her granny in light duties. She is served with the best food to make her become more attractive and beautiful. On her skin the girl applies castor oil and she is obliged to avoid sun burning her skin. While inside the girl is taught how to become a good wife and mother. She is taught different womanly activities such as hair plaiting, sorting vegetables, pounding maize, making mats, baskets, pottery and caps. Supplementing this knowledge the girls are also taught how to become good sexual partners to their future husbands (Mtewele, 2012 and Hamdani, 2012).

THE EFFECTS OF INITIATION RITUALS ON GIRL'S RETENTION INTO PRIMARY AND SECONDARY SCHOOL

A direct link between girl dropout and initiation rite is merely established. Different studies have correlated school dropouts of girls with the trainings and expectations the girls receive during initiation. In a study done by Hakielimu (2010) this concept was emphasized as it reports that " when a girl passes through different traditional rites her sexual arousal increases and thus psychologically a girl develops a strong sex urge and the girl no longer want to continue with studies". In another argument Colclough (2003) reports that in a discussion with teachers from Tanzania they mentioned that girls interest in schools declined dramatically particularly after being initiated. Mtewele (2012) accentuates this argument by stating that the root cause of girl droup out from school includes truancy and early pregnancy which are correlated to initiation ceremonies.

METHODOLOGY

Morogoro Rural is one of the 6 districts of Morogoro Region, bordered to the East by Pwani Region, to the South by Morogoro Urban and to the West by the Mvomero District. The district is administratively divided into 25 wards. The research was centered at Morogoro rural district and specifically at Mkambarani ward.

RESEARCH DESIGN

The design used was cross sectional which involved collection of empirical data from District Government Officials, Ward Executive Officers, Village Executive Officers, Ward Education Officer, Parents, Primary School Teachers, and Ritual mother, Primary School Girls, Faith Based Leaders and Secondary School Girls.

SAMPLE AND SAMPLING TECHNIQUES

The study employed both probability and non probability sampling techniques. Probability sampling was advantageous over non-probability sampling due to the fact that it enhanced a chance of getting samples that represents characteristics of the whole population targeted. Non probability sampling was used to obtain respondents from District and Ward levels.

Sample Size

The study engrossed the following categories of respondents: District Government Official (1) Ward and Village Officials (4), Primary and Secondary School Girls (46) and other stakeholders (23) making a total of 74 respondents.

Table 1. Sample size Distribution of the population

S/No.	Category of respondent	Frequency	Percentage
1	District government official	1	1.35
2	WEO and VEO	2	2.7
3	WeO	2	2.7
4	Parents	10	13.4
5	Teachers	10	13.4
6	Ritual mother	1	1.35
7	Girls from std. 6&7	10	13.4
8	Faith Based Leaders	2	2.7
9	Secondary school girls	36	49
10	Total	74	100

Source: *Morogoro survey, 2011*

Data Collection methods

Due to complexity of the study both primary and secondary data collection methods were utilized. The methods included interview, questionnaire, and focus group discussions. Interviews were applied to both primary and secondary school girls, District Government officials, Ward and Village officials, and other stakeholders while the questionnaire and focus group discussions were applied to both primary and secondary school girls.

Data Analysis

Quantitative and qualitative data analysis methods were employed. For quantitative data descriptive analysis was done using SPSS program. For qualitative data, identification of themes or patterns from the transcripts was made. The patterns were organized into coherent categories and interpretations made based on identified patterns and connections within and between categories.

Data Presentation and Discussion of Research Findings

Education and age of respondents

Table 2 below shows that 73.9% of the sampled respondents were aged between 13 and 16 years with the remaining minority aged 18 years or older. The study wanted to find out at what age girls do attends initiation ceremony in relation with school time. The study revealed that large number of girls have had attended initiation ceremonies at the age of 12 and above which implied that they passed in initiation ceremonies while they are in school.

Table 2. Standard / Form and Age of the students who responded.

Class level	Frequency	Percentages
Std 6-7	10	21.7
Form one	12	26.1
Form two	6	13.0
Form three	18	39.1
Total	**46**	**100.0**
Age of respondents		
8-12	4	8.7
13-16	34	73.9
17-22	8	17.4
Total	**46**	**100.0**

Source: Morogoro Research findings, 2011

STAGES OF INITIATION CEREMONIES

The study wished to know different forms of initiation ceremonies and rate of attendance in the community living in the area of the study. Initiated students interviewed asserted that there are different stages of initiation. Firstly there is the introduction which normally takes place on the day the girl experiences her first period and is celebrated by dancing and singing at the family level or clan. At this stage the girl is taken to a room in her family house and briefed on why she has experienced the bleeding, trainers said that songs are sang to mark the transition point from childhood to adulthood of the girl concerned.

Following this stage, girls are confined in house being provided with intense trainings including practical demonstration of various key issues that the girl undergoing initiation should know and practice in her daily life. The trainers and women with very close relationship with the girl demonstrate to the teachings. These teachings are traditionally performed under a huge tree known as Mkole which is the general name for the third training stage; reference is based on *Mkole's* characteristics features and use.

According to the ritual mother, Mkole tree is a symbol of physical strength and order as it is difficult to cut and is used to make sticks for striking children upon showing bad behavior. The tree is very straight which according to the Luguru denotes smartness, straightness or rightness in life. Further the tree is characterized with producing many small fruits which portrays that the initiated girl becomes fertile as the tree.

ATTENDANCE TO INITIATION CEREMONIES

From the study it was revealed that a good number (69.6%) of the respondents had already attended initiation Ceremony between the years 2009-2011. The minority who had not attended the ceremonies mentioned different reasons for not attending including that they were either not lugurus or their families were good Christians. Another group of girls also reported that their parents were educated and thus did not follow the cultural practices.

EFFECTS OF INITIATION RITUALS

The study investigated if the rite or ceremonies had any effect to the girls. From their responses it was learnt that there were two categories of effects, that is, during the rituals and after the rituals. During the ceremonies (during hibernation period) the girls reported to have faced different forms of abuse and wastage of their school time. Further they explained that after the hibernation period most of the girls involve themselves into sex, drop from school, change of behavior, being married below age, and other effects as shown in the table 3.

Table 3. Effects of attending initiation rituals

Description	Frequency	Percentage
During the rituals		
Wastage of school time	6	13
Mistreatments and violence	24	52
After the rituals		
Early engagement in sexual relations	25	54
Drop out from school	28	61
Change of behavior	22	48
Early childhood marriage	14	30
Early pregnancies	18	39
Psychological and mental effects	9	19
Truancy	19	41
Lack of obedience to teachers	20	43

Source: Morogoro Research findings 2011

WASTAGE OF SCHOOL TIME

About 13% of the girls during the interviews and focus group discussion argued that apart from respect to adults and hygienic reasons, initiation for them was meaningless and it is just wastage of school time. They argued that, they attended the ceremonies as a pre-requisite condition to *Luguru* culture since those who did not pass through this rite are taken as unclean and unfit to be a mothers and wives. Apart from that, this group of uninitiated women was segregated from the community as the following case explains;

"I went through the ceremony because everybody in the village goes through it. I was taught how to respect elders and not to sleep with men before marriage. Some of the things taught were irrelevant to me like Sleeping while bending my legs up to my chest level and walking all the way to school and back covered by Khanga cloth on my head for three years. Also, staying without taking bath and without meeting my father during the confinement period was unnecessary to me. Since all these trainings and others were done after school hours I was left with no time for my school work".

MISTREATMENT AND VIOLENCE

More than half of the girls (52%) interviewed responded that in a way initiation rites violated human rights. They reported to be mistreated by the elderly women throughout the process. Some of them reported to be shouted at, beaten, slapped and even being pinched. In a most awkward way, the girls complained of the action of removal of their pubic hair by using hand and hot ash as being torturing and embarrassing. Additionally they retorted that while hibernating they were forced to stay in a dark room and they were forced to whisper instead of talking loudly whenever they communicated. Further they expressed disappointment in an action where they were supposed to stand nude before elderly women for cleansing; to them this was humiliating since they were the centre of mockery to the women, as the following girl narrates;

"I hated the initiation rituals since I passed through a lot of mistreatment. My mhunga and granny used to pinch me a lot. I was forced to do a lot of things which I did not like, when I objected I was severely punished and I was threatened to be cursed. They told me that I will never get married and I will never be mother as result of the curse".

EARLY ENGAGEMENT IN SEXUAL RELATIONS AND PREGNANCIES

About 54% of the girls pointed early sexual engagement while on another hand 39% of them mentioned pregnancies as among the effects associated with initiation. Apart from girls, teachers and faith based leaders interviewed blamed these cultures as a source of early pregnancies. The girls explained that a number of girls who had been initiated within their age group associated themselves with sex though they are still very young. Some of them due to their naivety fell pregnant and are forced to drop out of school or commit abortion. According to them initiation encouraged the girl to engage into sex relations though they are forbidden to do it before getting married. They reported that about 90% of the trainings given during the confinement encourage them to explore sex, as they are told the goodness of the act, how it is done and how immediately they should do it. Further they complained that they are not educated on the effects one could encounter once they practice sex, as a result majority of them who practice it fall victims of early pregnancies and sometimes they become sick due to HIV/AIDS and other sexually transmitted infections.

TRUANCY AND DROP OUT FROM SCHOOL

Truancy was also among the effects of initiation rite mentioned by the girls, teachers and other stakeholders during interviews and focus group discussions. About 41% of the girls mentioned that truancy is faced by initiated girls both during and after the rite. During the hibernation period they reported that they were not comfortable coming to school covering themselves with *Khanga* (a wrapper) as the boys will start to mock and tease them as a result they opted to dodge school and stay home comfortably. Complementing this, girls claimed that sometimes their parents would seek permission for them to stay at home and hence whether she agrees or not she is obliged to obey. They further explained that low attendance to school always impacted their performance and as a result they performed poorly in their examinations.

As a result of the poor performance most of the girls opted to drop from school since they could not cope with the others. Apart from low attendance some girls and teachers mentioned that the trainings and instructions received during the confinement period did not encourage formal education but rather they encouraged the girls to obey and do what is right within their culture which is becoming good sexual partners to their future husbands and good mothers to their children. With this type of training the girls were lured into leaving the formal education and enter into the adult world of marriage and child bearing. They were taught that a luguru woman should get married at a young age and bear children at that tender age. With this type of education they were made to believe that these formal schools were meant for boys and men while they were only meant to be mothers and wives.

In failure to meet these expectations i.e. becoming wives and mothers, the girls argued that they faced a lot of challenges due to poverty levels in the villages and hence they were prompted to leave their communities in search of better living condition, in most cases ending up with domestic work, prostitution, street work, and informal or illegal work in urban cities.

DISOBEDIENCE AND CHANGE OF BEHAVIUOR

A good number of girls interviewed (43%) revealed that lack of obedience and change of behavior (48%) were observed after the girl initiated. They retorted that due to the fact that they are introduced to all secrets of womanhood they felt that they are equal to adult women. As a result of this the initiated girls felt they were not supposed to be told what to do or what is best with elders. They reported that they felt as adults should never be commanded or reprimanded by other elders. With stress they reported that they were made to believe that men and especially their future husbands are the most important human beings though they were also told to respect other adults. This had an impact both at home and in school as the teachers interviewed complained that the girls after being initiated they no longer respect them and especially female teachers. When probed about this complaint the girls denied it but commented that they would not tolerate any punishment given to them unfairly by teachers as the following case explains;

"Women teachers always punish the class for very minor mistakes. One day at the morning assembly, a teacher felt that students were mocking about the way she was dressing, so she demanded to know who made the mockery. Nobody volunteered and she was very furious. She immediately commanded our class to kneel down as a punishment. I did not agree with the punishment, I was eventually to meet her at the office and later got suspended. I never agree with the unfair punishment because as an adult I needed her to justify why she punished our class which she could not…."

PSYCHOLOGICAL AND MENTAL EFFECTS

Few girls (19%) reported to have succumbed different psychological and mental trauma. They reported to suffer from these traumas due to the act of cruelty performed towards them during the confinement period. Some of them recalled crying a lot due to beatings and pinchings, while others recalled being harshly shaved their pubic hair. A number of them even lamented the act of being nude in front of people as being very humiliating. Following this trauma some of the girls curse being born as Lugurus and swear never to expose their daughter through that experience.

Conclusion and Recommendations

Conclusion

Much as initiation rituals in Morogoro is important for sexual maturity of girls they are also not in favour of encouraging the growing girls in their education. This was confirmed through a research conducted in Morogoro Rural in 2011. From the research it was found out that inspite of the usefulness initiation rituals affect girl's education in different ways. The girls and other stakeholders mentioned different effects they face during the ceremonies and after. Among others they included wastage of school time, mistreatment and violence, and early engagement in sexual relations. Other effects included school drop out, being married at early age and psychological and mental effects.

Recommendations

In view of the research findings and the above conclusion, following are recommendations put forward:

- The government should enforce laws and bylaws against adult males who engage in sexual relations with girls under legal age of 18 years.
- The local authorities should emphasize on the importance of performing these rites during school holidays. Further they should emphasize that these rites should never interfere with the school programmes be it homework, examinations, etc.
- The public should be made aware on both the importance and triviality of initiation rituals.

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ALLELOPATHIC EFFECT OF PEARL MILLET (PENNISETUM GLAUCUM) SEEDS ON SEEDLINGS GROWTH OF THREE CEREALS

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ABSTRACT: Laboratory study was conducted to investigate allelopathic effects of seed aqueous extract of *Pennisetum glaucum* on seedling growth of three cereals; *Avena sativa*, *Triticum durum* and *Hordeum vulgare* Different levels of *P. glaucum* seed aqueous extracts concentrations (0%, 2%, 4%, 8% and 10%) were used to test its effect on the studied species. Results revealed significant allelopathic effects of seed aqueous extract *of P. glaucum* on radicle, coleoptile and total plant lengths. However, it was found that *Avena sativa* was the most susceptible and *Triticum durum* was the less sensitive on seed aqueous extract of *Pennisetum glaucum.*

KEYWORDS: *Pennisetum glaucum*, allelochemicals, allelopathic, cereals, seeds.

1 INTRODUCTION

Pearl millet constitutes an important source of dietary calories and protein [1], [2] in the daily diet of a large segment of the poor population in developing countries. Although it is consumed as a major staple food, the nutrient availability to the human gut is constrained by certain inherent antinutritional factors such as polyphenols and phytic acid [3]. Many studies have demonstrated that pearl millet whole grains are rich sources of phenolic compounds [4], [5]. Several studies have demonstrated that the outmost layers of the grains possess a high phenolic content [6], [7]. These compounds are also found in embryos and seed coat of grains [8], [9].

Phenolic acids consist of two classes: hydroxybenzoic and hydroxycinnamic acids [10]. Hydroxybenzoic acids are directly derived from benzoic acid and include gallic, p-hydroxybenzoic, vanillic, syringic, and protocatechuic acids, among others. The hydroxycinnamic acids include coumaric, caffeic, ferulic, and sinapic acids. Phenolic compounds have many roles: they prevent the oxidation of various food ingredients [11], regulated role in plant growth and morphogenesis and in the cell in response to stress and pathogens [12], [13].

Polyphenols also have several industrial applications such as in the production of paints, paper and cosmetics, as tanning agents and in the food industry as additives [14]. Phenolic acids have been shown to inhibit the in vitro growth of an assortment of fungal genera [15]. Phenolic compounds caused slow degradation and disrupt litter nitrogen nutrition [16]. Some phenolic compounds (catechol, coumarique, ferulique, gallique, gentistique, hydroxybenzoique, syringique et vanillique) also affect photosynthesis and mitochondrial metabolism. The operation affects all of the stomata and interacts with phytohormones [17]. Some authors [18] showed that p- coumaric acid at 10 ppm concentration inhibit rye, wheat and corn growths. This role played by phenolics is called allelopathy.

Allelopathy is an interference mechanism by which plants release chemicals which affect other plants; while it has often been proposed as a mechanism for influencing plant populations and communities [19]. Allelochemicals are generally inhibitors of the growth of roots, stems, leaves and overall plant growth. Several compounds are inhibitors of germination [20]. In most cases, the adverse effects of allelopathic result in mortality or a growth arrest.

Exposure of sensitive plants to allelochemicals can affect their germination, their growth and development. In fact, the germination of the seeds is then delayed or development of plants is inhibited [21]. Morphological changes were observed most often in the early stages of development [22]: effects on the extension of the stalk and the radicle. These variations can be observed in the post-emergence stage on the development of shoots and roots [23].

Allelopathy is considered as important in agriculture because it is exploited as a weed control strategy, alternative to the commercial herbicide dominated programs [24]. Incorporating allelopathy into natural and agricultural management systems may reduce the use of herbicides, insecticides, and other pesticides, reducing environment/soil pollution and diminish autotoxicity hazards. Considering importance of allelopathy and the observed adverse effects of Pearl millet seeds on some crops, we initiated the present study to find its possible allelopathic potential.

2 MATERIALS AND METHODS

Seeds from autochthonous pearl millet ecotype (KS) were collected, air dried at room temperature (25°C) and powdered. Aqueous extracts were prepared by soaking several concentrations of seeds powder (0-10-20-40-80-100 g/l) in distilled water at 25°C. After 24 h, the aqueous extracts was filtered. These extracts were tested against *Hordeum vulgare*; *Avena sativa* and *Triticum durum* on 2-folds of filter paper in Petri dishes. The filter papers were moistened with the respective extracts. Distilled water was used as a control. After 7 days, twenty seedlings were randomly taken out and plumule, radicle and total plant lengths were determined. All the bioassays, having 5 replicates, each with 25 seeds, were incubated at 25°C for one week. All the results were subjected to standard statistical analysis (ANOVA). The differences between the parameters were evaluated by Dunnett or Scott Knott test. The values of $p \leq 0.05$ when different of the control were considered statistically significant.

3 RESULTS

3.1 EFFECT OF AQUEOUS EXTRACT ON TOTAL PLANT LENGTH

Growths of the most species were significantly inhibited by the Pennisetum aqueous extracts (Fig. 1). Species in decreasing order of height were Avena (45%), Hordeum (44%) and Triticum (26%) respectively. Moreover, the higher is the concentration, the greater is the reduction of plant length except for wheat, where improved growth was noted till concentration of 80 g/l. For concentration up to this value, growth was declined by 26%. Correlations linking total plant height with concentrations are linear for barley and oats and polynomial for wheat.

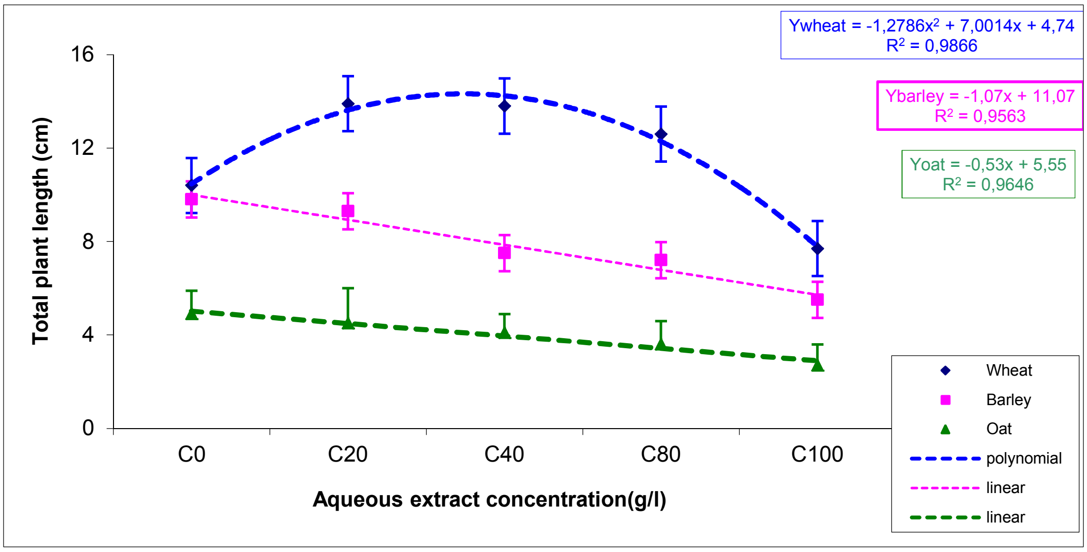

Fig. 1. Effect of Pennisetum aqueous extract on total plant length of three cereals (wheat, barley, oat)

3.2 EFFECT OF AQUEOUS EXTRACT ON RADICLE LENGTH

Root length of the seedlings for all species was significantly influenced by Pennisetum seed aqueous extract concentrations (Fig.2).. The inhibition at concentration 10% was significant for all tested plants. The highest concentration (100g/l) of Pennisetum seed aqueous extract caused 43% inhibition of root length for barley, 40% for oat and 30% for wheat compared with the control. For root growth, the least affected species is wheat. Maximum root length was recorded at 20 g/1 concentration for wheat and declined with increase in the concentrations, but reminded higher than control till 80g/l concentration. Correlations linking radicle height with concentrations are of the same type as for the total plant length.

3.3 EFFECT OF AQUEOUS EXTRACT ON PLUMULE LENGTH

Pennisetum aqueous extract improve plumule length of wheat till concentration 8%. More than this value, coleoptile length was decreased by 18%. The highest length was obtained for 4% concentration: amelioration was about 60% (Fig.3).

Oat was more sensitive where the inhibition reached 80%, while barley was less susceptible (47%) for the same aqueous extract concentration (10%). A little promotion on plumule length of barley can be seen at 2% concentration but the increase was not significant. Correlations linking plumule height with concentrations are polynomial for barley and wheat and logarithmic for oat.

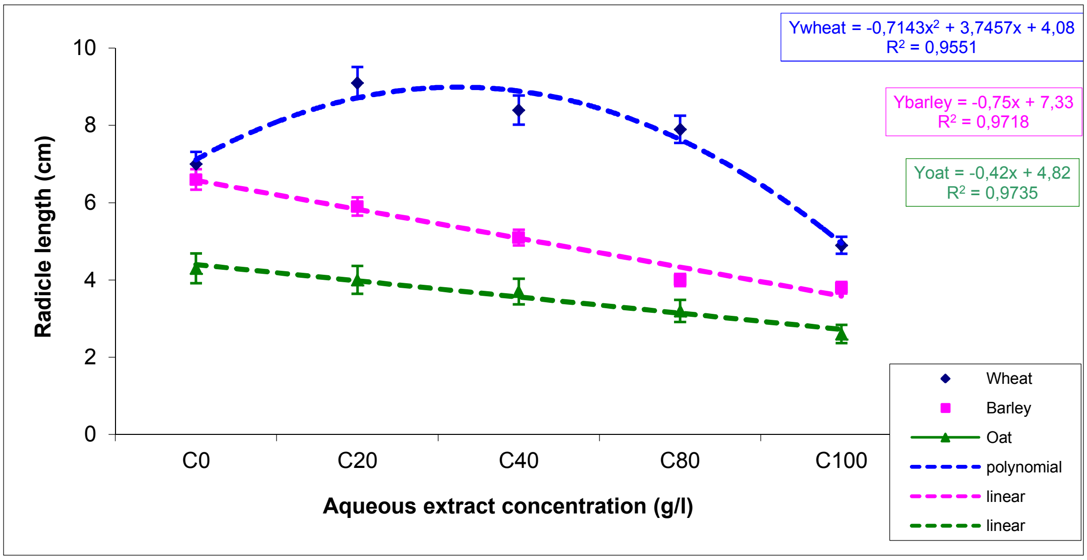

Fig. 2. Effect of Pennisetum aqueous extract on radicle length of three cereals (wheat, barley, oat)

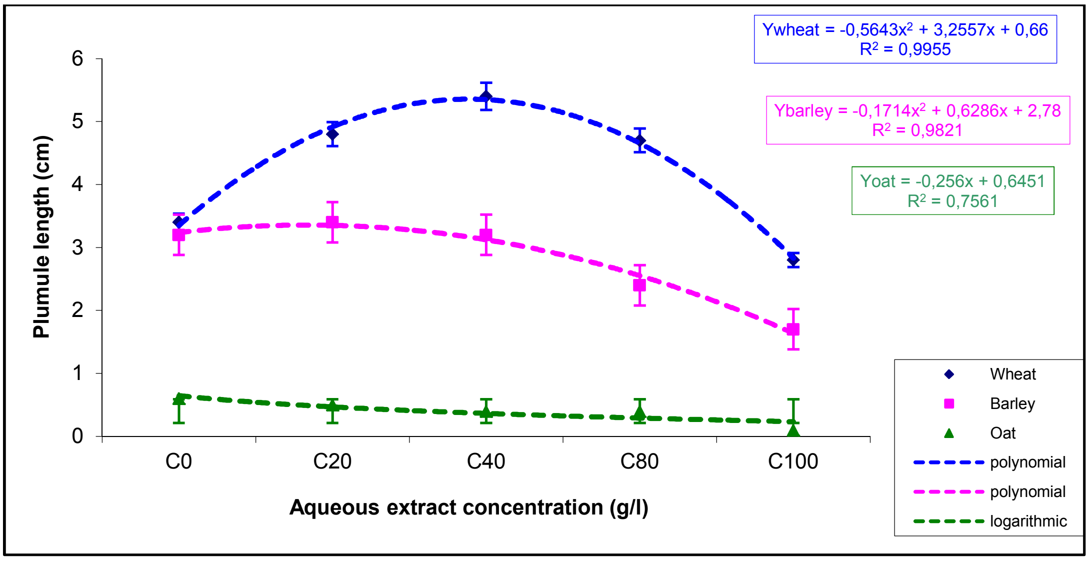

Fig. 3. Effect of Pennisetum aqueous extract on plumule length of three cereals (wheat, barley, oat)

4 DISCUSSION

In the present study, allelopathic effects of *pennisetum glaucum* seeds were observed on seedlings growth of three cereals: barley, oat and wheat.

Allelopathic effect of pear millet against other species is signalled in many studies [25], [26], [27], but this effect was reported in leaves, stems and roots [28], [29], [30] but has never been approached for Pennisetum seeds. Some authors had cited allelopathic effect of seeds in many plants [31], [32], [33], [34], [35].

Seeds aqueous extract of *Pennisetum glaucum* inhibited or stimulated radicle, coleoptile and total plant lengths in different ways, depending on concentration levels used, on receiver species and with organ treated. This result is corroborated by [36]. These authors reported that allelopathy involves both inhibiting and stimulatory effects and stimulation can observe for low allelochemicals aqueous extract concentrations. In fact, for wheat, decrease was more important for radicle length than for coleoptile length. While for oat, coleoptile was reduced twice than radicle. For barley, reduction in the growth of barley seedlings was more drastic for coleoptile than for radicle but the difference was not significant.

For total plant length, we have found that the higher is the concentration, the greater is the reduction of plant length except for wheat, where improved growth was noted till concentration of 80 g/l. Similar results were found by [37], [38], [39]. The inhibition at concentration 10% was significant for all tested plants. [40] found that allelochemicals that inhibit the growth of some species at certain concentrations might in fact stimulate the growth of the same or different species at different concentrations. In fact, Wheat seems to be the less sensitive species to allelopathic effect of Pennisetum seeds extract, while oat and barley respond in the same manner and exhibited a stronger inhibitory effect.

With respect to the growth of seedlings, the seed aqueous extract inhibited the growth of the coleoptile for all species at the highest concentration. The most affected was Oat where inhibition reached about 80%. The concentrations of aqueous extract 2, 4, and 8% stimulated the growth of the coleoptile of wheat. These same treatments completely inhibited the growth of oat coleoptile. Concentration less than 4% promoted coleoptile length of barley.

The comparative analysis for radicle length for all species showed that Pennisetum seed aqueous extract concentrations had a significant effect. The different species reacted in the same manner as for the total plant length and wheat reminded the least affected species. Many studies indicate the release by seeds of phototoxic chemicals during the preparation of aqueous extracts [34], [35].

The observed different phytotoxicity of *P. glaucum* may be attributed to the presence of variable amount of water-soluble inhibitory chemicals which hampers or promotes growth of the three cereals. Its effectiveness on seedlings growth suggests that seeds of *P. glaucum* may act as a source of allelochemicals. In fact, *Pennisetum glaucum* is a rich source of phenolic compounds [3], [41] and these phenolics appear to be among the key compounds [42]. In fact, they were identified as the allelopathic agents more often than all other classes of compounds combined [43]. Several authors [44] suggested that the concentration of coumaric acid was greatest and sufficient to reduce growth of other species. [45] also found that concentration of p-coumaric was the highest followed by ferulic acid. Many authors reported that phenolic compounds inhibit cell division [46] reduce root growth [47]; affect cell elongation [48], [49]; slowing the incorporation of amino acids [50]; can causes changes to cell ultrastructure [51] and affect ion uptake, membrane permeability, photosynthesis and phytohormone balance [52]. It is also possible that the cell elongation was affected by seed extracts of pearl millet. It was demonstrated that many allelochemicals inhibited gibberellin and indole acetic acid induced growth [53]. One of the suggested explanations for disruption of seedling growth and development during allelopathy stress is modification in mitochondrial respiration leading to decreased supply of ATP for all energy demanding processes [54].

Inhibition of seedling growth in allelopathy stress conditions may be therefore a result of decreased ion uptake. A root is the first organ to come into contact with allelochemicals in the rhizosphere, thus the effect of allelochemicals on ion uptake is particularly important. There is also much data on the effect of allelochemicals on membrane bound enzymes e.g. proton pumping ATPase localized in plasma membrane (H+-ATPase). H+-ATPase inhibition results in reduction in mineral and water uptake by roots and as a consequence leads to a strong effect on essential plant functions such as photosynthesis, respiration or protein synthesis leading finally to reduction of growth [54].

Responses of the three cereals to Pennisetum seeds extract measured in seedling growth differed among receiver species. In fact, allelopathic effect depends among donors' species and those receivers [55],[56],[57].

Strong allelopathic effect performed by others seeds aqueous extracts on oat was mentioned by [58],[59],[60],[61]. They attributed this inhibition to the action of some secondary metabolites such as benzoxazolinones which hampers auxin oat coleoptile synthesis.

Wheat demonstrated the less negative response to allelopathic effect of Pennisetum seeds extract. These results were noted in the studies of [62],[63]. They found that *P. harmala* à 1 % and *A. altissima* à 1 % et à 3 % stimulated coleoptile wheat length and inhibited radicle length. [37] noted that *Populus deltoides* aqueous extract less than 5% stimulated wheat coleoptile growth. Wheat coleoptile length was promoted by *Beta vulgaris* extract till 8% concentration [64].

Low allelopathic effect of Pennisetum on wheat seems to be due to antagonism effect between the two species which cancels and reduces the toxic effect of allelochemicals. In fact, wheat releases adversity of allelochemicals (phenolic acids, cyclic hydroxamic acids, short-chain fatty acids as well as many other phytotoxic chemicals) into the environment [65],[66].

5 CONCLUSION

The present investigation revealed that Pennisetum seeds aqueous extracts had effects on seedlings growth of three cereals. *Pennisetum glaucum* may act as a source of allelochemicals. Further studies are suggested to clarify the possible physiological mechanism related to allelopathic effect on plants.

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OCCUPATIONAL HEALTH HAZARDS AMONG SMALL SCALE INDUSTRIES IN ONDO STATE NIGERIA

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ABSTRACT: One of the major flaws of the Nigerian industrialization is the over emphasis on temporal growth with little or no emphasis on safety of workers in spite of the existence of Factories Act. This study examined the level of compliance to occupational health and safety standard among small scale industries in Ondo state. Data were collected from industrialists, workers and government's supervisory body through three different set of questionnaires. Data collected were analyzed using simple tables and bar graphs. The grand mean weighted values were compared with the mean weighted value in order to isolate the most important responses. The study discovered a very low level of compliance among small scale industries in the study area Out of 250 enterprises sampled, 62% (155) did not provide safety kits to their employees, 43% (108) did not have adequate ventilation, and 54% (135) did not have sanitary conveniences, while 35% (88) had no recreational facilities at all. In spite of this however wood based enterprises were identified to have the most compliance, although the compliance is only slightly above average (score of 37 out of a total of 60). Regional analysis of the pattern of compliance revealed that out of the 55 industries that had some acceptable level of compliance (which is only22 % of the entire industries sampled), Ondo North region was ahead of the other two regions Ondo North and Ondo South with 62%(34) of industries while others varied from 16%(9) to 22%(12). Reasons for low compliance were sought from proprietors workers and officials in the state ministry of industries which is the supervising body. Reasons given varied from lack of finance to ensure compliance, the belief that OHS was only meant for large scale industries, Proprietors lukewarm attitude to OHS, and fraudulent practices by supervisors.

KEYWORDS: Small Scale Industries, Occupational Health Standards, Compliance, Safety.

INTRODUCTION

There is little doubt on the importance of having a good implementable Occupational Standard to protect industrial workers from hazards. The Nigerian Factories Act of 1987 came about purposely to protect the factory worker from occupational health hazards (OHS) such as injury and death in the work place either from contact with machine or noxious substances provides that every factory in Nigeria big or small must make provision for cleanliness, overcrowding, ventilation, lighting, drainage of floors and sanitary conveniences. Yet empirical observation reveals that many of Nigerian industries are not complying with much of its provisions in spite of the existence of factory inspectors.

Many studies have established the importance of small scale industries (SSI) to economic development, The United Nations Millennium Development Goals (MDGs) sets a critical challenge of halving absolute poverty in the world by 2015, the Nigerian vision 2020, which was launched in 2006, has among its objectives sustainable industrial development by the end of targeted year. Small scale industries have been identified to be capable of making important contribution towards achieving these goals by reducing poverty, and improving other indices of development.

However, studies have shown that they are difficult to control since many of them are operating informally and so they are not registered with the Nigerian Corporate Affairs Commission or the state ministry of industries. Under these circumstances, they often do not comply with regulations which include occupational standards and safety measures on workers and those living within the areas of location. Records of occupational diseases are poor, primarily because industries do not report cases to the relevant government agency. However, a survey of occupational diseases reported in the literature suggests that conjunctivitis, chronic bronchitis, dermatitis, musculoskeletal disorders and injuries are common workplace health problems which many patients very often do not link with occupation except injuries due to low literacy rate among practitioners. Yet it is important to state here that many of such cases have reasonable grounds to be linked to workers operating environment.

It is important to state here that while many studies have been conducted on OHS in large scale industries (see Dasgupta and others 1998) OHS studies among small scale industries have often been ignored. There is indeed a careless assumption that because they are small and majority are labour intensive their OHS requirements and propensity to cause injury among workers are small compared to large scale industries. It is on these bases that this study examined the state of compliance with occupational safety measures among small scale enterprises in Ondo state

RESEARCH METHOD

In order to make the study representative of the entire state, three (3) major towns Akure, Ikare and Okitipupa, three (3) minor towns Ugbe, Obaile and Odeaye, three (3) major villages; Iboropa Aponmu and Ikoya were investigateed. The sample frame covered all the SSI (formal and informal) in the nine settlements selected. There were 1411 in the study area .The sample size for administering the first questionnaire i.e. on proprietors of the SSI was 250. This constitutes 25% of the entire sample frame (1411). The study also sampled one worker per industry making another 250, and 20% of employees in the state ministry of industries which is 100. To collect the needed data three different questionnaires were administered on these categories of stakeholders in small scale industries. Data were analyzed using simple table and bar graph, and other descriptive means

LITERATURE

Planners have always been interested in the outdoor environment .However it is now realized that the indoor environment is as important as the outdoor environment. The health and safety of workers in factories is therefore important if maximum benefits were to be derived from this industrial sub sector.

Although occupational safety and health is a very important issue at individual, social and national levels, it has not received much attention so far. Companies have not lived up to their ethical responsibility to assist workers in decreasing work-related injuries and illnesses. According to Azaroff, Levenstein, and Wegman (2002), Poor Occupational Health and Safety (OHS) standards are feature of small scale enterprise. Sarin (2000) in a study conducted in the Philippines on the OHS of the estimated 3.6 million children working in the informal SSI sector observed that over half were exposed to physical hazards including extreme temperature, humidity, and noise. A quarter said that they were exposed to chemical hazards. Nineteen per cent reported that they were exposed to biological hazards, principally bacteria and fungus. The small scale industries practice of clustering offers clear economic advantages but may also create negative environmental consequences especially when heavy polluters dominate the cluster. Large sections of towns such as Kashur have been seriously damaged by the proliferation of small tanneries in the core of the city, which created significant health problems to workers who are often not protected. This assertion was supported by Oyelakin-Oyelarin (1997) in his study of small scale industrial clusters of Nnewi and Akinbinu (2001) who studied the informal SSI cluster in auto mechanic village in Ibadan. HSE(2013) estimates that 2,000,000 people within the UK currently suffer from an illness caused by or made worse by the working environment. Despite the fact that illhealth can have a significant impact on the productivity of a business OHS standards are not a priority for workers or entrepreneurs struggling to keep their industries afloat. This is very regrettable given that cost effective OHS measures have been proven to increase productivity. Stewart (1996) argues that managerial decisions can result in either harm or benefit to others; thus managers are ethically obliged to use their authority to create benefit rather than cause harm. However, proper attention to workplace safety can result in improved morale, increased job satisfaction, and greater health for the organization as a whole.

The integration of home and workplace can also cause many problems. This is especially the case in Nigeria where many small scale enterprises are conducted at the homes of proprietors, who may not be financially capable of renting shops or factories to produce their products (Fatusin 2009). Apart from OHS standards, there are many ways living spaces can be compromised by entrepreneurial pursuits like so much small industrial activities takes place out of sight. Under most circumstances a foundry or electroplating operation run from an individual’s dwelling is impossible to regulate. Yet even a home-based activity such as basket weaving and garri making industry can be conducted in very unsatisfactory circumstances. It is almost impossible to monitor the environmental dangers opposed by such enterprises because they are so numerous and widely dispersed. It would be difficult to ensure that EIA measures would be respected in such enterprises. In Nigeria many firms do not even conduct EIA at all. To many small scale industries, Environmental Impact Assessment (EIA) is only for large scale industries.

On the other hand, occupational health practitioners are few and are mostly engaged in multinational and large national establishments and medical schools (Omokhodion 2009). There are a few independent consultant firms especially in Lagos and Port Harcourt. They provide services to medium and large-scale industries. Workers in small-scale industries, particularly those in the informal sector have little or no access to occupational health services.

FINDINGS

Level of Compliance with Occupational Health Standard by Small-Scale

The law specifically made provision for workers safety. Sadly however, findings show the provisions of these laws were not being adhered to in most of the 250 sampled small-scale industries. The implication of this is that most factory workers in the state were prone to occupational health hazard, perhaps more than large-scale industries whose operation might be under stringent supervision by the authorities. The provision of protection kits and sanitary convenience were abysmally poor among the sampled enterprises. For example, out of 250 enterprises 62% (155) did not provide safety kits to their employees, 43% (108) firms did not have adequate ventilation, and 54% (135) did not have sanitary conveniences, while 35% (88) had no recreational facilities at all. The structure of recreational facilities provided by the 22% who had something akin to recreational facilities was further investigated. The study found out that of the 55 enterprises in this category, over 65% (36) had only food canteens, 18%(10) had common rooms with indoor games while only 10% (6) had outdoor organized recreational facilities such as Table tennis court. The structure of compliance was categorised into seven categories, from very poor to excellent as shown in table 1

The category of enterprises that complied with OHS was investigated among the small scale industries. It was discovered that formal small-scale industries complied with this principles more than informal small-scale industries. For example, though the compliance averaged 15.7% for all categories of small-scale industries, the compliance rate for informal small-scale industries was around 4.6% while that of formal enterprises was around 11.1%. The conclusion that can be drawn under this scenario is that among small firms, formally established firms did protect their workers much more than informal enterprises. This is however not surprising considering the fact that formally established industries would have complied reasonably with provisions on OHS for them to be registered in the first place.

The sectoral analysis of small scale industries in term of protection of workers was analyzed. This was with a view to isolate the sub sector(s) where entrepreneurs contribute most to OHS. Elements of OHS such as provision of safety kits, strict enforcement of ventilation, provision of lights, display of warning signs provision of recreational facilities provision of emergency health services training and retraining of staff members on OHS control of overcrowding provision of sanitary facilities and monitoring on compliance with OHS were evaluated and scored. The average for each sectors were. Points were allocated from 0 to 6 depending on the average level of compliance as shown below

Table 1. Scores given to small scale industries on the basis of compliance to OHS

Scores	Points'	Grade	No of enterprises in the category
Above 70%	6 points	Excellent	8
60 to 69%	5 points	Very good	12
50 to 59%	4 points	Good	21
41 to 49%	3 points	Average	14
30 to 39%	2 points	Below Average	40
20 to 29%	1 points	Poor	58
Under 20%	0 points	Very Poor	47

Source: Fieldwork 2014

Table 2: Ranking of average relative compliance of industrial sub-groups to OHS

Categories	Provision of safety kits	Strict enforcement of ventilation	Provision of lighting illumination	Display of warning signs	Provision of recreational facilities	Provision of emergency health facilities	Training and retraining of staff on OHS	Control of overcrowding	Provision of sanitary facilities	Monitoring	Total Score
Food or Agro products	2	3	5	0	1	2	1	3	2	4	23
Industrial / Constructional material	2	5	2	0	2	4	3	2	1	3	24
Consumer Products	3	4	4	2	2	5	0	0	3	4	27
Metal/capital Product	5	4	4	0	0	1	3	2	1	4	24
Wood products	2	3	6	3	4	4	3	3	4	5	37
Textile	0	2	5	2	0	1	3	3	2	3	21

Source; Fieldwork 2014

Sectoral breakdown of enterprises in the above table revealed that enterprises in wood making sector has the highest score of 37 followed by those in consumer products with 27 points and the least being 23 points in the food and agro products sector. The implication of this is that the study established that in spite of the low compliance rate of the industries with OHS wood based enterprises complied most. Others is shown in figure 1

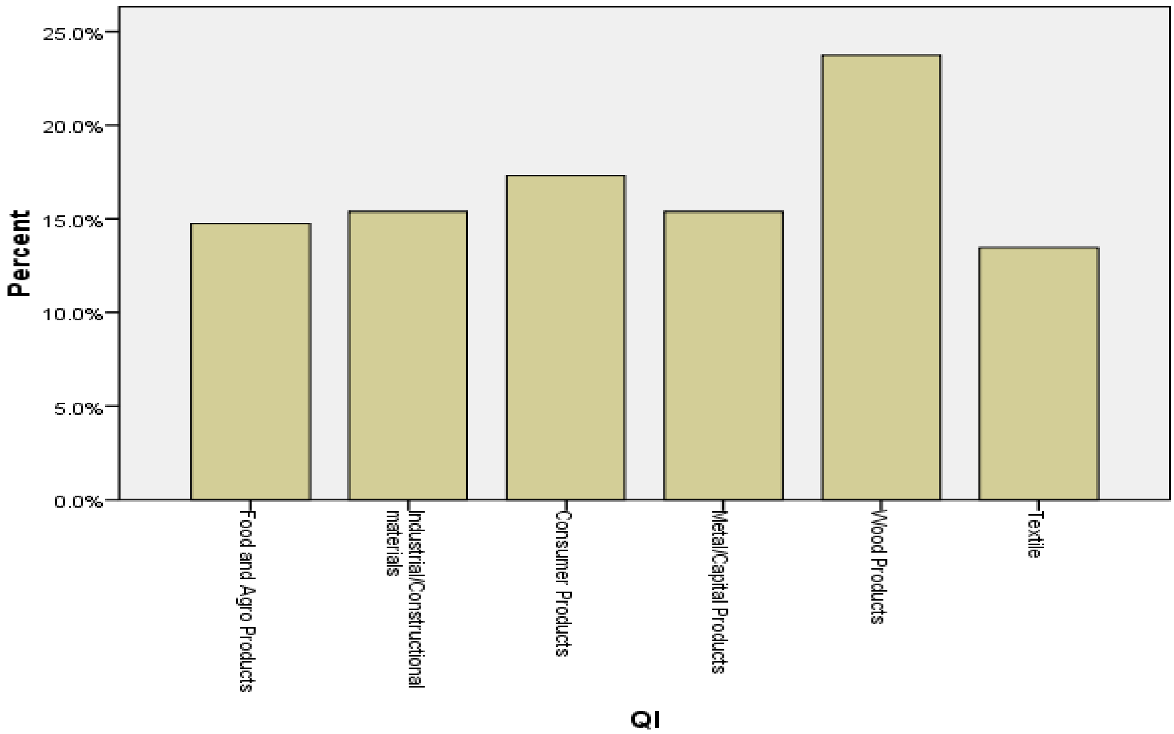

Figure 1 Sectoral breakdown of OHS among small scale industries sampled.

Source: Field Work, 2014.

An analysis of the breakdown of the above table reveals that metal and capital goods industries led with 5 points in the provision of safety kits for their workers, and the next being consumer products industries with 3 points. In the area of ventilation, industrial/constructional materials industries led with 5 points and closely followed by consumer products industries and metal/capital goods industries with 4 points each. In the area of provision of lights, wood products based enterprises led with 6 points followed by food/agro products based small scale industries and textiles with 5 points each. Many wood based industries displayed warning signs in their factories (3) and provided most recreational facilities (4), others being relatively insignificant.

In the same vein, consumer products industries led with 5 points in the provision of emergency health facilities followed by wood based enterprises and industrial/constructional products based industries with 4 points each. The table also shows that wood based enterprises lead in provision of sanitary facilities and monitoring of workers to ensure compliance with OHS, with 4 and 5 points in each of these categories, followed by enterprises in consumer products and food/agro based sectors.

The regional pattern of compliance to OHS was investigated. Out of the 55 enterprises in the categories of excellent, very good, good and average which may be considered as pass mark, 16% were in Ondo North, 22% in Ondo South and 62% in Ondo Central as shown in Fig.2

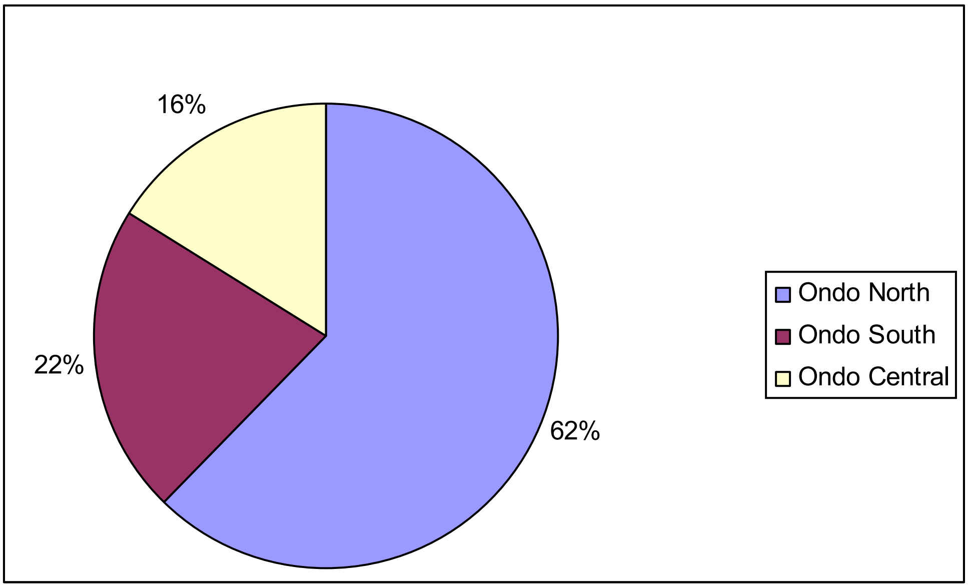

Fig.2 Regional pattern of enterprises that comply with OHS.

Source: Fieldwork 2014

The implication of this is that small scale enterprises in Ondo north region comply more with OHS than anywhere else in Ondo State. This is however not surprising considering the fact that Ondo North the most cosmopolitan in the state as well as the administrative capital where enforcing agency of government is located.

Reasons for Low Compliance

Reason for low compliance was investigated among proprietors, workers and enforcement bodies like the state ministry of industries. From the proprietors, it can be deduced from their responses that many factors are responsible chief among which are lack of money to ensure compliance, no awareness of need to comply, workers being too many to provide safety kits, government not willing to implement the laws and non registration of firms.

Table 3: Responses on Causes of low compliance by Proprietors

Factors	Responses							
	SA	A	DA	SD	Total	TWV	MWV	
No money	151	51	37	11	250	842	3.37	Acc
No awareness of need to comply	90	96	38	26	250	750	3.00	Rej
My workers are too many to provide safety kits	84	78	58	30	250	701	2.80	Rej
Govt. did not implement the safety laws	158	42	38	12	250	846	3.38	Accp
Non registration of firms	78	60	86	26	250	690	2.76	Rej

Source: Field Work, 2014.

GMWV = 3.37+ 3.00+2.80+3.38+2.76 =15.31/5 = 3.06

The Mean Weight Value (MWV) for the above responses and the General Mean Weight Values (GMWV) or the cut-off point for this grouped responses were calculated. In so doing, two out of the five listed factors were accepted as significant. These are the issue of lack of money to ensure compliance and Government not enforcing safety laws. These two factors are taken as significant in the opinions of proprietors of industries (see table 3)

The perception of workers on necessity of their firms to comply with occupational health standards was investigated. The result showed that out of 250 workers sampled, about 315 or 44% did not see the need to wear protective kits in the works place. Only 207 or 29% emphasized on the necessity of being protected. These were further analyzed to identify the most important of these responses as shown in Table 4.

Table 4: Responses on causes of low compliance by workers

Responses.	Responses							
	SA	A	DA	SD				
Proprietors don't value OHS	147	58	40	05	250	847	3.39	Acc.
OHS is optional in Small scale enterprises	155	43	37	15	250	838	3.35	Acc.
Govt. Should assist in providing safety kits	76	66	80	28	250	690	2.76	Re.j
OHS is meant for Large scale industries	139	67	30	14	250	831	3.32	Acc.
Non permanent staff don't need safety kits	48	72	85	45	250	623	2.49	Rej.

Source: Fieldwork 2014

GMWV = 3.37+3.00+2.80+3.38+2.76/5 = 3.06

From Table above, some causes of low compliance such as small scale industries not needing OHS, proprietors unwillingness to provide OHS, permanent staff not needing safety kits and OHS beig only meant for large scale industries were identified. However the first second and forth responses were accepted as significant because their respective Mean Weight Values of 3.39, 3.35, and 3.32 are greater than the Grand Mean Weight Value 3.06.

Proprietors of small scale industries therefore needed to do more if workers would not continue to be subjected to work hazards and If the benefits of industries on workers would be maximized and negative impact minimized as it pertains to workers safety.

Table 5: Responses on Causes Related to Supervisory Body (min. of industries)

Factors	Responses							
	SA	A	DA	SD				
The scope of work was too much for the available period	40	29	20	11	100	298	2.98	Acc.
Lack of enough motivation	20	18	32	30	100	228	2.28	Rej.
Lack of qualified manpower	35	35	19	11	100	294	2.94	Acc.
Many entrepreneurs are politically connected	42	28	20	10	100	302	3.02	Acc.
Fraudulent practise by supervisors.	37	33	18	12	100	295	2.95	Acc.

Source: Fieldwork 2014

GMWV = 2.98+2.28+2.94+3.02+2.95/5 = 2.82

Responses of officials in the state ministry of industries were sought to identify reasons for low compliance with OHS that pertained to supervisory bodies especially the ministry of industries. Some of the reasons given included the fact that their work being too much for the available resources, lack of enough motivation of staff, lack of enough qualified manpower, political connection of entrepreneurs which allowed them to get away with poor OHS, and fraudulent practices by supervisors. These are shown in table 5.

SUMMARY AND CONCLUSION

The study has been concerned with evaluating the structure and reasons behind the low compliance ratio of small scale industries to occupation safety standard in Ondo state. This was with a view to improving the level of compliance and ensuring high occupational standard among the enterprises. Proprietors, workers and monitoring agency of government which is the state ministry of industries were interviewed through three different questionnaires in order to identify the most significant reasons for poor occupational health standard in the study area.Data collected were analyzed using tables, bar graph and the group mean weighted value were compared with the mean weighted value in order to isolate the most important responses. The study found out an appalling state of compliance .Out of 250 enterprises 62% (155) did not provide safety kits to their employees, 43% (108) firms did not have adequate ventilation, and 54% (135) did not have sanitary conveniences, while 35% (88) had no recreational facilities at all. In spite of this however wood based enterprises were identified to have the most compliance, although the compliance is only slightly above average (score of 37 out of a total of 60) The implication of this is that the OHS policy as enshrined in the Factories Act, Federal Republic of Nigeria has not gone down well with small scale industrialists in the study area

The opinion of proprietors, workers and officials of the state ministry of Industries were sought on the reasons for low level of compliance on occupational safety. The significant reasons given included the issue of lack of money to ensure compliance and government not enforcing safety laws. Others included OHS being optional for small scale industries and proprietors don’t value OHS. The officials in the state ministry of industries which is the supervisory body on the other hand gave these reasons; work being too much for the available resources, lack of enough motivation of staff, lack of enough qualified manpower, and political connection of entrepreneurs which allowed them to get away with poor OHS, and fraudulent practices by supervisors.

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The impact of educational and religious institutions on the livelihood strategies and systems of Pastoral Maasai in Monduli District

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ABSTRACT: Religious institutions may be agents of advocacy, funding, innovations, empowerment, social movements and service delivery. This paper attempts to investigate the impact of religious and educational institutions in the livelihoods of the pastoral Maasai. The study was conducted in Monduli District. A cross-sectional design was adopted whereby structured questionnaire was administered to collect primary data. Secondary data were collected from District, religious and educational institutions' offices. A sample of 140 respondents was drawn from the population. The Statistical Package for Social Sciences software was employed for data analysis. From the findings it was observed that religious and educational institutions play their roles in changing the livelihood of the pastoralists by establishing and supervising various socio-economic activities aiming at poverty reduction. These projects include formal education and health services, water supply, food security and income generating activities. Participatory approach is adopted for the sustainable development projects. The opinions of beneficiaries were sought and it was found that religious and educational institutions had brought positive changes on the livelihoods strategies and systems of the pastoralists. It is recommended that religious and educational institutions and other development activists should introduce similar interventions for other tribal people particularly the Barbaig, Hadzabe and Sandawe. Their livelihood patterns need to be changed because of the changing environment.

KEYWORDS: Religious institutions, systems, development activists, pastoral.

1 INTRODUCTION

Pastoralists can be defined as those communities who derive their living primarily from the management of livestock in rangelands and engage in transhumance practices as a consistent means of existence. Rangelands are those areas where limitations such as climate restrict the use of land to extensive grazing of natural pastures rather than cultivation of crops (Alkire, 2004).

At the same time policies, institutions, recent changes and processes are affecting the Maasai livelihood patterns, trends of migration and food security. Population increase, declining resource base and impact of economic policies have negatively affected their livelihoods. Maasai pastoralists are now increasingly relying on constructing a diverse portfolio of activities and income sources in order to survive and improve their standard of living through coping or adapting new strategies hand in hand with acceptance of new or modern source of institutions and practices (Cost, 2003).

Among the most important social institutions are religion and education (Sahil, 1997). In order to achieve the purpose of attaining education and in realization of its importance, the Maasai are now building schools for their own children. Generally, pastoral Maasai are receptive to modern education, though with some exceptions as to girls' schooling, but the inability of the education system to adapt itself to their conditions has made it difficult for them to fully participate (Sahil, 1997).

Again, development activists express the need for better integration of the Maasai into the modern world. Generally educational and religious institutions are seen as the most important tools to this end, but the views on education differ greatly between pastoral groups. A minority tend to consider education as useless or even hostile to their own cultural values. They tend to take their sons out of school so that they can herd and girls are taken out of school in order to be married. Groups that are very much affected by external threats tend to consider education as an important tool to look for better paid employment opportunities outside the pastoral Maasai (Alkire, 2004).

Hall (1975) contended that the level of illiteracy was very high among the Maasai and this affected the ability to have access to information which is critical to empowerment. They remain unaware of local issues concerning politics, government, markets and this makes them vulnerable, isolated and weaker politically and socially. This in turn tends to have negative impact on their livelihood. Education is an important ingredient in development initiatives and as far as changes are concerned, the change agents find it easier dealing with literate community.

Religious institutions may be agents of advocacy, funding, innovations, empowerment, social movements and service delivery. Some observers argue that conversion to Christian religion has contributed to the weakening of the indigenous pastoral institutions. This study seeks to assess the impact of education and religion in changing the livelihoods of the pastoralist Maasai.

There is a long standing controversy over the role of religion in social change. Haralambos (2000) claims that religious ideas and systems can have a considerable effect on economic development. It is a critical factor in civil society support for development priorities. Pastoral livelihoods depend critically on relationships with other social groups in terms of resource, services and options for livelihood diversification (Kijanga, 1977).

Despite the religious efforts as far as education is concerned, there is little information on the impact of these efforts on the pastoral Maasai in Monduli district. This paper was set to provide more information on the impact of the religious initiatives in education to pastoral communities.

2 METHODOLOGY

2.1 Study Area and Justification for its Selection

Monduli District is among of the six Districts of Arusha Region. Others are Arusha Municipality, Ngorongoro, Meru, Longido and Arumeru. It is bordered by Arumeru District to the east, Ngorongoro and Karatu Districts to the west, Mbulu and Babati Districts to the south, Simanjiro District to the south east and Longido District to the north. Administratively, the District is divided into three divisions i.e. Manyara, Makuyuni and Kisongo. It has 11 wards and 41 villages. The District has an area of 6 419 sq km of which 6 291 sq. km. is land area. About 3 984 sq. km is grazing land while 1054 sq. km. is arable land and 375 sq. km. is under forest. Water covers 128 sq. km.

Monduli District has been chosen because of the presence of a great number of actors involved in socio-economic activities that facilitate the development of the Maasai pastoralists through different approaches. Among these, include church based-groups which are playing a key role such as provision of assistance in education. Again in the District, boarding schools are built in areas where there are many pastoralists as a way of ensuring that pastoral children continue attending schools when their families have to move with the livestock during drought conditions. More than 80% of students in these schools are Maasai. This raised the need to study empirically about the role played by educational and religious institutions in changing the livelihood systems of the pastoralists Maasai.

2.2 Research Design

A cross sectional research design was used. This research design enabled the researcher to collect data from different households at a single point of time. The design was useful for this study given limited resources (time, finance and resources available). In addition, the method gave room to make comparisons of the responses among different groups of respondents to see how dependent variables relate to independent variables (Bailey, 1994).

2.3 Sample and Sampling Procedure

For the household survey, ten sample villages were purposively selected covering the two major zones: the highlands and the lowlands. The sample villages were purposively selected to cover a wide range of activities and interventions done by religious and educational institutions on the livelihoods and production systems. The villages selected include Emirete, Mfereji, Losirwa, Enguiki and Mlimani A (highland zone). Others were Silalei, Ngarashi, Migombani, Kigongoni and Mbuganni (lowland zone).

A range of sampling methods including livelihood analysis was applied as a footing step to the study. These helped to identify wealth groups and livelihood typologies that acted as a sampling frame. The exercise was conducted in all ten sampled villages and 10% of the total households were chosen in each village using village registers in order to provide a sampling frame. The final result was the identification of three wealth groups ("rich", "medium" ad "poor"). The rich households were a relatively small group, covering about 12% of the total households. The medium households constituted about 36% of the households, with few assets to draw and the poor households made up more than half of the total population (52%).

Livestock possession was listed as the most important determinant of wealth. The Maasai are regarded a "poor" when they own below 100 cattle or "medium" when they own between 100 and 500 cattle. Those owning more than 500 cattle are regarded as rich. Possession of grazing land and crop production land was also considered as the most important determining factor of wellbeing. The sample households for this study were therefore, taken randomly from the list of households under each group resulting in a sample size of 140 villagers. Ten educational and religious institution representatives were also purposively selected taking into consideration the roles and responsibilities they have in their respective institutions making a total of 150 respondents (17 from the rich, 50 from the medium, 73 from the poor and 10 education and religion representatives). The purpose of wealth ranking was to ensure that the sample drawn represent the full range of livelihood circumstances in the study area.

2.4 Data for the Study

This study has benefited from both primary (own survey data) and documentary collected between 2008 and early 2009. The details on the methods and types of data are presented in the subsequent subsections.

a) Semi-structured interviews

At the household level, a detailed questionnaire was administered to a total of 70 households. The questionnaire sought to elicit a set of information that would help in analyzing the role of educational and religious institutions and the benefits accrued from various development interventions in different programmes and projects aiming at changing the livelihood systems (i.e. increased income, increased well-being, reduced vulnerability, improved food security, improved health, more schools and more sustainable use of natural resources). The questionnaire constructed encompassed issues of livelihood household data such as assets (physical, financial, social, human and natural assets), housing conditions, source of water, number of meals per day, type of toilet, access to social services (health, education) and household sources of energy.

b) Documentary Review

The primary data collected were complemented by documentary information collected from different sources including:

(i) The Monduli District Education Office: Collected data on enrolment rates, ratios, school performances and number of schools.

(ii) The Monduli District Agricultural and Livestock Development Office: Obtained data on livestock and crop production, livestock diseases and availability of water for livestock. These were useful in analyzing the trends in levels of production.

(iii) The Evangelical Lutheran Church of Tanzania Office: Obtained useful data on the projects and programmes implemented and supervised by the church. They include projects related to income generating activities aiming at poverty reduction.

(iv) Arusha Archdiocesan Integrated Development and Relief Office: Collected data or issues related to HIV/AIDS and health care projects.

(v) The World Vision Tanzania Office: Obtained useful data on relief, advocacy and health provision programmes and projects.

2.5 METHODS OF DATA ANALYSIS

Both qualitative and quantitative techniques were used to analyze the data. For more precise analysis, computer-based Statistical Package for Social Sciences (SPSS) was used. Descriptive statistics were employed to present the results.

2.6 CONCEPTUAL FRAMEWORK

The study used the Sustainable Livelihood framework. Chambers and Conway (1992), define livelihood as comprising the capabilities and activities required for a means of living. This framework helps us to identify and value what people are doing to cope with risk and uncertainty, make the connection factors that constrain or enhance their livelihoods on the one hand and policies and institutions in the wider environment and identify measures that can strengthen assets, enhance capabilities and reduce vulnerability. The starting point is the vulnerability context within which people operate. Attention is next given to assets people can draw upon for their livelihoods. Assets interact with policies, institutions and processes to shape the choice of livelihood strategies. These in turn, shape the livelihood outcomes, which are often the type of impact people are interested in. However, these outcomes are not necessarily the end point, as they feed back into the future asset base.

The analysis of vulnerability context considered the shocks and trends (animal diseases, population pressure, drought and shortage of land) in pastoralist production system, emergence of new livelihood strategies (for example farming, trading activities, formal employment) and the benefit of educational and religious in changing the pastoralist livelihood systems.

At the village level, the vulnerability indicators included lack of infrastructure (for example year passable roads) lack of schools, lack of health facilities and underprivileged access to water sources. Household income levels; access to livelihood assets; household structure (construction materials), toilet facilities, energy used by the house and food security were used as indicators for the household vulnerability.

The analysis of livelihood assets involved measurement of basic social assets that people in the study area have in their possession. These assets were considered as “capital” base from which livelihood is constructed. The study considered a wide range of asset portfolio (including water, land, livestock holding, economic and financial assets) which is essential for the pursuit of any livelihood strategy.

Access to financial capital was assessed from the ability of the household to save and borrow from formal organizations (example banks) and informal structures (example relatives) and ownership of liquid assets such as livestock.

Access to social capital was measured using indicators such as membership to organizations, social relations and associations and reciprocity. The access to human capital was measured from the number of illiterate people, education level and number of people with formal employment. Among others, livelihood strategies of the pastoralists – natural resources, diversification and intensification were considered to be key livelihood strategies in the study area.

The livelihood outcomes were measured using different indicators, including secured access to water, increased schools, improved health facilities, improved food security, increased income, good housing and even maintenance of cultural assets, and thus have a feedback effect on the vulnerability status and asset base.

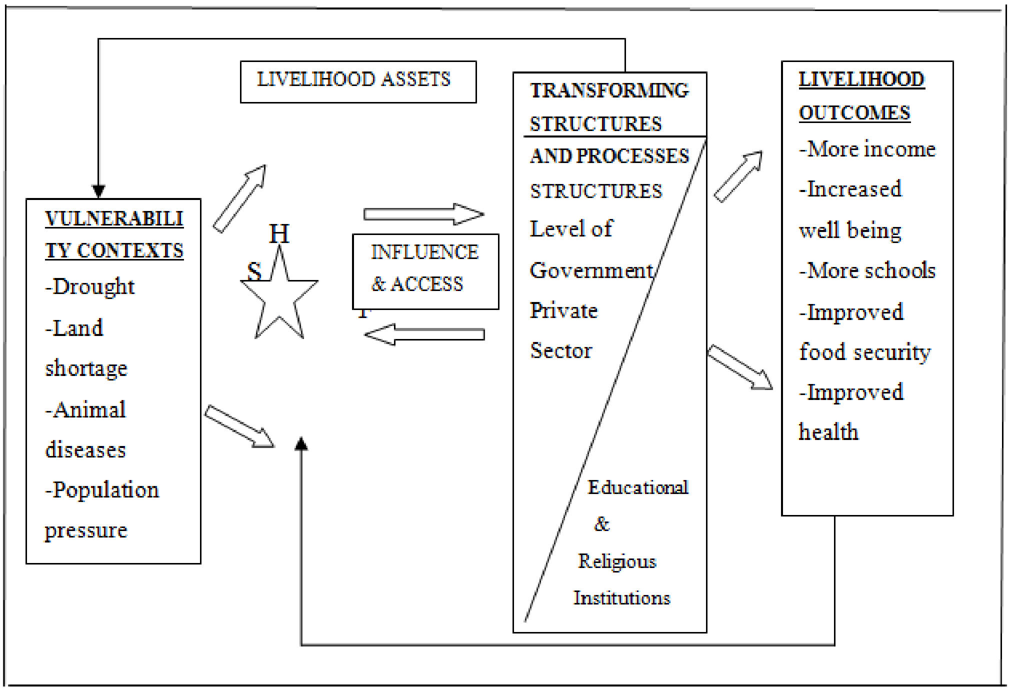

Figure 1: Conceptual framework

Source: Carney, D. *et al* (1999: 9).

Key:

H = Human Capital (skills, knowledge, ability to labour and good health to pursue different livelihood strategies)

F = Financial Capital (financial resources which are available)

P = Physical Capital (infrastructure and production equipment to enable people to pursue livelihoods)

S = Social Capital (social resources upon in pursuit of livelihoods)

N = Natural Capital (natural resource stocks from which resources are available)

3 RESULTS AND DISCUSSION

3.1 CHARACTERISTICS OF RESPONDENTS

a) Age and sex composition

Age and sex are important variables in examining the characteristics of population because the life of the pastoralist Maasai is well ordered through a series of life stages which are determined by age and sex. The age set is marked by specific duties and privileges (Hollis, 1976). Age and sex provide chances to compete in labour force and determine entry into schools (Shyrocks and Siegel, 1976:13). Age also saves as a base in population growth (Kpedekpo, 1998).

The Maasai males are rigidly separated into five groups: child (Ileyiok), junior (Isipalio), warrior (Irbarnot), junior elder (Irmuran) and senior elder (Irmorwak). Maasai females are categorized in four age groups which are ndoiye, ndito, sangiki and yeyo or kokoo. Maasai also follow a strict division of labour that is organized on age group and gender line (Kpedekpo, 1982).

Table 1: Distribution of male respondents by age (n=70)

Age (years)	Frequency	Percentage
18 – 20	10	14.7
20 – 39	15	35.7
39 – 49	17	24.7
49 – 59	11	15.7
59 - 69	7	10.0
Total	**70**	**100.0**

Table 1 show that most of respondents are middle age between 20-59 (60.4%). From the findings obtained, this age group is comprised of those pastoralists who are energic and are active in productive activities including looking after cattle.

Table 2: Distribution of female respondents by age (n=70)

Age (years)	Frequency	Percentage
15 - 20	18	25.7
20 - 39	28	40.0
40 - 60	16	22.9
70 - 100	8	11.4
Total	**70**	**100.0**

Table 2 shows female respondents by age. Again most female respondents (40%) had their age between20-30 years, a group which is also active in production activities. Tables 2 and 3 show that equal representation of both genders were taken into consideration during sampling. Gender is central for livelihood analysis in the household because gender relations show how household members play different roles within the household.

c) Marital Status

Another important aspect in analyzing the characteristics of respondents is marital status. In Maasai community again, apart from age, labour force is dictated by marital status. In this study marital status is classified into four categories: married, single, divorced and widowed. Married refers to legal union between two or more partners, whether religious, civil or traditional. Single refers to all those who are permanently separated and widow refers to a woman or man whose permanent sexual partner has died.

Table 3: Distribution of respondents by marital status (n=140)

Marital status	No. of respondents	Percentage
Married	120	84.7
Single	12	9.3
Widowed	7	5.3
Divorce	1	0.6
Total	**140**	**100.0**

Table 3 shows that majority (84.7%) of the respondents were married. Marriage in Maasai community has a significant role. While the Maasai men are responsible for looking after cattle, water and grazing lands, women form a very important labour force for household activities. The study observed that women have the responsibility of collecting water for domestic use and for calves. Also, it is the duty of a Maasai woman to construct clusters of huts or bomas. Until recently, divorce was not part of the Maasai culture.

d) Educational level

Education whether formal or informal is the most important means to obtain equal access to knowledge, skill, jobs and participation in wider society (Murphy, 1967). The findings on Maasai's level of education reveal that their level of education is low to the extent that most of them (64 %) do not know how to read and write. Illiteracy is higher among females. Due to the low level of education among the pastoralist Maasai, a very insignificant number of them are employed in public service. As a result non pastoral outsiders make most of the decisions at district level.

Table 4: Distribution of respondents by sex and level of education (n=140)

Level of education	No. of respondents	Male	Female	Male percentage	Female percentage
No education at all	90	20	70	14.3	50.0
Primary education	20	17	3	12.1	2.1
Secondary education	10	8	2	5.7	1.4
Tertiary education	8	6	2	4.3	1.4
Adult education	7	5	2	3.6	1.4
University level	5	3	2	2.1	1.4
Total	**140**	**59**	**81**	**42.1**	**57.7**

From Table 4 one can conclude that the low level of education among the pastoralists Maasai is due to the Maasai tradition which does not allow children to attend school because of their role in the pastoralist economy. Girls were supposed to be married while boys were looking after cattle. Parents have to move from one place to another looking for water and pastoral lands. The findings concur with those of Figholi (1992) who contended that education sector among pastoral communities in Africa has been neglected completely.

3.2 Livelihood Analysis

a) Livelihood assets

The results of quantitative analysis of the available key livelihood assets as revealed from the household surveys are summarized in Table 5.

Table 5: Household major assets (capitals) (n=140)

Asset ownership	Frequency	Percentage
Livestock	101	72.1
Agricultural land	21	15.0
Both pastoral and agricultural land	7	5.0
Other assets	11	7.9
Total	**140**	**100.0**

As can be seen from Table 5, there is a variation in terms of number of dominant assets owned in the households. In other words, access to livestock (72.1%) is the major determinant of household livelihood in the villages studied. Often the access to livestock and grazing land are inseparable: Livestock keeping requires grazing land. This suggests high value of land in terms of its contribution to household wealth.

About 72.1% of the households in the sample villages engage in livestock keeping (cattle, goats, sheep, and donkeys). Livestock numbers are quite high, hence livestock keeping is an important source of livelihoods. Livelihood platform of the poor households is less favourable in comparison to the medium households. The study revealed that the poor had limited access to natural resources such as land, human capital and labour, physical production capital such as livestock, and to social capital such as membership of local societies and associations.

The limitations in the livelihood platforms mean that the poor are thus most likely to be hit by production problems such as labour shortages, animal diseases and droughts. In addition, when such problems occur, the poor households are also the ones that are most likely to be hit hardest, as they do not have the resource base to cope with shocks or to overcome short periods of crisis. Poor households often experience a critical period at the peak of rainy season, when they have fully exhausted their household reserves, food shortages, disease prevalence and cash demands are high.

Access to grazing land is an important constraint in livestock keeping. Livestock keeping is fully dependent on access to grazing land. As a result access to grazing land is one of the major determinants of household wealth in the studied villages. The income of most households' throughout the year depends on cattle. The higher strata households are those with access to livestock.

Lending and borrowing mechanisms were also ranked as another important form of social capital. In the villages studied for example, social interactions are primarily dependent in collective action; income generating groups some of which the membership of which is dominated by middle income households. In the villages visited kin arrangements and drawing on social networks were strongly stressed. Collective action, good social relationships, mutual support and traditional ceremonies are important mechanisms to support the local livelihood strategies. Collective action, traditional ceremonies and kin arrangements crosscut social strata and result in higher levels of social capital for poor households (Table 6).

Table 6: Weighted percentages for the common social assets (n=140)

Type	Frequency	Percentage
Traditional ceremonies	50	35.0
Collective action	40	31.0
Kin arrangements	20	12.0
Lending and borrowing	14	10.0
Village meetings	9	8.0
Religious meetings	7	4.0
Total	**140**	**100.0**

In general, vulnerability in terms of access to physical resources increases from the rich to the poor. Some villages like Esilalei for example suffer the most droughts for livestock and have less favourable conditions for crop production. Likewise, livelihoods in villages in Monduli Juu are less vulnerable as the households in this area own more livestock and some pieces of land for crop production.

3.3 Activities of Educational and Religious Institutions in Monduli District

Evangelism activities are the backbone of most churches in the District. Evangelists offer services in more remote congregations and parishes. The evangelist activities include preaching, teaching, lead choir, funerals and administration of the congregations. Often parish workers lead women groups and support spiritual life in the parishes. Other religious denominations operating in the District include the Pentecostal Churches and Islam. Their contribution on the livelihoods of the pastoralists is not so significant.

Education is one of the basic tools for development and as such the government of Tanzania has invested heavily into the sector since independence. In 1974 the government launched the universal primary education in order to eradicate illiteracy amongst its populace; major goals were to provide education to all children aged 7 to 13 and reduce adult illiteracy from 69% to 5%.

Education and religion are organized social efforts aimed at bringing change of human behavior that would otherwise not occur naturally. These institutions are strengthening Maasai livelihoods and making them more secure and sustainable through initiating and supervising a number of interventions. The following are some of the active religious institutions in the District.

3.4 The Effects of Religious and Educational Institutions in Changing the Livelihoods of the Pastoralists Maasai

Field data in the villages studied indicate that there is a remarkable positive change in the livelihood systems brought by educational and religious institutions. Positive changes seemed to be more pronounced on socio-economic aspects such as water and sanitation, education, health, advocacy and spiritual development (Evangelism). Some changes were also noticed in the agricultural and livestock sub-sectors.

a) Provision of education

Before the interventions of religious and educational institutions in the villages studied, education infrastructure was virtually non-existent. Most of the sampled household interviewed (80%) said that classes were held in mud huts without latrines and girls could not attend school. Only half of the children enrolled in schools, and only half of those attended. Even worse, only one percent of the children passed the national examinations. This was further evidenced by respondents' level of education and the level of illiteracy in the District which is 64%. Interventions done by religious and educational institutions had raised the enrolment rates in primary schools with little gender differential. It was noted that estimates of the retention rate (the population of children enrolled in standard one who stay through standard seven) and school leaving showed improvement (80%).

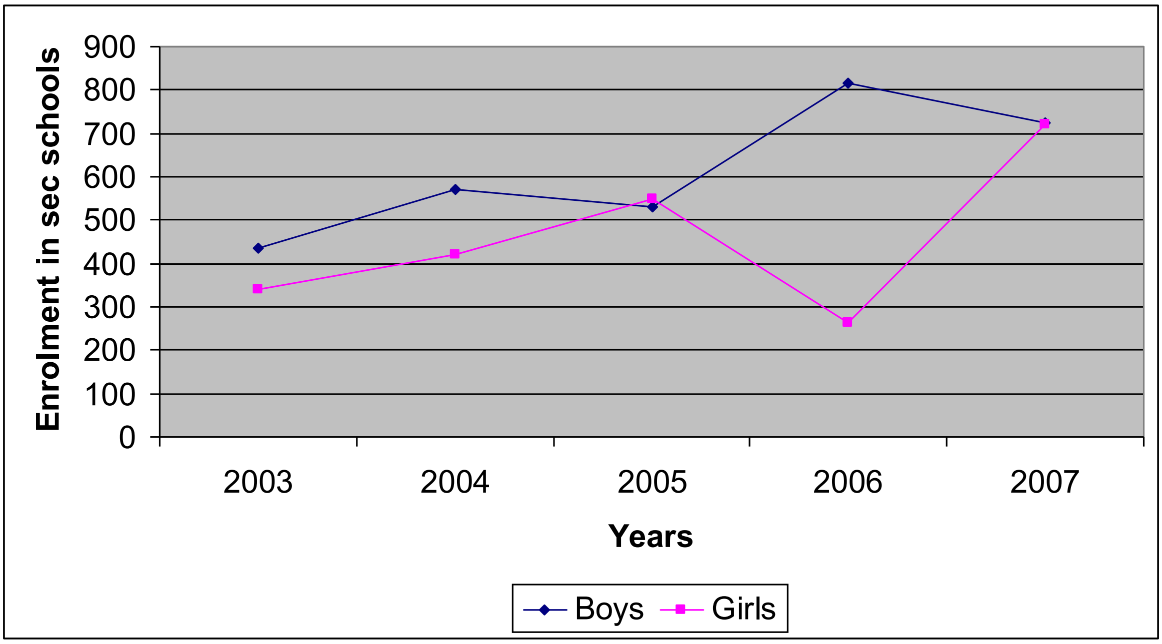

Figure 2: Students enrolment in secondary schools from 2003-2007 by sex

Expansion of primary schools in the villages studied rose from 3.5% in the year 2000 to 15.7% in the year 2007. Primary teachers increased from 185 in the year 2000 to 556 in 2007, with a ratio of 1:36 teacher – pupil. In the studied villages almost all school age children were enrolled in school, 87% attend, and more than 40% are selected to attend government schools. In the villages studied education is widely acknowledged as the key to reduce poverty. This information was supplemented by District Municipal data which showed that estimated primary enrolment rose from 3 859 (30.5%) in the year 2000 to 22 550 in 2007, though in the year 2000 the enrolment of boys was 6% higher with 2214 males compared to 1712 females (Figure 2).

The number of primary school facilities in the villages studied also showed improvement. Classrooms available were 285 (58%) of the total requirement, teachers houses were 298 (27%), desks were 7193 (94%) and pit latrines were 325 (40%) of the total requirement. But the illiteracy rate by sex in the villages was very high among female (74.6%) as compared to men (25.6%). Child Sponsorship Programmes done by religious and educational bodies in the study area have enabled children to have better care and bright future. Their livelihood opportunities are improved and increased. Fifty children in the villages studied were the beneficiaries of this Programme. The Sponsorship ends when they reach the level of form four (ELCT) and university level (CIT). It was further noted by this study that some of the sponsored children fail to continue with their education after the support ceases because most of the parents cannot afford the high costs of education.

Much emphasis is also placed in school building programmes. Moringe Girls Secondary School (Mlimani village), Maasai Girls Lutheran Secondary School in (Olarash village) in Monduli Juu, Enyorata Secondary School in Enguikki village are among the outcomes of ELCT Arusha Diocese interventions and AAIDRO respectively. There are number of pre-school centres with more than 215 children in all the villages visited.

b) Health Provision

Before any interventions were done by religious and educational institutions, 90% of the interviewed villagers said that traditional healers were the first source of health care in the villages to most people. Almost half of the children were suffering from malnutrition and child bearing women were not immunized and preventable communicable diseases infected almost 89% of the villagers and few used mosquito nets.

After interventions, data from the villages studied showed that less than 3% of children suffer from malnutrition, the incidence of communicable diseases has been reduced from 89% in the year 2000 to 23% (2007) and more than 80% of pregnant women and children were immunized. In the villages visited, areas of special emphasis have been constructing health centres, clinics, rehabilitation and construction of maternity wards. Equipment and medical supplies have also been provided to all health centres and dispensaries in all villages in the study area. Villagers have also been trained in primary care, ten counselors work with HIV and AIDS patients (the infection rate is 14% at Mto wa Mbu ward) and eight birth attendants have been trained in modern hygiene techniques.

ELCT had four dispensaries in the study area (Kimokouwa, Ketumbeine, Eluai and Gelei) and AAIDRO under RC Church has two dispensaries and one hospital at Mto wa Mbu. AAIDRO is also providing handicapped services at Selela village. ELCT and AAIDRO are also providing VCT services in all the villages studied.

Health indicators in the study area also included infant mortality rate, under five mortality rates, immunized children (12 – 23 months) against measles and access to toilet facilities. District estimates showed that out of 952 live births in 2007 there were two live deaths (105 deaths per 100 000). Out of 1897 children born alive, there was an occurrence of 93 deaths (the death ratio of 49 per 100 000 live births). Immunization of children under – five and child bearing mothers in 2007 covered 85% of the total population in the study area. Field data indicate that 53.1% of the villagers in the study area had access to pit latrines toilets, 3.7% flush toilets and 43.2% had no toilets.

c) Water and Sanitation

It was noted that before religious and educational interventions in the villages studied, villagers had no clean and potable water. Money invested by religious and educational bodies in developing infrastructure to provide easy access to clean water has lifted the villagers from impoverishment. It was mentioned by villagers that before the interventions in villages, life was difficult for women and children who had to walk long distances to fetch water from dirty dams and wells. The health of the villagers was poor and most of them were infected with water-borne diseases. ELCT Diocese of Arusha had built and handed over water projects in two villages in the study area while AAIDRO had handed water projects in three villages.

In the villages studied 44.4% of the villagers had access to piped water, 38.3% had access to spring water and 17.3% had access to surface water (lake, rivers, and stream). These data were also supplemented by Monduli District data as shown in Table 8.

Table 7: Number of people served with water by Division 2007

Division	Population	Population served with water	Number of villages	Villages with access to water	Percentage
Makuyuni	19 833	13 605	9	5	55.5
Manyara	28 354	21 467	7	4	57
Kisongo	63 850	55 202	22	13	59
Total	**112 037**	**90 274**	**38**	**22**	**57.2**

Table 8 shows that more than half (57.2) of the villages have access to water for both livestock and home consumption. Efforts done by religious and educational institutions have enabled villagers to access bore holes, dams and other existing water schemes.

d) Improved food security

The value and benefits of religious and educational interventions on the livelihoods of the pastoralist Maasai were also pronounced in aspects of food production and food security. Before the interventions of religious and educational institutions in the area of the study, most of the villagers had limited access to water and farming techniques which left most of them vulnerable to drought and struggling with food insecurity. More than 23% of the households had no enough food to last all year round and most of the children were malnourished. When asked on the food situation 42% of the villagers interviewed had the opinion that food security has improved because of better farming techniques and seed which provide a better yield. It was evidenced that under Area Development Programme (ADP) which is implemented by WVT some farmers had started using manure and had been trained on pest control and animal husbandry. Loans which are provided under ADP had secured families in the villages of the study area with 25 ox-ploughs.

Study analysis on the number of meals taken by the household per day indicates that 18.5% of the household members take three meals a day, 77.5% take two meals a day, and only 3.7% complained to take one meal a day. Study findings also show that 22.2% of the villagers had never experienced food shortages between 2000-2007 and only 8.6% had food problems in that period. AIDRO also provide nutritious food for the PLWHA in all the villages studied. The statistical data on food production were also available from the administration in the District.

The current study also used the District data to show dynamics of food production and food security. District data indicate that the yields of major food crops (maize, beans, paddy, wheat and banana) have increased in terms of hectares and tonnage.

Table 8: Major food crop production in the study area 1989/90-2006/07

Crop	1989/90		2006/07	
	Hectare	Tons	Hectare	Tons
Maize	7 295	14 925	3 210	14 887
Beans	4 763	8 830	8 830	18 115
Paddy	1 350	3 319	3 000	14 420
Wheat	700	10 687	700	13 190
Banana	14 700	98 670	950	10 687
Total	**28 808**	**136 431**	**13 690**	**44 479**

Although there have been fluctuations both in terms of hectare and tonnage there is a slight improvement of food production. In the study villages, it was noted that despite the agricultural potential in some villages such as Emirete, Mfereji, Losirwa and Mgombani, there appears to be little effort to improve this sector because the main agricultural interventions have so far focused on supply of seeds and improved livestock management.

e) Improved houses

Before interventions of educational and religious institutions, the pastoralist Maasai were living in traditional houses (small clusters of huts) made of stick and cow dung. These huts were not permanent and included enclosures for cattle. After interventions made by religious and educational institutions, the housing conditions of the pastoral Maasai have improved. In the villages visited 30% of the houses were built with bricks and iron sheet, 4% were concrete and 66% were made of mud and grasses.

f) Income generation activities

In order to assist villagers to gain access to greater income, religious and educational institutions have helped villagers in the formation of income generating groups and some villagers have been trained on various life and entrepreneurship skills. Income generating activities found in the studied villages included tailoring, breeding projects, dairy goat projects, poultry and flour mills. Religious and educational efforts had enabled villagers to establish community based organizations (CBOs).These organizations provide ongoing support to local development. Religious and educational efforts also had enabled villagers to establish saving and credit societies such as Monduli Women Lutheran SACCOS and Monduli Women Catholic SACCOS (Single Mothers Group) which have been established and registered by the government so as to assist villagers in developing their small enterprises.

Asked on the contribution of the income generating projects 65% of the villagers particularly women said that their conditions were steadily improving, and situations which only a few years ago were unthinkable are taking place as a growing norm. Women take part in discussions and they participate in running and supervising various projects.

g) Awareness-raising

Religious and educational institutions through their advocacy units are also involved in training of the pastoralists on child rights; gender mainstreaming, gender policy, girl child education and FGM eradication through workshops, seminars and exposure learning visits. Several training workshops are conducted to enhance the capacity of the community members.

Educational and religious/institutions are changing the livelihoods of the pastoralist Maasai hence, increasing their wellbeing and their livelihoods. They are strengthening the livelihood security by enabling them to build on their assets and capabilities which are the basis of the household livelihoods.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

Study findings indicate that there is a remarkable positive outcomes in the pastoralist livelihood systems in Monduli District brought by interventions done by religious and educational institutions. Positive outcomes have been pronounced on socio-economic aspects such as water and sanitation, education, health, improved food security, good housing, awareness raising and income generating activities. In this manner educational and religious institutions are improving the wellbeing and the livelihoods of the pastoralist Maasai. Educational and religious institutions are strengthening the livelihood security of the pastoralist by enabling them to build on their assets and capabilities which are the basis of the households' livelihoods.

4.2 RECOMMENDATIONS

Based on the findings and conclusions, the following are the recommendations:

Religious and educational activities are transforming the livelihoods of the pastoralists Maasai in Monduli towards development. There is a need for religious and educational institutions to introduce similar interventions to other tribal people, especially the Barbaig, Hadzabe, Sandawe, Tatoga and Taturu.

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Influence of short fibers on the quality characteristics of the product, yield of yarn and waste of cotton fiber

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ABSTRACT: This article is devoted to the influence of short cotton fibers and trash on the yarn quality parameters, as well as the yield of yarn and waste of cotton fiber. Carding process at a spinning mill is the last step of removing trash and defects such as neps, peel, seed count neps. Flaws found in the card sliver directly affect the number of defects in the yarn. These defects can not be detected by weight testing and roving sliver. In order to determine short fibers in the card sliver modern fiber measuring instrument USTER AFIS PRO-2 is used. As an object three different lots of cotton fiber of sort 1 in 4 types of selection C-6524 were taken from three different cotton cleaning factories. Studies have shown that removal of neps, short fibers and trash are not dependent on each other. As well as analysis of the results showed that the yarn produced from cotton fibers in cotton cleaning factory-1 meets 5% level according to international standard USTER tester. In this factory cotton fiber have been reported with short fiber content of about 5.6%, and the number of neps 227 units per gram of fiber. Second and Third cotton factories' fibers comprising a short fiber content of 8.7% and 10.3%, and the number of neps are 269 and 280 units respectively. Studies showed that the content amount of short fibers is not changed, and in the process of carding even increases so that it requires careful research.

KEYWORDS: fiber, nep, seed count nep, sliver, roving, carding, yarn, spinning.

1 INTRODUCTION

In the textile industry it is well known that, price of raw materials is a significant part of the cost of production in spinning factories. Hence - the process of optimizing the use of raw materials is the main objective of control and requires changes in the properties of the fibers in the spinning process.

Carding department at spinning mill is the most demanding area to support the management of this process. Carding process is the last opportunity to remove trash and defects such as neps, peel, seed count nep in the card sliver before spinning. Without considering combing process it is difficult to remove trash and vices.

Number of defects such as neps and thickened place on yarn directly related to neps, skin particles, seeds and short fibers that are in the card sliver. Neps and short fiber content are in carding and tape can not be detected by testing the weight and roving.

As a result, it is possible that the tape with an acceptable coefficient of variation and roving can create ineffective spinning that causes the production of low-quality yarn.

2 RESEARCH AND ANALYSIS OF THE EFFECTIVENESS OF CARDING COTTON FIBER

2.1 SHORT FIBER CONTENT (SFC)

Applied information in this article focuses on the changes in neps, quantity of short fibers and trash in the spinning process.

Short fiber content (SFC) - an assessment of short fiber included in cotton fiber. During the calculation method used «suter-web» - the array to measure the number of fibers in each group lengths or mass fraction, expressed as a percentage of the quantitative. It is known that fibers with a length less than 0.5 inches (12.7 mm) are not used in the spinning process and removed as waste. \

In the process of carding short fibers and neps should be removed, however experiments showed that these trashes are partially removed.

2.2 REMOVAL EFFICIENCY OF NEPS, TRASH AND SHORT FIBER IN CARDING TAPE

Checking the contents of the number of neps, short fibers, trash and cleaning efficiency on carding machines showed that removal of neps, short fibers and trash are not dependent on each other.

Removal efficiency of defects in carding tape of fiber 1-grade 4-type selection C-6524 in cotton factories of Uchkurgan, Namangan and Pop-3 are shown below (Figure 1)

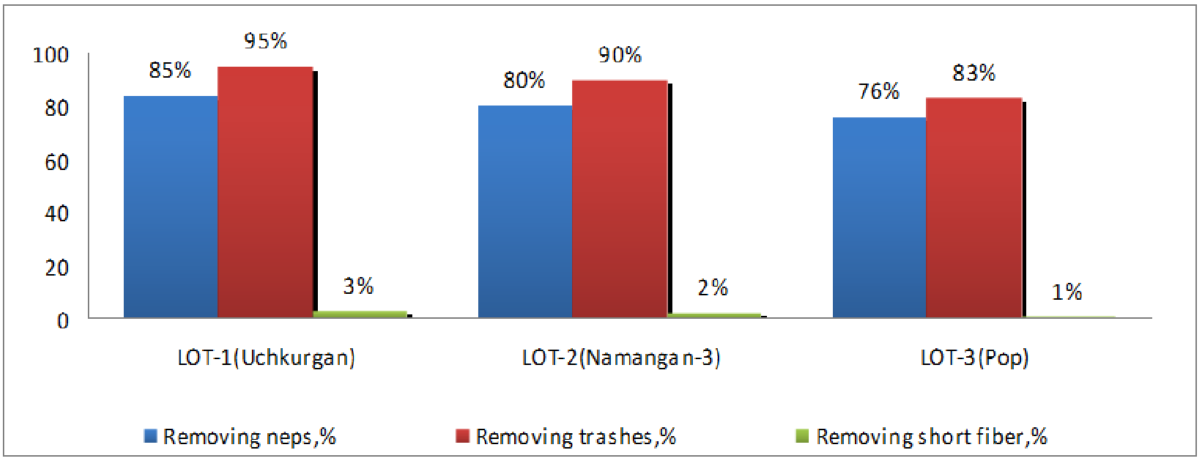

Fig. 1. Removal efficiency of neps, trash and short fiber in carding tape

The share of fibers with a length of less than 0.5 inches should range from 2% to 20%. [2]

2.3 QUALITATIVE INDICATORS OF COTTON FIBER

The level of short fiber content should be verified by the card sliver using modern fiber measuring instrument USTER AFIS PRO2 on ENTERPRISE LLC HAIN TEX. As an experimental object, we took three different lots of cotton fiber of sort- 1, type-4, selection C-6524 from three different cotton factories. (Table 1)

Qualitative indicators of 4-type, 1-sort cotton used for the production of ring yarn T = 19,8 tex (Ne = 30 'S) are given below:

Table-1. Qualitative indicators of cotton fiber

Fiber lots	Total Nep Count [Cnt/g]	Seed Count Neps [Cnt/g]	L(w) [inch] Average length	Short Fiber Content (w) %0.5inch	Average Upper Length(w) [inch]	L(n) [inch]	SFC(n) % 0.5 inch	5% L(n) [mm]
LOT-1(045)	227	16	24,58	5,63	29,5	20,45	17,37	33,7
LOT-2(042)	269	22	24,0	8,7	29,2	20,0	22,63	33,4
LOT-3(028)	280	28	24,2	10,3	29,04	20,01	27,1	33,2

Table 1. Continuation

Fiber Lots	Maturity Ratio	IFC [%]	Total Trash Count [Cnt/g]	Dust Count [Cnt/g]	Trash Count [Cnt/g]	VFM [%] Visible Trash	Fineness [mtex]
LOT-1(045)	0,93	4,85	307	268	33,4	1,015	166
LOT-2(042)	0,91	5,02	444	398	39	1,091	164
LOT-3(028)	0,92	5,4	880	805	74	1,7	165

Optimization the process of removing neps, short fibers and trash on carding machine is one of the most important tasks in the development of yarn. On this occasion, all three parties of fibers were tested on laboratory equipment for cotton - fiber content on the number of neps and short fibers. The result of the analysis is given below (Fig. 2).

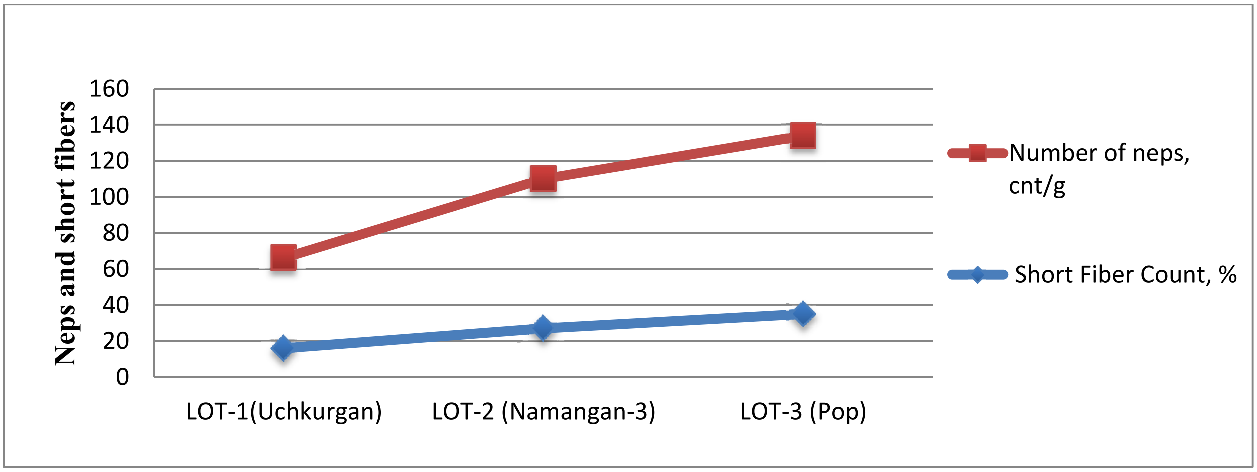

Fig. 2. Analysis of the number of neps and short fibers on the card sliver

Proceeding with research, in the development of given yarn there is linear density and determined amount of short fibers on transition to spinning.

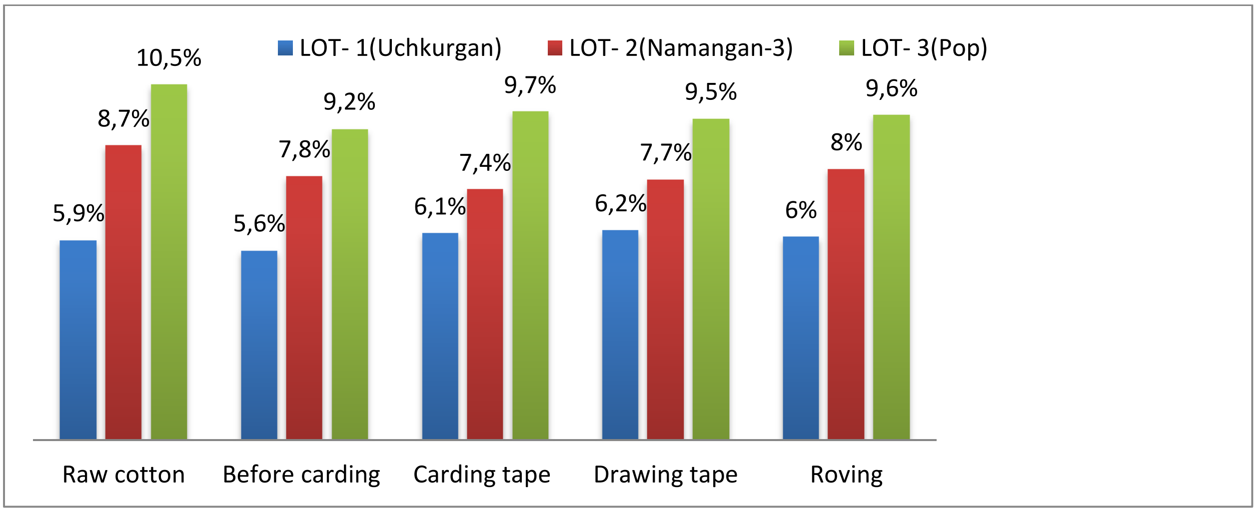

Fig. 3. Analysis of the amount of short fiber content (SFC) in the spinning process at the transitions, %

As seen in the Fig.3 number of short fiber content is not changed, but even in the carding process increases. It follows that the carding process requires careful research.

3 RESEARCH TO DETERMINE THE QUALITATIVE INDICATORS OF SINGLE YARN

Quality indicators on a single yarn, such as values, thick places (THICK +50%) and neps (NEPS +200%) in and Lot -2, Lot -3 relatively higher than Lot-1. According to laboratory tests processed, cotton yarn fibers Lot-1 showed better results and it is included in the 5% level according to international standard Uster, (Table 2) [3]. Exactly this standard is used in most of the Uzbek textile enterprises. This is due to the fact that the party on the cotton fibers LOT-1 was made with the presence of short fibers in the fiber limit, 5.6%, and the amount of neps 227 pcs. per gram of fiber. Lot-2 and Lot-3 content of short fibers is within 8.7% and 10.3% respectively. The number of neps are 269 and 280 pc. per gram of fiber (Table 1). This proves that the short fibers and the number of neps have a major impact on the quality characteristics of manufactured product and can be one of the aspects that affect badly to the quality of yarn.

Table 2. Qualitative indicators of single yarn Ne 30S '(19,8 tex) generated at spinning factory SP LLC HAIN TEX from three different lots of cotton fiber

		Uster statistics-2001			KCD 30'		
LOT		5%	25%	50%	LOT-1	LOT-2	LOT-3
COUNT (Ne)		30	30	30	30,00	29,90	29,90
CV % / Count		1,00	1,50	1,90	1,76	1,88	1,93
Rkm		18,80	16,80	15,70	15,97	15,40	14,65
CV % / CV_{RKM}		8,10	8,70	9,30	9,05	9,97	10,02
ELONGATION /		6,50	6,20	5,80	5,24	5,10	5,03
CV % / CV_{Elang}		6,80	7,40	8,20	7,73	8,33	7,17
U % /		11,20	12,00	12,80	11,95	12,23	12,55
CV % /		14,00	15,00	16,00	15,17	15,62	15,96
I.P.I.	**THIN -50% (km) /**	6	12	18	8	10	20
	THICK+50% (km) /	100	170	210	160	224	244
	NEPS +200% (km) /	150	220	350	195	238	286
HAIRINESS /		4,7	5,2	5,5	6,0	6,0	6,0

Table 3. Yield of waste and yarn at different contents of short fibers from three different lots of fiber, the calculation is made in 100 tons of cotton fiber

Lot number of cotton fiber	Short Fiber Content, %	Yield, %	Yield of Waste, %	Loss, %	Average price, USD/kg	Income, USD
LOT- 1(Uchkurgan)	5,6	86,3	11,5	2,2	3,1	266 600
LOT- 2 (Namangan-3)	8,7	85, 1	12,6	2,3	3,1	263 600
LOT- 3 (Pop)	10,5	84,2	13,4	2,4	3,1	261 020

It could be argued that the short fiber content has a significant impact at the spinning process, especially it affects the yield of the fiber yarn. As it can be seen in Table 3 on Lot-1, Lot-2 and 3, the yield of yarn decreased to 85.1% and 84.2%, and Waste increased 12.6% and 13.4%. It can be explained that the content of the short fibers on the fiber Lot-2 and Lot-3 varies, short fiber make up about 8.7%, 10.5% respectively. Short fiber Content on incoming fiber based on Lot-1 is about 5.6% and it shows significantly better results in comparison with LOT-2 and 3. Yield of the fiber yarn is 86.3%, while the yield of Waste is 11.5% (Table 3). To conclude that taking over fiber with the least amount of short fiber will be profitable for spinning mills, as this is the main goal of every company. Analysis of incoming raw materials can serve to solve the above mentioned reasons for spinning production [4].

Cost of raw material is more than 60% of the cost of production in most spinning factories. Having an excellent knowledge of the raw materials has always been the intention of the leaders and managers of factories as raw materials selection determines many reasons. Selection of raw materials is not only important, but using of raw materials is also efficient. This means that in order to control waste disposal, it is necessary to analyze the process of neps exploitation in carding machine. Technological Equipment Settings allow modernizing fiber defects, optimizing the quality and increasing revenue. Consequently management characteristics of fiber spinning factories, is needed to serve effectively in sequence to produce high quality product [1].

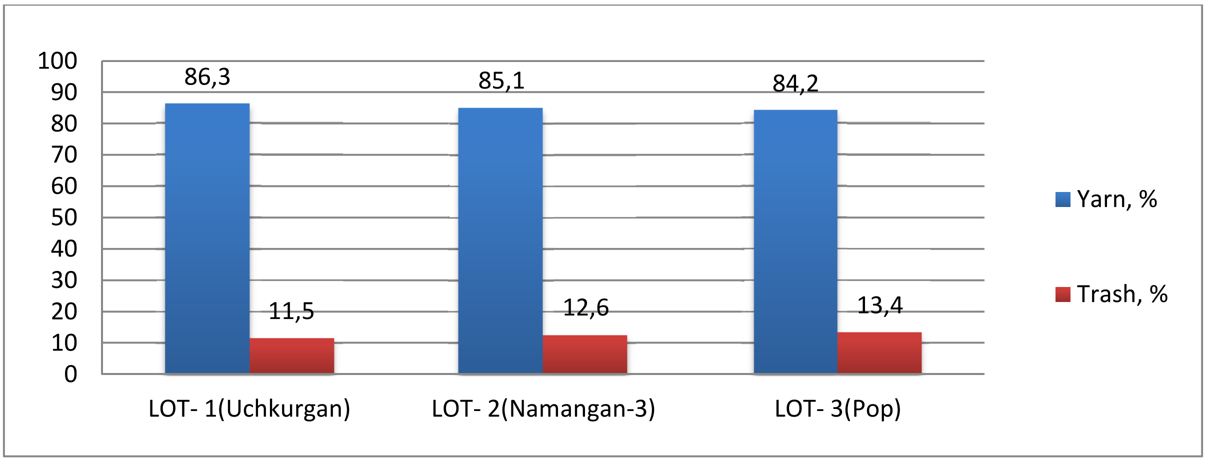

Fig. 4. Analysis of trash and yarn yield from two used fiber lots in the production, calculation is made by 100 tons

4 CONCLUSION

In developing given yarn linear density, we determined the content of short fibers over all transitions spinning.

Studies have shown that removal of neps, short fibers and trash are not dependent on each other. As well as analysis of the results showed that the yarn made from cotton fibers in the cotton factory-1 meets 5% level according to international standard USTER.

Cotton fiber of this factory has been reported with short fiber content of about 5.6%, and the number of neps 227 units per gram of fiber. Cotton fibers in Factories 2 and 3 comprised a short fiber content of 8.7% and 10.3%, the number of neps 269 and 280 units respectively.

Studies showed that short fiber content is not changed, however in the process of carding even increases so that it requires careful research.

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Germination and Growth Status of Endangered Medicinal Plant *Caesalpinia bonduc* (Linn.) Roxb. in Meerut (U.P.) India

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ABSTRACT: The present study therefore, deals the germination and growth status of *Caesalpinia bonduc* endangered medicinal plant in Meerut district U.P. *C. bonduc* of family Fabaceae is a moderately size deciduous shrub species, growing wild throughout the deciduous forest of India. *Caesalpinia bonduc* is highly valued plant species for the human beings and environment management. The plant parts like barks, leaves, root and leaves widely used for medicinally purposes. The plant species is distributed few parts of India but now it is threatened species in many areas in the country. The species does not found in Meerut areas. Hence, there is an urgent need for conservation of this species. A total 100 seeds were sowing in 10 cemented pots of size length 90 cm. into width 60 cm. containing soil: manure ratio 3:1, during the second week of May 2013. It was observed on daily, seed germinated after 6 days germination commenced. I had recorded total seed germinate 95 % within 21 days from the date of sowing. The growth parameters shoot length and girth size were recorded at June, July, August, September 2013 and April, May 2014. Final reading on plant height Mean 163.8 cm. and girth size Mean 6.66 cm. was recorded at the age of twelve months from date of sowing. The results indicate of the germination and growth status at all stages enhanced. The saplings were growing 1 m. above per year in Meerut. It is concluded that the aim of the present study is to spread awareness towards the conservation and establishment of the endangered medicinal plant *Caesalpinia bonduc* in those areas where the plant species is now does not found.

KEYWORDS: *Caesalpinia bonduc*, Endangered, Conservation, Meerut.

1 INTRODUCTION

Caesalpinia bonduc (Linn.) Roxb. is a wild highly thorny shrub belonging to the family Caesalpinaceae. It is commonly called as the Gray Nicker, fever nut. It is a large straggling, thorny shrub, leaves are compound. The flowers are pale yellow in colour, in supra-axillary racemes at the top. The fruits are inflated pods, covered with prickles, about 7.5 cm long, 4.2 cm. width and 2 seeds per pod. The seeds are globular, hard seed coat, grey in color with a smooth shiny surface. *Caesalpinia bonduc* is an important medicinal plant extensively distributed throughout India, Burma, Sri Lanka, Africa and in other tropical and subtropical regions of the world. The plant grows all over India especially in seacoast and in many forests and hills. *Caesalpinia bonduc* is used for medicinal treatment such as: plant leaves used in memory weakness, sexual weakness, painful menstruation and malaria diabetes while young shoot used in toothache and gum bleeding and flowers used for hair growing and control hair fall. The oil from the seeds is used in convulsions and paralysis. Burnt seeds with alum are good dentifrice useful in spongy gums and gum boils and its fresh fruit powder is used in fever. The juice of leaves is anthelmintic, good in elephantiasis and small pox diseases. The root bark powder with honey used in the cases of hernia. *C. bonduc* is reported to possess multiple therapeutic properties like antipyretic, antianaphylactic and anti diarrheal (Iyengar and Pendse, 1965), anti asthmatic (Gayaraja *et al*., 1978), antidiuretic and anthelmintic (Neogi and Nayak, 1958), antiviral (Dhar *et al*., 1968), *Caesalpinia bonduc*, a multipurpose, widely-used species with cultural and medicinal properties (Harden,2002; Hessou *et al*., 2009). *C. bonduc* plant parts (leaves, roots and seeds) are being used by local people in Benin and this for a wide range of purposes, from medicine, over commercialization to cultural practices and other domestic uses. Its hard seeds are roasted, ground and then boiled for medical treatments including a diuretic for diabetes and a cure for malaria (Chakrabarti *et al.,* 2005). *C. bonduc* mainly used against prostrate gland disease in traditional pharmacopoeia in Africa (Upadhyay *et al*., 2001;

Hessou *et al*., 2009). The seeds have been used from centuries and are still used in jewellery, prayer beads, good luck charms, and worry stones (Rancho Leona 2002, Workman1980). *Caesalpinia bonduc* can play an important role in the biodiversity of the forests, protection of the soil and furnishing cover for wildlife. Flowers of this species are the widely source of nectar for honey bees, *xylocopa,* butter flies and author insects species*. Apis dorsata* has been known to visit flowers of *Caesalpinia bonduc* in the Nallamalai forest, Andhra Pradesh, India (Daehler, 2005). The species is sometimes planted as hedge to prevent undesired entry into property (Nelson, 1996) and can be planted for dune stabilization. The species also threatened by overexploitation of its roots (Hutton, 2001). Widespread loss and degradation of native forests is now recognised as a global environmental crisis from 2000-2005, global forest area declined by around 20 million ha/yr (Hansen *et al*., 2010), As a consequence, many plants species are threatened and disappear more and more from their natural ecosystems (Adomou et al.,2005). *C.bonduc* is classified as rare and endangered species in the world (Harden, 2002). It is also reported to be critically endangered in Malaysia (Hou D, Larsen k & Larsen SS,1996). Further, unscientific over exploration of the plant parts like seeds, barks and leaves for medicinally purposes and destruction of habitat by anthropogenic activities drag this species towards the threshold of threatening condition and wall become extinct if proper steps are not taken for its conservation. Hence, there is an urgent need for conservation of this plant species. *C. bonduc* tolerates drought condition saline soils, marshy land and occasional flooding with seawater. So, It can grow in a wide range of many areas of the country where it species not found. Meerut's soil is more fertile and has a warm subtropical climate and becomes very cold and dries in winters from December to mid February while it is dry and hot in summers from April to June. During extreme winters, the maximum temperature is around 12^0 and minimum 3^0 to 4^0 Celsius. Summers can be quite hot with temperatures rising upto 40^0 to 44^0 Celsius range. The present study aim to spread awareness towards conservation and establishment of *C. bonduc* endangered medicinal plant in Meerut and those areas where It species are not found. The study will also prove to be of immense usefulness for the conservation of rare plant species in the forest.

SYNONYMS: *Guilandina bonduc L., Guilandina bonducella L., Caesalpinia bonducella (L.) Fleming, Guilandina crista (L.)*

MATERIAL AND METHODS

The present study was carried out at B – 16, Jwala Nagar, Ambedkar Chowk in District Meerut Uttar Pradesh for the period May to September 2013 and September to May 2014. The matured and healthy seeds were collected from Naryanganj, District Jabalpur, Madhya Pradesh by Dr.Yashwani Rai during the first week of march 2013. A total 100 seeds were sowing in 10 cemented pots of size length 90 x width 60 cm. containing soil: manure ratio 3:1 during the second week of May 2013. It was observed on daily seed germinated starts after 6 days germination commenced. I had recorded total seed germinate 95% within 21 days from the date of sowing. After four months old saplings were transplanted into the fields at urban and rural areas of District Meerut during the end of September 2013. The growth parameters shoot length and girth size were recorded at June, July, August, September 2013 and April, May 2014.

RESULTS

The result shows that the total 95% germination was observed within 21 days during end of May 2013 from date of sowing. Seedlings height Mean 27.56 cm., 62.26 cm., 100.4 cm. and 110.36 cm. and girth size also observed Mean 1.1 cm., 2.3 cm., 3.4 cm., and 5.1 cm. at June, July, August, and September 2013 respectively. After four months old saplings were transplanted into the fields, urban and rural areas of District Meerut. Final reading on plant height Mean 155.24, 163.8 cm. and girth size Mean 6.22, 6.66 cm. ware recorded at the April, May 2014. Growth of all stages of *Caesalpinia bonduc* is fairly rapid and established in rural and urban areas of Meerut District. The saplings were growing 1.5 m above in one year in Meerut areas results clear table 1, 2. 3 and figures 1 to 10. As a consequence, many plants species are threatened and disappear more and more from their natural ecosystems. Seeds are still important starting materials for propagation of many vital tree species. Furthermore, the use of seeds as propagules has been considered the easiest and cheapest, and the most common means for many agro forestry and timber tree species (Akinnifesi *et al*. 2007Generally, this has been attributed to the fact that seeds are often easy to produce and handle (Black 1989). Germination and seedling establishment are two very critical phase in the life history of tree species (Ramakirshnan 1972, Gomez - Pompa & Vezques-Yanes 1974, Harper &White 1974). Developing conservation and domestication strategies for the endangered scrambling shrub *C. bonduc* (Roxb.) (Assogbadjo, A. E 2011). *C. bonduc* grows in full sun and is in tolerant of shade, but can withstand areas with partial shade (Francis, 2000). Callus induction and shoot regeneration from epicotylexplants of ethnomedicinally important *C.bonduc* (Roxb). (Cheruvathur, *et al*., 2010) Ethnic differences in use value and use patterns of the threatened multipurpose scrambling shrub (Azihou *et al*., 2011)The present study focuses on the endangered shrub *C. bonduc* development and established in Meerut district, a multipurpose plant with species having medicinal and ecological value.

TABLE – 1: SEED GERMINATION PERCENTAGE OF CASEALPINIA BONDUC

MAY							
Days	3	6	9	12	15	18	21
Germination % (%)	_	_	20	50	70	80	95

TABLE 2. :THE PLANT SHOOT HEIGHT AND GIRTH SIZE AT JUNE, JULY, AUGUST, AND SEPTEMBER 2013, IN POTS

Months	Plant Height (Cm) Mean SD	Girth Size (Cm) Mean ± SD
June	27.56±0.30	1.1 ± 0.1
July	62.26±0.25	2.3 ± 0.1
August	100.4±0.17	3.4 ± 0.47
September	120.46±0.15	5.1 ± 0.25

TABLE 3. :THE PLANT SHOOT HEIGHT AND GIRTH SIZE AT APRIL AND MAY 2014, IN FIELD AREAS OF MEERUT

Months	Plant Height (Cm) Mean SD	Girth Size (Cm) Mean ± SD
April 2014	155.24±0.79	6.22 ± 0.26
May 2014	163.8±0.45	6.66 ± 0.32

Fig. 1. C. bonduc Seeds were collected by Yashwant Rai from Narayana Ganj, Jabalpur, M.P.

Fig. 2. Seeds of Caesalpina bonduc in the pod

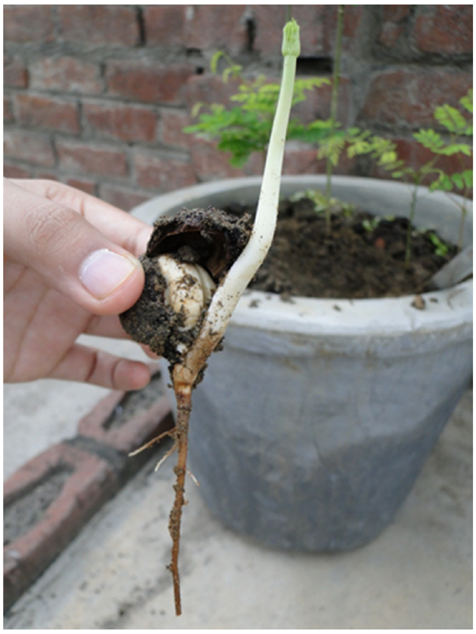

Fig. 3. Unsacrified seed germinated 6 days after sowing

Fig. 4. View of Seedling first leaves of Caesalpinia bonduc

Fig. 5. View of Germinate saplings of C. bonduc

Fig. 6. 15th days growth of C. bonduc (after sowing)

Fig. 7. One month growth status of C. bonduc in pot (after sowing)

Fig. 8. Four months growth status of C. bonduc in pot (after sowing)

Fig. 9. Growth status at May 2014 in Village Gotka, sardhna Meerut

Fig. 10. Growth status at May 2014 in Sanjay Van, Delhi road Meerut

CONCLUSION

It is concluded that the aim of the present study is to spread awareness towards conservation of endangered medicinal plant *Caesalpinia bonduc* in those areas where the plant is now rarely found. This research work will also prove to be of immense usefulness for the conservation of endangered *Casealpinia bonduc* species in the forest. Since this plant is beneficial for humans in many ways, therefore it is required that wide propagation and conservation of this plant should be carried out, in order to ensure that future generations can benefit from it.

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Modélisation des Facteurs de Risque Génétiques dans l'Accident Vasculaire Cérébral Ischémique

[Modeling of Genetic Risk Factors in Ischemic Stroke]

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ABSTRACT: In this article, we focus our work on the modeling of genetic risk factors on ischemic strokes occurred. To do this, logistic regression was widespread in our study. We proceeded in two stages: the first, we modeled the probability of the occurrence of ischemic stroke in an individual (i) based on genetic risk factors. Our sample consisted of 330 individuals aged at least 40 years, divided into 165 patients who had an ischemic stroke and 165 controls.
We applied the Wald test for all variables in the model one by one and we concluded to Reject H0, since the coefficients of our variables are not all zero.
In a second step, we studied the effects of these variables on the risk factors and then the effect of variables on Ischemic stroke to present the model equation.
We set a prediction threshold after specification test, that allows us to ensure the quality of the fit of the model and its degree of prediction, the proportion of people who have ischemic stroke is (50%). The results showed that 128 of 156 people with Ischemic stroke allowed a positive predictive value of 82%. We conclude that the prediction rate and the success rate of our model is 80.30 %, the results obtained with the «XLSTAT» software show a very good model with (sensitivity 78% and specificity 83%).

KEYWORDS: Ischemic stroke, genetic risk factors, modeling, logistic regression and fit test.

RÉSUMÉ: Dans cet article, nous focalisons notre travail sur la modélisation des facteurs de risque génétiques sur la survenu des AVC ischémiques. Pour ce faire, La régression logistique a été largement répandue dans notre étude. Nous avons procédé en deux étapes, dans la première, nous avons modélisé la probabilité de la survenue d'un accident vasculaire cérébral ischémique chez un individu (i) en fonction des FR génétiques. Notre échantillon était composé de 330 individus âgés d'au moins 40 ans, répartis en 165 patients ayant fait un AVCI et 165 témoins.
Nous avons appliqué le test de Wald, pour toutes les variables du modèle une à une et nous avons conclu au Rejet de H0, puisque les coefficients de nos variables ne sont pas tous nuls.
Dans une seconde étape, nous avons étudié les effets de ces variables sur les FR et ensuite l'effet des variables sur l'AVCI afin de présenter l'équation du modèle.
On a fixé un seuil de prédiction après test de spécification qui nous permet de nous assurer de la qualité de l'ajustement du modèle et son degré de prédiction, la part des personnes qui ont AVCI (50%). Les résultats obtenus ont montré que 128 personnes sur 156 ayant un AVCI ont permis une valeur de prédiction positive de 82%. Nous concluons que le taux de prédiction ou le taux de succès de notre modèle est de 80.30%, les résultats obtenus avec le logiciel «XLSTAT» montrent un très bon modèle (sensibilité de 78% et spécificité de 83%).

MOTS-CLEFS: AVC ischémique, facteurs de risques génétiques, modélisation, régression logistique et Test d'ajustement.

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1 INTRODUCTION

L'accident vasculaire cérébral ischémique (AVCI) est une pathologie fréquente, grave et invalidante, reconnue comme problème majeur de santé publique.

Elle représente la première cause de handicap non traumatique acquis chez l'adulte et la deuxième cause de démence après la maladie d'Alzheimer et la troisième cause de mortalité. [1]

L'incidence de cette pathologie augmente nettement avec l'âge, or la population mondiale vieillit : entre 2009 et 2050 le nombre de personnes âgées de plus de 60 ans va tripler dans le monde, et celui des plus de 80 ans va quadrupler. Ceci laisse présager une forte croissance de la prévalence de l'AVCI au cours du siècle. [2], [3].

Selon la définition de l'Organisation mondiale pour la santé, l'AVCI est un déficit neurologique focal (ou parfois global) d'apparition soudaine, durant plus de 24 heures d'origine vasculaire [4].

Le Maroc est sérieusement menacé par les maladies cardiovasculaires qui constituent un enjeu épidémiologique. Parmi celles-ci, on trouve les accidents vasculaires cérébraux ischémiques qui constituent actuellement un véritable problème de santé au Maroc.

Une enquête épidémiologique réalisée à Rabat et Casablanca, en 2010, avec le soutien financier de l'Académie Hassan II des sciences et techniques, a montré que la prévalence des AVC au Maroc était de 300 pour 100.000 habitants. Cette étude a été faite sur 30 000 ménages en milieux urbain et rural Cette enquête, constitue la première du genre en Afrique et dans le monde arabe, elle a regroupé - plusieurs universitaires marocaines, (neurologues, généticiens, biologistes, statisticiens, cardiologues, endocrinologues et nutritionnistes) . Cette étude avait pour objectif d'évaluer le rôle des affections cardiaques, des facteurs nutritionnels, biologiques et génétiques dans la genèse de l'accident vasculaire cérébral ischémique (AVCI) [5].

Le but de ce travail est de Modéliser l'impact des FR génétiques sur la survenue d'un AVCI.

2 METHODOLOGIE

2.1 MATERIEL

Il s'agit d'une étude Cas Témoins apparié réalisée pendant 3 années dans le laboratoire de génétique et pathologie moléculaire de la faculté de médecine de Casablanca (LGPM) en collaboration avec les services de neurologie des CHU de Casablanca et Rabat.

Notre échantillon de départ était composé de plus 725 individus dont 195 ont un AVCI. Nous avons retiré de cet échantillon les individus de moins de 40 ans, L'échantillon restant comporte 330 individus âgés de 40 ans et plus, dont 165 sont malades, et 165 témoins apparié sur l'âge chaque cas d'AVCI à 1 témoin. Puisque d'après la littérature[7], l'âge est le facteur de risque le plus important, en effet après 55 ans, et pour chaque tranche d'âge de 10 ans, les taux d'AVCI sont multipliés par 2 à la fois chez l'homme et chez la femme[8],[9].

Le LGM nous a confié les résultats de l'analyse génétique des 330 échantillons, cette analyse a concerné 9 gènes (MTHFR, FII, ACE, FV, APOE, PAI, ENOS, APOA5, ALOX5AP).

2.2 METHODE

Les données de notre échantillon sont analysées à l'aide du logiciel de statistique le plus complet de Microsoft «XLSTAT» qui est basée sur le langage Visual Basic. Le code de XLSTAT utilise à la fois ce code (VBA, pour l'affichage) et du code C++ (pour les calculs), compatible avec les plateformes Windows et Mac.

Nous avons procédé à la réalisation d'un modèle de régression logistique [10],[11],[12]. Ce dernier permet de prédire la probabilité pour qu'un AVCI arrive (valeur de 1) ou non (valeur de 0) à partir de l'optimisation des coefficients de régression.

Le résultat varie toujours entre 0 et 1. [13] Lorsque la valeur prédite est supérieure à 0,5, l'événement (AVCI) est susceptible de se produire, alors que lorsque cette valeur est inférieure à 0,5, il ne l'est pas.

Le modèle de régression logistique a comporté plusieurs étapes :

1- une recherche bibliographique approfondie au préalable est obligatoire. En effet la qualité d'une régression logistique repose, avant tout, sur le choix des variables explicatives [15], [16] que l'on est susceptible d'intégrer au modèle.

2- Il a été nécessaire ensuite d'étudier et d'analyser les liaisons entre chacune des variables explicatives [cf. tableau I] et la variable dépendante: on a réalisé une analyse univariée ; les odds-ratios calculés sont bruts

3-Nous avons été contraints d'essayer plusieurs stratégies afin de parvenir à un modèle final qui devrait porter le maximum d'informations tout en ayant un nombre limité de variables, afin de faciliter l'interprétation : les plus employées sont les procédures dites « pas à pas descendantes ou pas à pas ascendantes ».

- **Présentation du Modèle**

Il s'agit de modéliser la probabilité de la survenue d'une maladie cardiovasculaire chez un individu i en fonction des facteurs génétiques.

AVCI = 1 s'il y a AVCI
AVCI = 0 si pas d'AVCI

Ou AVCI est une variable latente qui peut s'écrire comme la somme d'¦une combinaison linéaire de caractéristiques propres à chaque individu et d'un terme aléatoire.

AVC= β xi + ε i

- x est un vecteur de variables explicatives ;
- β est le vecteur associe des paramètres ;
- ε est l'aléa ;

Afin de calculer la probabilité, il a été nécessaire de spécifier une distribution statistique pour les εi. Les deux lois statistiques les plus couramment utilisées sont la loi logistique et la loi normale, qui donnent alors le modèle qualitatif binaires appelé Logit « Le modèle Logit offre un avantage sur le plan de la technique d'estimation des paramètres et son fondement mathématique est relativement simple » [14].

Le modèle Logit suppose que F suit une loi logistique. Dans ces conditions, la probabilité qu'un individu ait une AVCI s'écrit :

P (AVCI=1) = $\frac{exp^{(\beta i X i)}}{1+exp^{(\beta i X i)}}$

Par conséquent, la probabilité de ne pas avoir cette maladie sera donnée par :

P (AVCI=0) = $\frac{1}{1+exp^{(\beta i X i)}}$

- **Ecriture du modèle**

AVCI = β0+ β1âge + β2FII + β3 MTHFR + β4APOE + β5F5C + β6PAI + β7APOA5 + β8ALOX5AP

Tableau 1. Décrit les variables explicatives utilisées dans notre modèle

Variable	Modalités	Effectifs	%
FII	AA	5	1,52
	GA	49	14,85
	GG	276	83,64
MTHFR	CC	149	45,15
	CT	151	45,76
	TT	30	9,09
ACE	DD	188	56,97
	ID	115	34,85
	II	27	8,18
APOE	E2/E2	4	1,21
	E2/E3	30	9,09
	E2/E4	47	14,24
	E3/E3	193	58,48
	E3/E4	33	10,00
	E4/E4	23	6,97
F5C	CC	176	53,33
	CT	112	33,94
	TT	42	12,73
ENOS	GG	190	57,58
	GT	117	35,45
	TT	23	6,97
PAI	4G	122	36,97
	4G/5G	90	27,27
	5G	118	35,76
APOA5	CC	27	8,18
	CT	100	30,30
	TT	203	61,52
Alox5AP	AA	181	54,85
	TA	93	28,18
	TT	56	16,97

3 RESULTATS

L'échantillon comporte 330 cas témoins apparié selon l'âge avec une moyenne d'âge de 55 ans

Les résultats sont présentés sous forme de moyennes, les données sont analysées à l'aide du logiciel «XLSTAT». Le test de signification entre chaque facteur de risque avec l'AVCI à partir du test Ki Deux

La régression logistique et le coefficient de corrélation ont été utilisés pour analyser les relations existant entre l'AVCI, l'âge, le sexe, FII, MTHFR, APOE, F5C, ACE, PAI, APOA5, ALOX5AP.

Nous avons choisis comme tests d'hypothèses, le test sur les paramètres (test de Wald) et le test de spécification (tableau de contingence).

Le test de Wald, proche du test de score, sert spécifiquement à tester la nullité d'un ou plusieurs coefficients, en particuliers de tous sauf la constante.

H0= tous les coefficients sont nuls / H1= au moins un des coefficients est différent de 0.

On a appliqué le test de Wald, pour toutes les variables du modèle une à une et on a conclu au Rejet de H0, puisque les coefficients de nos variables ne sont pas tous nuls. [cf. tableau 2].

Tableau 2. Test de l'hypothèse nulle H0 : Y=0,500 (Variable AVCI)

Statistique	DDL	Khi²	Pr > Khi²
-2Log(Vraisemblance)	22	190,799739	< 0,0001
Score	22	144,511677	< 0,0001
Wald	22	81,9472572	< 0,0001

Une fois que le modèle de prédiction, a été conçu, nous avons évaluer l'efficacité et l'ajustement. On a pu le faire de la manière suivante :

Confronter les valeurs observées de la variable dépendante avec les prédictions [cf. tableau 3].

En utilisant le Test de spécification [17] qui nous a permis de nous assurer de la qualité de l'ajustement du modèle et de son degré de prédiction et de calculer par la suite le pourcentage d'observations bien prédites qui donne un critère de performance du modèle.

Tableau 3. Classification pour l'échantillon d'estimation (Variable AVCI)

PREDICTION			
OBS	0	1	Total
0	**137**	28	165
1	37	**128**	165
Total	174	156	330

On a fixé un seuil de prédiction, la part des personnes qui ont AVC (165/ 300=0,5) dont on a eu comme résultats, 128 personnes qui ont un AVC ont été bien prédis sur 156, avec une valeur de prédiction positive de 82,05% et 137 qui n'ont pas AVC ont été bien prédis sur 174. Le taux de prédiction de notre modèle est de 80,30% ((128+137/330*100). [cf. tableau 4]

Tableau 4. Indicateurs de notre Modèle

Vrais positifs	128
Faux positifs	37
Taux d'erreur	19,70%
Taux de succès	**80,30%**
Sensibilité	77,58%
Spécificité	83,03%

Les résultats obtenus avec le logiciel «XLSTAT» montrent un très bon modèle (sensibilité de 77,58%% et spécificité de 83%).

La courbe ROC, évaluant les résultats de classification en fonction du seuil de décision est sensibilité en fonction de spécificité (Figure 1). Cette courbe ROC montre, l'AUC surface sous la courbe ROC (Area Under Curve) égale 0,89 (ce qui conduit à une bonne sensibilité) comme nous l'avions souligné, et plus l'AUC est grand, meilleur est le test.

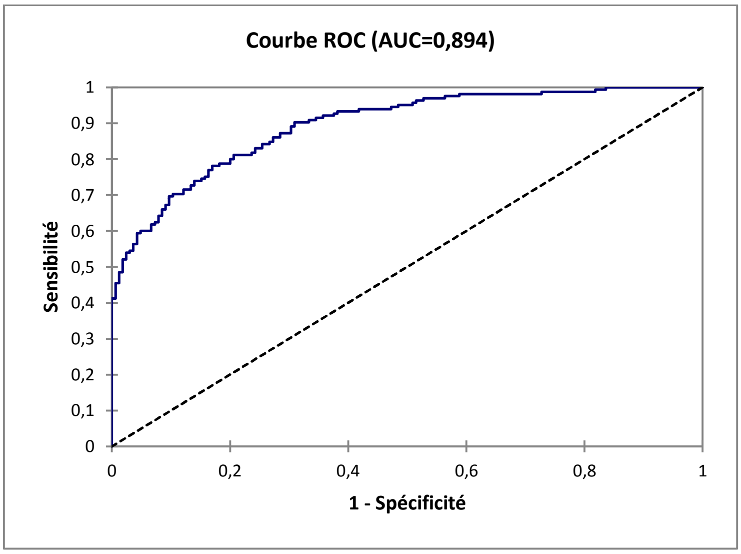

Fig. 1. ***Courbe ROC du seuil de décision, pour une modélisation de FRG sur l'AVCI.***

4 Conclusion

Les résultats de modélisation ont montré que les facteurs génétiques étaient des facteurs de risque puissant pour les AVC ischémiques

On a observé que le modèle de la régression logistique dans notre étude cas Témoins, nous a permis d'analyser la corrélation entre la survenue d'un AVCI et de ses facteurs génétiques.

L'outil informatique et ses applications nous ont permis de réaliser plus aisément cette analyse. Cependant, dans la matrice de confusion, nous avons conclu, le modèle de prédiction réalise 28 + 37 = 65 mauvaises prédictions. Le taux d'erreur est de 65/330 = 19,7 %

La statistique du rapport de vraisemblance LAMBDA est égale à 190, la probabilité critique associée est 0. Le modèle est donc globalement très significatif, il existe bien une relation entre les variables explicatives (FII, MTHFR, APOE, F5C, ACE, PAI, ENOS, APOA5, ALOX5AP…) et la variable expliquée.

Apres une étude individuelle, des coefficients liés à chaque variable explicative, nous avons constaté que les gènes ACE et ENOS ne semblent pas jouer de rôle significatif dans cette analyse.

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Cluster Computing for Processing Large Data Sets

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ABSTRACT: In this research we propose a cluster for handling the existing processing problems in distributed environments. The volume of data transmitted through online service provider facility is already measured in terabytes. A single customer support outlet sends approximately 2 GB data in one day. Normal digital computers face instances like resources, cost and processing time for the processing of such large amount of data. Here we propose Cluster computing as solution of processing speed problem in processing huge amount of data transmitted. Experiment results shows that processing speed is directly proportional to computational power.

KEYWORDS: Cluster Computing, Processors, Large Data Sets, Real Time, Speed, Distributed Environments, System, Transmitted.

1 INTRODUCTION

With the expansion of business in an organization, we need increased processing power, reduced cost, and scalability to process gigantic sized data we get every day from online service provider facility. Also, there is need for easy file sharing, and 24/7 availability. With the traditional network installed, there are limitations of processing power, scalability and availability. In this research we have conducted experiments on a medical advisory company. To answer patient's queries and provide them quick response in real time, the biggest problem is to search and share information, at a rapid pace, anytime from anywhere. We have been facing main challenge of processing speed in existing system. Currently we have installed mainframe server with 60 GHz processing speed.

Cluster computing is an efficient way for an organization for the processing of a very large amount of data. That gives same data processing speed as we will obtain from super computers to process large amount of data in a very cheap cost. In this process we connect many computers with one another simultaneously, through a local area network, to get high processing data speed as we have obtain from super computers within our cost limit. We can make cluster of computers using existing computer systems connected through network or local area network. There are used multiple computing sources to make an efficient computer cluster and these are connected with each other in a cluster to make a single powerful system for the processing of large amount of data. The multiple computing elements used in computer cluster are storage devices and processors respectively. We make computer clusters, because of parallel processing speed. It can become thrice as fast as current speed. Cluster computing is a very cheap technology which accelerates data processing speed. In this technology, desktop computers are used.

Following are main reasons why we choose cluster computing as a solution to computing gigantic data of our company.

- In cluster, multiple processors can execute in parallel resulting increase in speed to a greater extent.
- Cluster computers provide a high speed computation facility.
- Computer clusters is a very cheap technology in accordance with the cost point of view. Because it provides multiple applications and functionality which utilizes existing resources.
- Cluster computing technology is the best resource to utilizes existing applications.
- It is a flexible structure because we can add more elements in it if we feel need to do this.

Our research is backed up by experimental results we conducting at medical advisory company. We installed a cluster of computers having 8 Dual Core 128 bit 8.2-GHz Pentium processors. We examined results obtained and compared with the results from existing system and we found that cluster computers can solve problem of processing gigantic data in real time hence cost effective and time saving.

This paper comprises of introduction in which we discussed problems with the current system, our proposed solution, merits and demerits of proposed system. In related work we described how other people used systems like our proposed system and the analysis of success and failure they achieved. In fourth section of the paper we discussed framework overview of the proposed system which is followed by technique used for our experiment and experimental results. Conclusion, future work and references are given at the end.

The research paper has organized as; Section I elaborates Introduction .Section II elaborates related work. In this section, we provide some related work in the area of computer clustering. Section III elaborates frame work overview. In this section, a typical framework of middleware has been proposed for cluster computing to process patient's data. Section IV elaborates technique we have used in this. Section V discusses the Experimental Results and the paper is concluded in section VI.

2 RELATED WORK

In this section, we provide some related work in the area of computer clustering. In Cluster Computing R&D in Australia, Asian Technology Information Program ATIP, the overview of clustering computing research and development in Asia Pacific region is given. The report itself is divided in three parts software research part, cluster computing projects and cluster systems; the main focus is on Australian academic research. It also gives us a summary of some reports which tells us about the research going on cluster computing in Australia. With the passage of time cluster computing is becoming very popular and cluster computing technology will be a primary area of research for computing community.

In Nexus a low level substrate is proposed which allows different framework to share same resources providing isolation among them which free them implements their own programming model. As new frame works and programming models emerge in a same cloud they still need to share resources and data sets. To share resources between different frameworks is a difficult job because each framework has its own way of performing job execution and resource management. In Nexus job execution management is isolated from resource management by providing a resource management layer over different frameworks. As slot is provided by Nexus on which each framework run its task and perform arbitrary work.

In Integrating IS Curriculum Knowledge through a Cluster-Computing Project, a cluster computing project is developed to expose business students to concepts of parallel and distributive computing and security networking. In designing this project, the concepts of OS, networking, parallel computing are used. The basic objective of Integrating IS Curriculum Knowledge through a Cluster-Computing Project is to introduce the concept of distributive and cluster computing in business.

3 FRAMEWORK OVERVIEW

In this section, a framework of cluster computing to process a patient's data is proposed. Data received from help desk and online system is given to application layer. The Application is the top most layer of a cluster computing architecture and user request is received by this layer. The request can be storage or computational job. The middleware is the 2nd Layer which is again divided into sub-layers the framework is given in figure 1.

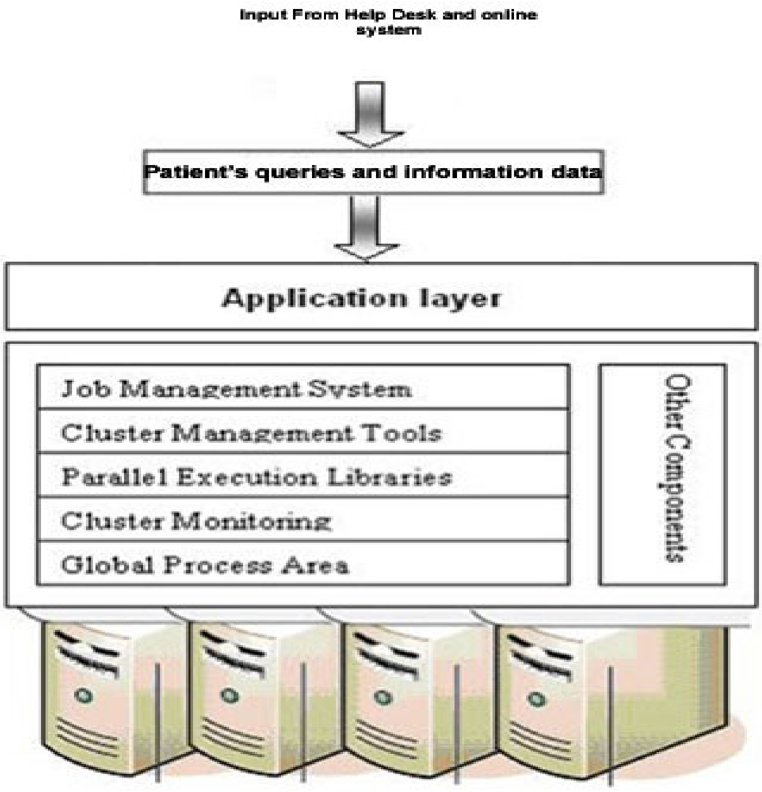

Figure 1: Framework Overview

4 TECHNIQUE

The user query for the certain information is taken up by first layer of computational cluster. i.e. top most layers these services are known as ontology services. The ontology services are treated by the Job Management System that first takes the refined job and then in next step divided it into independent subtasks and after that these sub tasks are divided among the multiple nodes of the Job Management System. In the above mentioned all the activity the process of recursion is assumed to be involved in the breakdown of the major problems into sub tasks for reliable performance. All of these processes are then to be divided among all computational cluster nodes. After this, distributed and multi agents has to be verify the required knowledge from knowledge based cache and knowledge based replica. If our required information is to be found here in this step at computational cluster then it is no need for the inquiry of the data cluster here and if still our required output could not found here, then there is a need for the refinement of the query by the agents. Then after the refinement of the query it is to be forwarded to the data cluster. Then Data extraction from that cluster is to be performed and finally the obtained output is returned in Global Process area to the KRE. This KRE consists of very important data mining steps. These steps are transformation, matching of patterns, and extraction of knowledge modules (knowledgebase), Data mining query and cleaning. KRE synchronized and update the knowledgebase.

Our Cluster test bed consists of 8 Dual Core 128 bit 8.2-GHz Pentium processors, 4 GB RAM, 1TB HARD-DISK computers connected by a HP 2524 Fast-Ethernet switch. All the processors had a common memory and they all are executed through kernel level code. The module interconnection bus (MBus) is a 40 Mhz 64-bit bus that is capable of sustained bandwidth of 80 Mbytes per second and a peak of 320 Mbytes per second. All machines consist of processor and each processor comprises on 256KB second level cache and 8KB two way associative instruction caches. The data transfer rate in a single moved is recorded up to 128 bytes. The processors in our experiment environment are homogeneous i.e. all processors will have same architecture and speed. It uses Linux cluster operating system and cost approximately $20,000.

5 EXPERIMENTAL RESULTS

On the base of experimentation we can conclude that processing speed is directly proportional to computational power. The main input parameter for our experiment is a block of 1GB data.

The performance of the 4 processor clusters with a block is 2.24 Gflops(1 Gflop = 1 billion floating point operation per second) while performance of 60 Ghz mainframe system is 1.4 Gflop.

Table 1: Processing speed

System	Processors speed(GHz)	Performance (Gflops)
Clusters	65.6	2.24
Mainframe	60	1.4

Graph can be shown as:

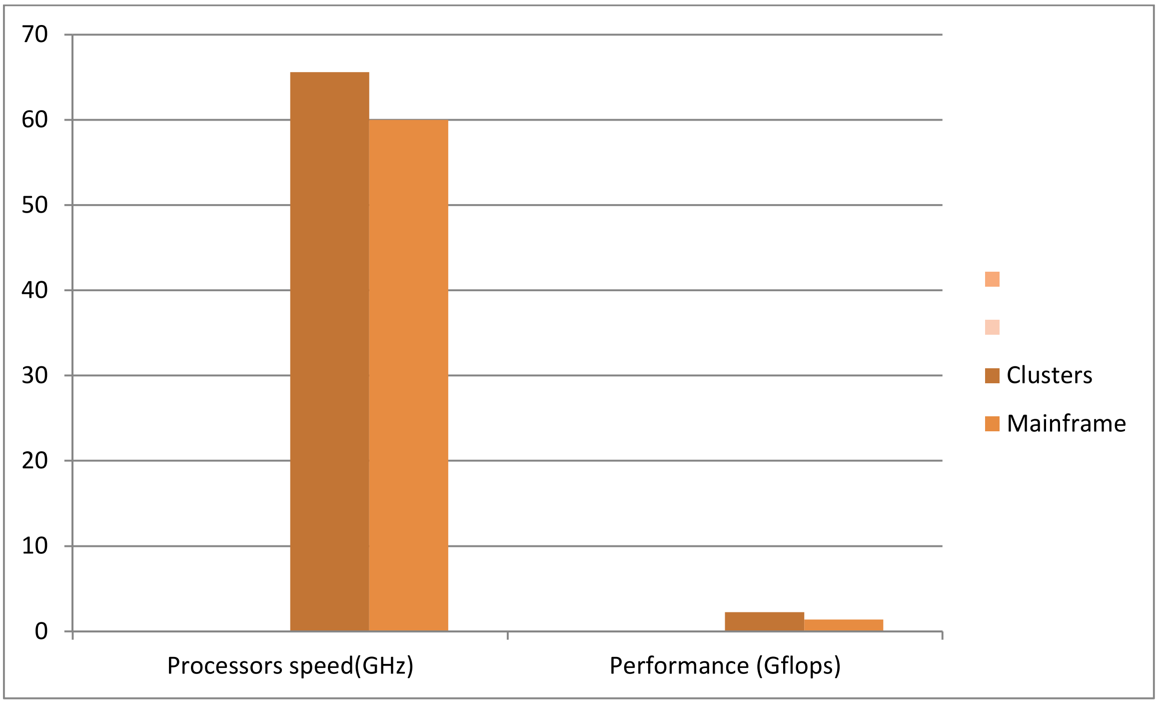

Figure 2: The performance of 4 processors

Table 2: Cost

System	Cost
Cluster	$20,000
Mainframe	$25,000

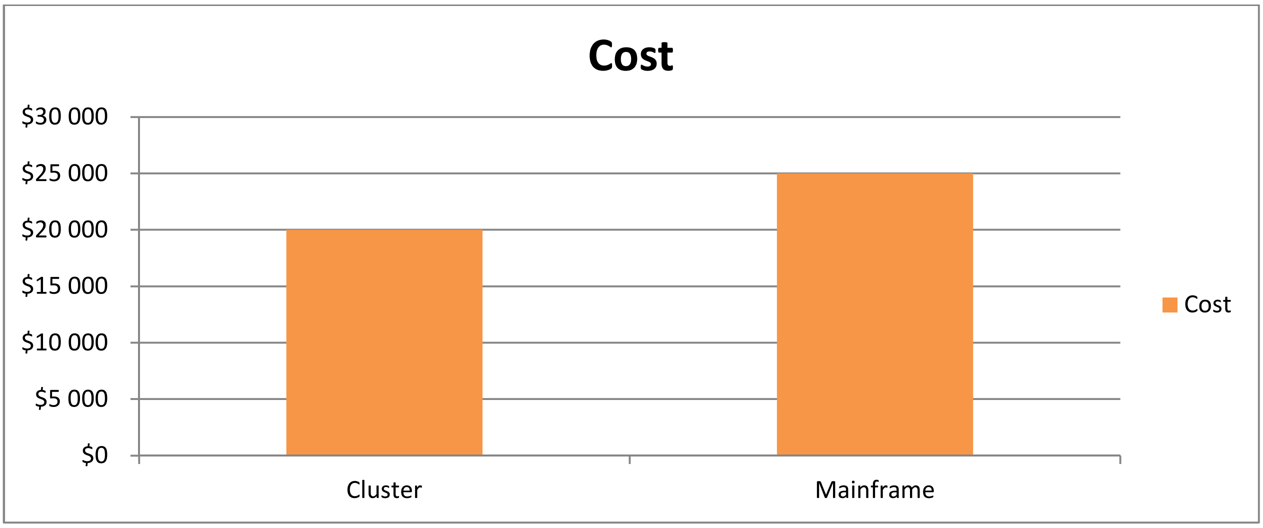

Figure 3: Comparison of cost between Cluster and Mainframe

6 CONCLUSIONS

In this research article we have discussed that how cluster computing is highly robust technique to process large data sets. Here we have proposed a framework for processing large data sets in medical advisory company. We have discussed here a sample of these application areas and how they benefit from the use of clusters.

We found that each node of cluster has very high computational capabilities but interconnecting switch is a bottleneck for speed. In future we'll conduct research to improve computational power by introducing some middleware.

ACKNOWLEDGMENT

First, I am thankful to Allah Almighty, whose support and strength helped me in bringing this work to the end. After that I am thankful to my teacher Dr Ataul Aziz Ikram for his support and guidance.
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GREEN MARKETING: THE EMERGING TREND IN INDIA

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ABSTRACT: This article focus on the important issue of marketing that is *Green marketing*. This is one of the biggest needs of the time to keep our environment safe. So this article focuses on the various organizations or the corporates that are actually taking the initiative to keep our environment free from harmful pollutants. Many companies are adopting green for capturing market opportunity and we can say that there is a future of green marketing in India. There are many examples which show that how companies are moving towards this "green concept".

KEYWORDS: Green Marketing, Environment, Eco- friendly, E-waste.

Green marketing is a phenomenon which has been developing in the modern Indian market. Urban consumers are more aware about the green products but still it is a new concept for the masses. According to the American Marketing Association "Green marketing is the marketing of products that are presumed to be environmentally safe". It is an effort by organization to design, promote and to distribute the products that will not harm the environment. Thus green marketing consist of huge range of activities like product modification, changes to the production process, packaging changes, as well as modifying advertising & also increases awareness among the people. Both Consumers and marketers worldwide are showing more concern about the environment by preferring environment-friendly products and services. And it is very important on the part of consumers to adopt the green products because if we see the India's global image on environmental issues it is not a good one. It ranks low on Yale's Environmental Performance Index 2014 (Rank – 155). So now it has become a challenge to keep our natural environment safe. As a result of this businesses have increased their rate of targeting consumers who are more concerned about the environment. Many companies are adopting green for capturing market opportunity and we can say that there is a future of green marketing in India. There are many examples which show that how companies are moving towards this "green concept".

NAME OF INDICATOR	SCORE	RANK	10 YEAR CHANGE
Overall Score	31.23	155	5.4%
Health Impacts	50.04	127	26.68%
Air Quality	23.24	174	-29.49%
Water and Sanitation	26.28	124	54.95%
Water Resources	10.49	87	
Agriculture	58.4	117	16.47%
Forests	35.07	57	
Fisheries	22.64	67	-0.22%
Biodiversity and Habitat	39.18	125	0%
Climate and Energy	35.24	104	

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Among the recent green marketing effort in automobile sector in India was the introduction of hybrid electric car (Prius) by **TOYOTA** .It's a fuel economy car that protects the environment compared to the average car, Prius could have saved an estimated 1,445,971,501.65 gallons of gas & 20,509,138.39 tons of CO_2 emissions in the U.S since 2000. Prius is certified as an Advanced Technology Partial Zero Emission Vehicle in California and states.

Another green effort is by **HERO** brand in India. HERO Electric is a pioneer in the Indian Electric Two- Wheeler Industry which provides Eco-friendly and Cost-effective mode of transportation. On an average every hero electric bike reduces more than 1 ton of CO2 & other harmful gases in its lifetime. As per the recent study done by the Booz & Company for electric vehicle in India ,a mere 5% of conversion of vehicles to electric vehicles can save 45 lac liters of petrol/year .

Next is **WIPRO**, It has launch its new eco-friendly Wipro Greenware desktops, manufactured with materials completely free of deadly chemicals like polyvinyl chloride (PVC) and brominated flame retardants (BFRs), for the first time in India. The recycling of these eco-friendly PCs ensures reduction of the exposure of the hazardous chemicals to the environment. The waste management strategies of wipro are:

i) Recycling the waste for further use
ii) Arranging for safe disposal

To operate this strategy, they follow the processes of segregating waste into organic, inorganic-waste, hazardous, packaging, Bio medical and other categories, which are then recycled either in-house or through outsourced vendor. During FY12-13 the total end of life E-waste collected and recycled through authorized vendors was 247 tons. And because of this effort WIPRO has Ranked 1st in 2012 Indian ranking of Climate Disclosure Leadership Index (CDLI) for the 3rd time in a row & ranked 2nd in the Global 500 listing of Newsweek's Green Company Rankings 2012

Paint companies are also not far from this green concept. Brand like **KANSAI NEROLAC** has also introduced a range of products that are lead free that does not add any such heavy metals in its manufacturing process. Nerolac which has come out with a new brand campaign 'No VOC No Gadbad' by its brand ambassador Shah Rukh Khan seeks to talk about the harmful effects of the use of Volatile Organic Chemicals (VOC) in paints. Now it has become the 2nd largest paint company in india

Next in the line to join is **VOLTAS** from Tata Group. In 2007, Voltas initiated the 'Green' range of air-conditioners, following which the government made it mandatory for home appliances to have energy star ratings. Energy Star is an international standard for energy efficient consumer products that originated in the US. Thus devices like Air conditioners, refrigerator, plasma and other appliance which carrying the star logo use about 20-30% less energy than the set standards.

In same line we have **GODREJ**. Godrej Appliances launched India's first 100% green refrigerator in 2002 & also green balance air conditioner. The Green Balance Air Conditioners use eco-friendly R290 refrigerant ensuring 'Zero Ozone Depletion Potential' and a minimum global warming potential of just 3. Godrej Refrigerators were conferred the National Energy Conservation Award 2009 by the Government of India.

Even our fashion industry is also tying its best to promote the green concept. If we talk about clothing, a fast growing fashion trend, Anita Dongre has also joined the line of eco-fashion with her brand, **GRASSROOT.** It's a 100% environment friendly brand. Eco-fashion is a process of creating garments with environment friendly techniques which are non-hazardous to the environment. Largely, eco-clothing uses organic cotton, bamboo jersey, viscose and linen, etc. Other brands that use organic fibre are Bhu:sattva, UV & W.

Next sector to look is our banking Industry. Best Green IT Project: **STATE BANK OF INDIA.** SBI is also entered into green service known as "Green Channel Counter". SBI is providing many services like paper less banking, no deposit slip, no withdrawal form, no checks, no money transactions form & all these transaction are done through SBI shopping & ATM cards. State Bank of India turns to wind energy to reduce emissions. SBI became the first Indian bank to harness wind energy through a15-megawatt wind farm developed by Suzlon Energy. The wind project is the first step in the State Bank of India's green banking program dedicated to the reduction of its carbon footprint and promotion of energy efficient processes.

With so many examples we can easily analyze that now companies are also contributing their part towards the green concept & what drives them to go green is their customers' growing concern for environment. None of the sector is untouched by this green marketing whether it's automobile, Banking sector, IT Industry, fashion industry, electronics, textiles and others. Green marketing should not be considered as just one more approach to marketing, but has to be pursued with much greater vigor, as it has an environmental and social dimension to it. With the threat of global warming looming large, it is extremely important that green marketing becomes the norm rather than an exception or just a fad. Recycling of paper, metals, plastics, etc., in a safe and environmentally harmless manner should become much more systematized and universal. It has to become the general norm to use energy-efficient lamps and other electrical goods.

Marketers also have the responsibility to make the consumers understand the need for and benefits of green products as compared to non-green ones. In green marketing, consumers are willing to pay more to maintain a cleaner and greener environment. Finally, consumers, industrial buyers and suppliers need to pressurize effects on minimize the negative effects on the environment-friendly. Green marketing assumes even more importance and relevance in developing countries like India.

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Artificial Intelligence Robotics: Services and Future roadmap

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ABSTRACT: This paper is about the future of robotics for civil use. Cooperation between robots with different capabilities is one of the aspects which can influence on the future of robotics. In this situation coordination is an important factor which must be take to account for making a robust behavior for each robot. Robots are being used across the various domains of manufacturing, services, healthcare/medical, defense, and space. Robotics was initially introduced for dirty, dull, and dangerous tasks. Today, robotics is used in a much wider set of applications, and a key factor is to empower people in their daily lives across work, leisure, and domestic tasks.

KEYWORDS: branch, engineering, technology, design, research, computer.

1 INTRODUCTION

Robotics is the branch of technology that deals with the design, drawing, construction, production, operation, and application of robots, [1] as well as computer system for their control, sensory feedback, and information processing. The design of a given robotic system will often incorporate principles of mechanical engineering, electronic engineering, and computer science (particularly artificial intelligence). The study of natural systems often plays a key role in the systems engineering of a project and also forms the field of bionics. The mathematical expression of a natural system may give rise to control algorithm for example, or by observing how a process is handled by nature, for example the bifocal visualization system, an equivalent system may be formed using electronics.

The idea of creating technology that can function separately dates back to conventional times, but research into the functionality and potential uses of robots did not grow substantially until the 21st century[2].Throughout history, robotics has been often seen to mimic human behavior, and often manage tasks in a similar fashion. Today, robotics is a rapidly growing field, as technological advances continue; research, design and building new robots serve various practical purposes, whether domestically, commercially, or militarily. Many robots do jobs that are hazardous to people such as defusing bombs, mines and exploring shipwrecks.

This paper summarizes the current state of robotics, and previews the findings of a robotics road mapping effort currently under way. Robotics originated with the goal of building human-like machines, but it has become much more than that. Even though we are still decades away from human-like machines, the developing robotics technologies are proving useful in ways that nobody expected: robot-assisted noninvasive surgery; disposal of roadside bombs; automated lab science for drug discovery; even auto-focus features in digital cameras. The broad impact of robotics is proven, even though robotics is still in the early stages of its development.

Robotics thus affords a unique opportunity to make a cross-cutting investing that advances both fundamental research and development in an area vital to U.S. competitiveness while providing the potential for near term job, business development and educational returns. Outlined below are the broad critical application areas for robotics. The creation of a $100 million initiative to be matched by industry to establish test beds in the major application areas could generate nearly

10000 new jobs impacting a wide range of sectors. The specific proposal advanced is to create a competitive process to establish a series of robotics test beds in communities across the nation. These test beds would be devoted to specific health, transportation, agriculture, manufacturing and extended care services. The selected test beds must include large and small industrial partners in the end user community. Recognizing the unique capacity of robotics to be a powerful tool for education, each proposal should incorporate a strategy for the test bed to engage K-12 students and to foster the development of new educational applications. The remainder of the paper addresses the unexpected breadth and significance of robotics.

2 CONNECTING COMPUTERS TO THE REAL WORLD

Robotics transforms the connection of computers to the real world. The significance of this connection is difficult to overstate. To start, consider the role of sensors, and the effect on the World Wide Web, and future networks. At present the World Wide Web is restricted mostly to document and other information provided by humans. Even when cameras and other sensors are attached, our computers and networks are primarily a communications and storage medium. Every advance in the software to analyze and understand the sensory data enables numerous applications.

The cost of the sensors, the computers, and the communications is relatively low, as evidenced by the number of cell phone cameras in use. As our computers achieve even a crude understanding of video imagery, the applications are many, and will profoundly change our lives. The most obvious applications are security: pervasive intelligent security monitors for homes, for borders, and for the civil infrastructure will result, and will become more capable and more affordable as the perception techniques continue to improve.

Computers are fun to play within their own right, but they're best used as a tool to interface with the real world. We use the term "Real-World Computing" to refer to the use of a computer in some kind of real-world situation. This could involve data collection, prediction, controller functions, or anything.

Some of the real-world applications that we were played with are:

- Time - make your computer clock sync up with the world's most accurate atomic clocks
- Weather - real-time weather warnings, forecasts, and information
- GPS - accurate position information anywhere on the planet
- Radio - software defined radio and audio signal processing
- Earthquakes - when the earth moves, you can hear about it
- Astronomy - watching the skies
- Photography - capturing the real world

3 CONNECTING HUMANS TO THE REAL WORLD

Robotics also transforms the connection of humans to the real world. Sensors often transcend the limitations of human perception. They enable us to see far away, to see very small things, to see three-dimensional images of the inside of our bodies, and to integrate imagery from numerous other sensors, such as GPS, motion sensors, and others. This information can be presented to a human in an interactive way, in effect giving a video-game like experience, letting the human experience the world in ways that are now impossible. The most exciting applications are in education.

4 ROBOTICS IN SERVICE

Service robots assist human beings, typically by performing a job that is dirty, dull, distant, dangerous or repetitive, including household chores. They typically are autonomous and operated by a built-in control system, with manual override options. The term "service robot" is less well-defined. The International Federation of Robotics (IFR) has proposed a tentative definition, "A service robot is a robot which operates semi- or fully autonomously to perform services useful to the well-being of humans and equipment, excluding manufacturing operations."[3]

Robotics is about action, and the main goal of that action will be to serve humans. Robotics technology does not resemble common science fiction scenarios. In most instances, robotics technology will be embedded in common objects, and not recognizable as a robot. An example is unmanned vehicles. Vehicles are already driving themselves in certain restricted applications such as shipping yards. Unmanned aerial vehicles are proving themselves, and unmanned ground vehicles are nearing substantial deployment. When passenger cars drive themselves, the result will be dramatic improvements in efficiency and safety, with enormous savings in fuel, insurance, medical bills, and overall a great improvement in the quality of our lives. Another example is assistive technology in our homes, which can enable the elderly and disabled to live independent lives, rather than moving into institutions.

4.1 TYPES OF SERVICE ROBOTS

The possible application of robots to assist in human chores is widespread. At present there are a number of main categories that these robots fall into.

Industrial

Industrial service robots can be used to carry out simple tasks, such as examining welding, as well as more complex, harsh-environment tasks, such as aiding in the dismantling of nuclear power stations. If the robot is an automatically controlled, reprogrammable, multipurpose manipulator programmable in three or more axes, which may be either fixed in place or mobile for use in industrial automation applications. It is called "Industrial Robot"[4].

Restaurant and bar

Many bars are starting to become automated through the use of robots, even producing complex cocktails. [5] There are also robots used for Waiting. [6]

Domestic

The Roomba vacuum cleaner is one of the most popular domestic service robots.

Domestic robots perform tasks that humans regularly perform around their homes such as cleaning floors, mowing the lawn and pool maintenance.

Scientific

Robotic systems perform many functions such as repetitive tasks performed in research. These range from the multiple repetitive tasks made by gene samplers and sequencers, to systems which can almost replace the scientist in designing and running experiments, analysing data and even forming hypotheses.

Autonomous scientific robots perform tasks which humans would find difficult or impossible, from the deep sea to outer space. Robots in space include the Mars rovers which could carry out sampling and photography in the harsh environment of the atmosphere on Mars.

4.2 EXAMPLES OF SERVICE ROBOTS

- PatrolBot
- CoroBot
- ADAM SGV
- HelpMate
- Cybermotion
- Roomba
- DESIRE

5 GLOBAL COMPETITIVENESS

Robotic technology for manufacturing was originally developed in the United States, but the manufacturing robotics industry is now dominated by Asia and Europe, with serious consequences for US robotics and for US manufacturing. Unlike manufacturing, the service robotics sector is just beginning to develop. Ultimately it will dwarf the manufacturing sector. The United States is well placed, with an outstanding research and development community, and the business infrastructure to encourage innovative applications of the new technology.

6 ROBOTICS ROADMAPPING

Several months ago a group of robotics leaders, drawn from universities, industry, and government labs, formed a roadmapping effort funded by the National Science Foundation. A series of workshops is in progress, with the goal of articulating a national robotics agenda. The goals of the roadmapping effort are: (1) to identify the future impact of robotics on the economic, social, and security needs of the nation; (2) to outline the scientific and technological challenges to address;

and (3) to draft a roadmap to address those challenges and realize the benefits. So far four surveys have been done. Three surveys focused on application areas: manufacturing, service, and medical and healthcare. A fourth survey focused on emerging technologies and trends.

Manufacturing

The manufacturing sector continues to be vital to the US for many reasons. It is an especially significant part of exports. Manufacturing practices are changing rapidly in the types of products that can be produced, the quality with which they are produced, and the speed with which new products can be brought to market. Robotics for manufacturing continues to advance, and may be poised for radical acceleration, fueled both by new fundamental approaches to robotics and automation research, and improvements in many component technologies such as perception, machine learning, and human interfaces.

Medical and Healthcare

Medical robotics is already a major success as use of minimally invasive robots significantly reduces recovery time and risks associated with surgery. Today a large number of prostate procedures are performed with robots, and a significant number of robot-assisted cardiac procedures are performed daily. Robots are also being used for rehabilitation and in intelligent prostheses to help people recover lost function, and socially assistive robots are being developed capable of providing monitoring, coaching, and motivation for encouraging cognitive and physical activities, and minimizing isolation and depression. Today US are the leader in robot assisted surgery.

Service

The service sector includes both professional and domestic services. Professional service robots are used in logistics, agriculture, cleaning, and mining. A logistics example is harbor automation to ensure increased inspection of containers to improve homeland security. In agriculture, the primary need is to increase productivity to ensure continued economic viability. In mining, robots are used to increase efficiency but also to increase safety. Other professional services include warehouse management, automatic surveillance of areas etc. Domestic service robots include automatic floor care such as vacuuming. Already today more than 3 million home robots have been deployed. Robots in the home are essential to reduce time spent on daily chores and enable the elderly to maintain a clean and organized home. Today the US is the leader in service robotics.

The fourth survey addressed emerging technologies and trends. Robotics integrates many different component disciplines and technologies. Robotics has often been driven by advances in these component technologies, and in return robotics has often provided the applications that have motivated these advances. The roadmapping effort identified 63 different technological advances which promise to impact robotics, and 35 different new applications which will be enabled by various advances. A few specific technology areas of significance are micro and nano-technology, sensors and motors, the theory and engineering of analyzing and controlling dynamic systems, communication and networking, theory and practice in machine learning, and human interface software. A national initiative in robotics would address many national priorities. It would ensure future competitiveness and hence employment in a rapidly growing sector. It would directly affect the effectiveness of our nation's military and the security of the homeland. It would enrich our lives by bringing outstanding educational opportunities, good jobs, greater safety, better health care, personal security, and a level of independence and freedom that only our wealthiest citizens presently enjoy.

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EFFICIENT AND EFFECTIVE SUBSET SELECTION PROCESS BASED ON CLUSTERING ALGORITHM

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ABSTRACT: Process with high dimensional data is enormous issue in data mining and machine learning applications. Feature selection is the mode of recognize the good number of features that produce well-suited outcome as the unique entire set of features. Feature selection process constructs a pathway to reduce the dimensionality and time complexity and also improve the accuracy level of classifier. In this paper, we use an alternative approach, called affinity propagation algorithm for effective and efficient feature selection and clustering process. The endeavor is to improve the performance in terms accuracy and time complexity.

KEYWORDS: Classification, Data mining, Feature selection, Feature clustering.

1 INTRODUCTION

Data mining is the route of ascertaining the interesting knowledge from hefty amounts of information repository. Noisy, incomplete, inconsistent records are humdrum properties of huge real world databases and data warehouses. To handle this type of errors, data preprocessing techniques are extremely essential for producing good quality result. Feature selection, also known as attribute subset selection is similar to preprocessing technique, used for dimensionality reduction; improve the classifier accuracy, removing irrelevant and redundant data. Feature selection techniques are categorized into four types: the Filter, wrapper, Embedded, and hybrid methods [1]. Filter method [11], [12] is momentous selection when we use large number of features. Filter the features using ranking based approach. Wrapper method [2], [14] is used to estimate the integrity of the selected subset features by using predictive accuracy of machine learning algorithm [1], [14] which provides greatest accuracy. Embedded method [14] has grand efficiency than remaining methods, it works with training process. Hybrid method is the mixture of filter and wrapper method. Thus, we will focus on the wrapper method in this paper.

Several conventional feature selection algorithms are available but we will focus on application of cluster analysis for more effective feature selection process. Cluster analysis is the progression of grouping similar objects into one class. For produce an optimal result, affinity propagation algorithm have been studied and used in this paper.

In general affinity propagation is most flexible and simple clustering algorithm. It works through the concept of "information passing" between data objects. Key benefit of this algorithm is low error; maintain high speed and prominently no need to compute the number of clusters before executing the algorithm.

The proposed feature selection process based on affinity propagation algorithm produce optimal subset of features with high accuracy and minimum time requirement.

The rest of the paper is organized as follows: in section II, we demonstrate the related work. In section III, we analysis about the process of existing work. In section IV, we summarize the proposed work with comparison analysis. In section V represent the conclusion about this paper.

2 RELATED WORK

Dimensionality reduction, identifying and removing irrelevant and redundant features are done with the process of feature selection. Feature selection is same as the data preprocessing technique for producing best possible subset of features.

There are several algorithms and schemes for feature selection process are obtainable, Relief is well known and good feature estimator. Using relief algorithm [1], [4], [5] estimate the quality of the feature subset but it successfully remove irrelevant features only, does not consider about the redundant features.

The Mutual Information [1], [6] is another method for determine the dependence of pair of features and feature with target class. In [3], M. Dash and H. Liu et al, focuses on inconsistency measure for feature selection process with various search strategies, each strategies correspond to different algorithms, such as

- Focus: Exhaustive search
- ABB: Complete search
- SetCover: Heuristic search
- LVF: probability search
- QBB: Hybrid search.

Figure 1 shows the flow diagram of feature selection process.

Steps for feature selection process:

Invention: process with original dataset, produce a candidate subset.

Estimation: evaluation is done using candidate subset.

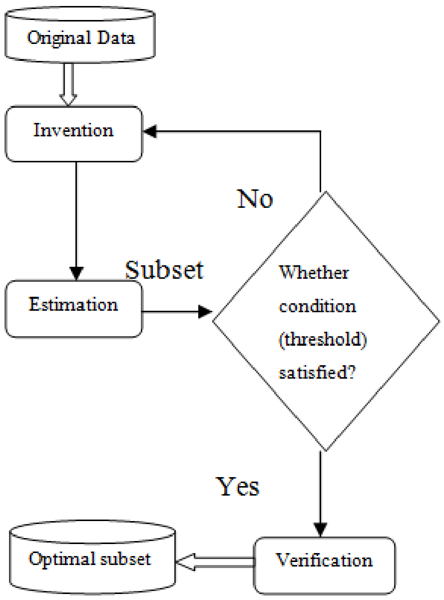


Fig. 1.Feature selection process

Verdict process: Compare the selected subset with checking criteria (threshold value)

Substantiation: cross validation is performed for select optimal subset of features.

In [8], Z. Zhao and H.Liu et al, Proposed a method to handle the feature order problem with help of INTERACT algorithm. Based on the interaction (correlation) between features, achieve the feature selection process. For increase se the efficiency of the performance of feature selection, cluster analysis very important concept. Grouping the data objects into clusters as like tree structure, also known as dentrogram is the idea of hierarchical clustering, [1], [9] it is classified into two types: Agglomerative (Bottom up approach) and divisive (Top down approach) algorithm. R. Butterworth et al, use the AGENS for making the dentrogram of votes dataset, this structure helps to understand the features and corresponding relative importance.

In [1], Qinbao Song et al, proposed a new FAST algorithm that gain more accuracy and reduce time complexity than traditional feature selection algorithm like, FCBF, Relief, CFS, FOCUS-SF, Consist and also compare the classification accuracy with prominent classifiers. Graph-theoretic clustering and MST based approach is used for ensure the efficiency of feature selection process.

Classifiers plays vital roles in feature selection operation since accuracy of selected features are measured using the progression of classifiers. The following classifiers are utilized to classify the data sets [1], [8], Naïve Bayes: it works under Bayes theory and is based on probabilistic approach and yet then offers first-rate classification output. C4.5 is the successor of ID3 [1] support of decision tree induction method. Gain ratio, gini index information gain are the measures used for the process of attribute selection. Simplest algorithm is IB1 (instance based) [1]. Based on the distance vectors, it performs the classification process. RIPPER [1] is the rule based technique, it make a set of rules for the purpose of classify the data sets. Classifier is one of the evaluation parameter for measuring the accuracy of the process.

3 EXISTING WORK

Out of many feature selection algorithms, FAST algorithm is one of the most effective feature selection algorithms. It works based on the following terms [1]:

- T- Relevance
- F-Correlation
- R-Feature
- F-Redundancy

For irrelevant preprocess calculate the symmetric uncertainty between feature and the target concept, based on that threshold value removing irrelevant features. Then apply the graph theoretic clustering [1] method for grouping the relevant features. For best result use the minimum spanning tree concept, it follows two steps:

1. Construction of tree with minimum weight.
2. Partitioning the tree, each tree represents the cluster of features.

FAST algorithm gains the [1] performance in terms of (i) accuracy, (ii) runtime, (iii) Proportion of selected features than traditional algorithms like ReliefF, CFS, FOCUS-SF and Consist with respect to different classifiers.

4 PROPOSED WORK

In this section, we present the analysis of proposed algorithm and process. Irrelevant and redundant data highly affect the performance of the mining process. Feature selection is the process of recognize and eliminate the unrelated and redundant features for improving the classification accuracy, reduce the dimensionality etc…

The main issue in the FAST algorithm is construction of minimum spanning tree because it takes more time to building and partitioning the tree for selecting most optimal features. To overcome this type of issue we choose alternative algorithm for reducing running time and also improving the accuracy level of features.

In our proposed implements, Semi supervised learning technique has detains the features. Semi supervised learning is a machine learning pattern in which the model is constructed using both labeled and unlabeled data for training typically a small amount of labeled data and a large amount of unlabeled data. Affinity propagation algorithm is one of the most important clustering algorithms with high speed and low error. This algorithm is really suitable for selecting most appropriate features. For improving the accuracy level we utilize the some similarity measures such as, Jaccard similarity measure and cosine similarity measure.

Jaccard Similarity Measure: To find the similarity between sample sets, Jaccard similarity measure most appropriate measure for improving the classification accuracy. It is defined as the amount of intersection is divided by amount of union of the sample sets.

$$J(R, S) = \frac{| R \cap S |}{| R \cup S |}$$

Where, R and S are the two sample sets.

| R **|, |** S **|** are the cardinality of R S, it represents the elements in the sets R, S.

| R ∩ S | is the value of the intersection between two sets R and S**.** | R U S | is the value of the union between two sets R and S. J (R, S) is the jaccard index value,used to calculate the similarity between two sample sets. This type of measure mainly used to improve the performance of the classification process.

For example consider two sets with numbers, R = {0, 2, 5, 7} and S = {1, 7, 8, 9, 0}. Calculate how similar are R and S?

$$J(R, S) = \frac{| R \cap S |}{| R \cup S |}$$

$$= \frac{| \{0, 7\} |}{| \{0, 1, 2, 5, 7, 8, 9\} |}$$

$$= 2 / 7 = 0.2857$$

The above method is the process of determine the similarity range between two sample sets. Apply this concept to documents, it contains bag of words.

Consider the following example for establishing jaccard coefficient value for two documents.

R= {beautiful flower}

S= {lotus national flower}

$$J(R, S) = \frac{| R \cap S |}{| R \cup S |}$$

$$= \frac{| \{\text{flower}\} |}{| \{\text{beautiful, lotus, national, flowers}\} |}$$

$$= 1/ 4 = 0.25$$

For efficient estimation of accuracy min hash method has been used, it is represented as,

$D_J = 1\text{-}J (R, S)$

$= 1\text{-} 0.25 = 0.75$

Where, D_J denotes the accurate distance between two sets (i.e. Training set and original file).

COMPARISION ANALYSIS

The following graphs represent the results of different algorithms in the following terms:

- Classification Accuracy
- Runtime

Classification Accuracy: It represents the quality of selected subset of features. Also known as effectiveness.

Runtime: It shows the execution time of the entire process. It also denoted as efficiency.

DATA FLOW DIAGRAM

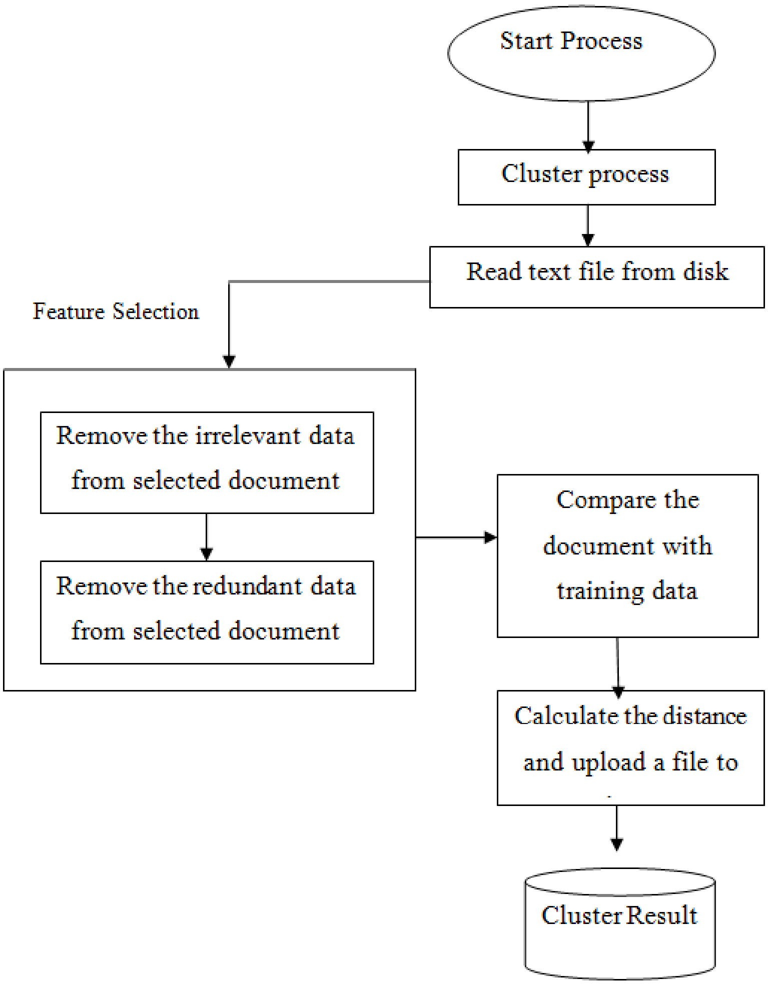
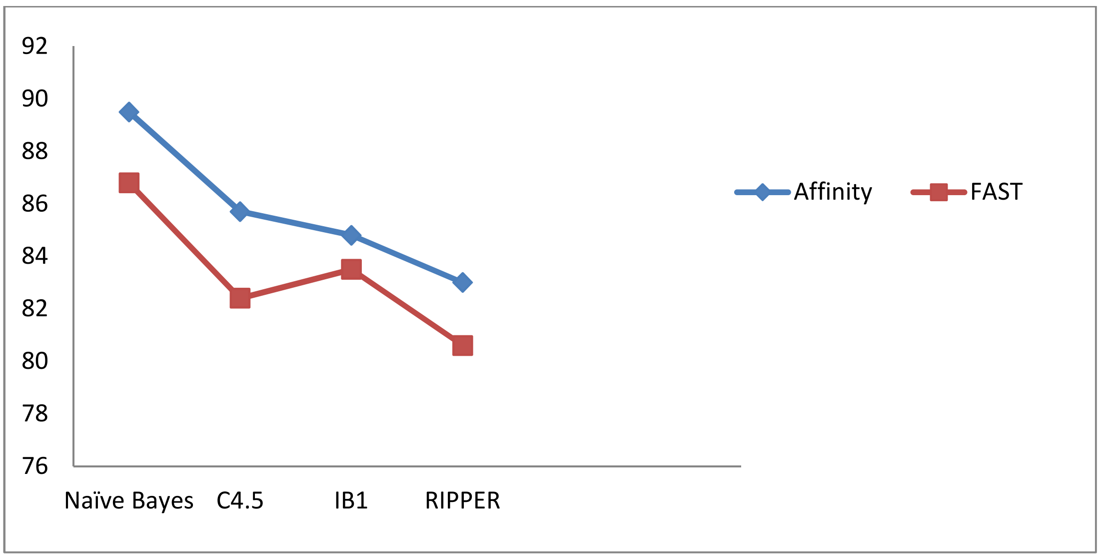
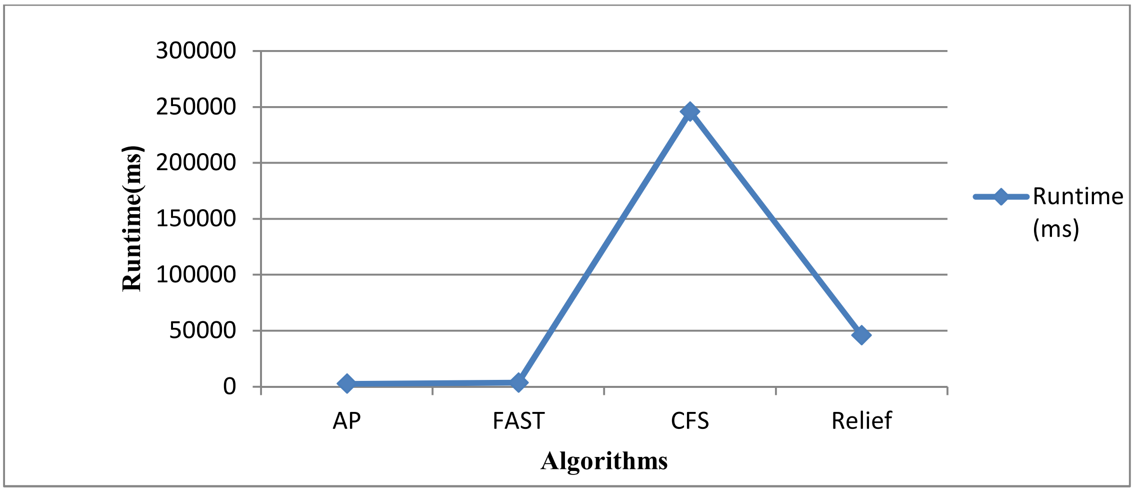


Fig. 2.Data Flow Diagram



Graph 1: Classification accuracy



Graph 2: Runtime

5 CONCLUSION

In this paper, we have discussed an alternative clustering based feature selection algorithm. This algorithm effectively removes the irrelevant and redundant features for dimensionality reduction. Grouping the features for selecting optimal set of features based on the semi supervised learning method. We have compared the performance of the proposed algorithm with existing FAST algorithm in terms of accuracy and runtime. Main benefit of proposed algorithm is high speed and low error. The motive of this process is increasing the accuracy level of classifiers and reducing the runtime of the algorithm.

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A USER ACTIVITY BASED INTELLIGENT BUILDING DESIGN FOR FULL AUTOMATION OF A ONE BEDROOM APARTMENT BUILDING

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ABSTRACT: The research paper discusses a user activity based building automation system for real time monitoring and control for a standard one-bedroom unit. Standard buildings designed and built in Nigeria are without any form of automation and with emerging technologies that support automation of certain sections/processes in buildings the intelligent building paradigm can be a realizable objective. This paper thus proposes a microcontroller based design interfaced with appropriate sensors, actuators and voice recognition abilities to develop a building automation system (BAS) whose control action is based on human activity analysis/ human presence detection. The developed system when implemented would offer the advantage of real-time occupancy information for control of lighting and other electronic circuitry so as to save a significant amount of the electrical energy.

KEYWORDS: BAS, Microcontroller, Sensors, Actuators.

1 INTRODUCTION

An intelligent building according to the European Intelligent building group (EIBG) is one "that incorporates the best available concepts, materials, systems and technologies integrating these to achieve a building which meets or exceeds the performance requirements of building stakeholders which includes the owners, managers and users as well as the local and global community" or the definition by the intelligent building institute (IBI) as one that provides a productive and cost effective environment through optimization of its four basic components – structure, systems, services and management as well as the interrelationships between them.

Buildings since the 1980's have slowly been integrated with technologies and processes that have created a safer, comfortable and more productive facility for its occupants. Intelligent building technology thus refers to the integration of four systems namely a Building Automation System (BAS), a Telecommunication System (TS), an Office Automation System (OAS) and a Computer Aided Facility Management System (CAFMS) where a sophisticated BAS is actually the basis of every intelligent building [15]. The desire to improve comfort inside new, large building after the World War resulted in more complex mechanical systems, better heating and control systems, Pneumatic controls and mounted electrical switches. The period through the 50's, 60's, 80's and the current time saw the emergence of different technologies such a Pneumatic sensor transmission that permitted local indication and remote signaling, electrochemical multiplexing systems which resulted in the reduction of installation cost and maintenance, Automatic control, emergence of user friendly systems, man-machine interface, smart multiplexers, field interface devices (FID's), Microprocessor based distributed direct digital control (DDDC), interoperability and expandability that allowed the linking together of monitoring and control systems and more compatible communication protocols that were suitable for implementation of diverse technology towards achieving the “Intelligent Building” is very wide and almost never ending as changing human wants/needs would require bigger complex building designs that need to be automated to meet future standards.

Recent research(s) are focused on developing energy intelligent buildings by integrating occupant activity and behavior as a key element with which the buildings can automatically turn off unused lights, computers, etc. This key element has long been used for control of various devices like artificial light, HVAC devices, etc. As an example, past research has shown that the use of real-time occupancy information for control of lighting can save a significant amount of the electrical energy used for lighting. User activity and behavior taken into account in the automation of a building to realize the “intelligent building” paradigm provides answers to questions such as what are the most valuable activities or behaviors and their impact on energy saving potential? Etc. The field of intelligent buildings, intelligent homes, building automation systems (BMS) encompasses an enormous variety of technologies, across commercial, industrial, institutional and domestic buildings, including energy management systems and building controls. The function of building management systems is to control, monitor and optimize building services such as lighting, heating, security, closed-circuit television (CCTV) and alarm systems, access control, audio-visual and entertainment systems, ventilation, filtration and climate control, etc., even time and attendance control and reporting (notably, staff movement and availability).

2 RELATED WORK

Reference [8] proposed a research methodology that describes an integrated approach to using results of literature search and inputs from expert survey in the field of building automation and thus presented a framework for identifying and classifying key parameters thus, a building automation performance index (API) model.

Reference [9] developed a system that can be utilized in assessing a building’s energy or operating cost performance where in such case, the building automation system was simply treated as a set of options chosen from a list where automation would be assumed to be at optimum levels whenever an option from the list is selected.

Reference [11] provided a novel survey of prominent international intelligent buildings research efforts with the theme of energy saving and user activity recognition and thus devised new metrics for comparative study, determination of most valuable activities and behaviours with focus on their impact on energy saving potentials for each of the main subsystems that we used as a case studies such as HVAC, light and plug loads. A conclusion with principles and perspectives for energy intelligent buildings based on user activity with clear reference to the most promising and appropriate activity recognition technologies and approaches were discussed.

The CASAS Smart home project is a multi-disciplinary research project at the Washington State University focused on the creation of an intelligent home environment. The approach attempts to view the smart home as an intelligent agent that perceives the environment through the use of sensors, and can act upon the environment through the use of actuators [3].

Reference [6] presented SPOT-LIGHT which was a prototype system that can monitor energy consumption by individuals using a proximity sensor. The basic idea is that an occupant carries active RFID tag which is used for detecting proximity between user and each appliance. This proximity information is then used for energy apportionment, reporting the energy consumption profiles in terms of useful/wasteful power of each user with each appliance.

Reference [12] proposed a microcontroller based design for a building automation system for real time sensing and control of the sitting room, entrance and adjourning doors as well as lightings and window control. The research effort centered on user presence detection control and achieved intelligent control of some basic household appliances.

Reference [7] aimed to provide an overview addressing the state-of-the-art in the area of activity recognition, in particular, in the area of object-based activity recognition. A novel approach to activity recognition based on the use of ontological modeling, representation and reasoning, aiming to consolidate and improve existing approaches in terms of scalability, applicability and easy-of-use initial reviews of existing approaches and algorithms which have been used for activity recognition in a number of related areas were also reviewed from which each of these their strengths and weaknesses were discussed with particular emphasis placed on the application domain of sensor enabled intelligent pervasive environments. Based on an analysis of existing solutions, the researchers then proposed an integrated ontology-based approach to activity recognition where the proposed approach adopted ontologies for modeling sensors, objects and activities, and exploiting logical semantic reasoning for the purposes of activity recognition thus enabling incremental progressive activity recognition at both coarse-grained and fine-grained levels.

Reference [10] considered two requirement models, namely binary satisfaction and continuous satisfaction models, and proposed two decision algorithms to determine the proper illuminations of devices and to achieve the desired optimization goals. A closed-loop device control algorithm was applied to adjust the illumination levels of the lighting devices. A WSN-based intelligent light control system for indoor environments was thus proposed. Wireless sensors are responsible for measuring current illuminations. Two kinds of lighting devices, namely whole lighting and local lighting devices, are used to provide background and concentrated illuminations, respectively in the research effort.

Reference [1] described a system to detect user behavior patterns in an intelligent workplace. The system is designed for a workplace equipped in the context of Sensor9k, a project carried out at the Department of Computer Science at the University of Palermo (Italy). The proposed approach consists essentially of three different phases of analysis of the data gathered by the deployed wireless sensor network, regarding the environment state and the user presence. The pre-processing stage analyzes data in order to detect anomalies, remove outliers and replace missing data, the action, detection and modeling phase analyzes sensor data trends to infer changes which can be ascribed to human actions; appropriate models allow for a better understanding of the extracted information. Finally the Extraction of behavior Patterns phase is accomplished to find relationships of interest and to detect similar clusters in the AMI data.

Reference [13] present a security system for collecting data from detectors for carbon monoxide, flammable gas, smoke, radon and from an access control system based on fingerprint recognition, which sends warnings through a GPRS link. The warnings are sent over the Internet as the concentration of toxic gases or smoke increases over a certain level or an unauthorized access is repeated several times. The transmitted data contains information about the type of danger situation and the location of the system determined by a GPS receiver.

3 METHODS

A structured approach to system analysis as summarized below was used in developing the system.

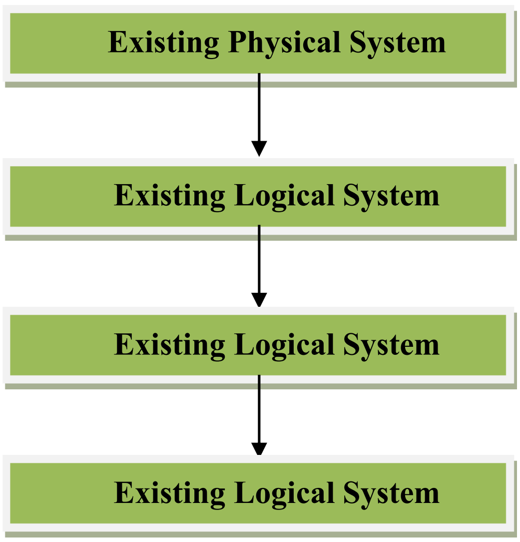

Fig. 1. A Structured approach to System Analysis

Source: Reference [14]

To provide answers to the following questions relating to the problem statement such as:

- What programmable control device can be used to implement the automation required for the One (1) bedroom apartment?
- What sensors and actuators would be required to execute the control action?
- What level of automation is currently being employed and is developed/deployed system flexible for the future?

A top-down design approach was used where the overall system was broken down into smaller modules to handle different areas of the study. AutoCAD was used to draw the design of a standard one bedroom apartment. Microcontrollers, sliding motors (Actuator) and associated circuitry, Infrared/motion sensors, temperature sensor, light illumination sensor, clock alarm circuit and voice recognition device with appropriate electronic circuitry was used to develop the building automation system (BAS) whose control action is based on human activity. The infrared/motion sensor is used to detect human presence at the sitting room and bedroom respectively. The microcontroller triggers the sliding motor enabling the door/window/window blind to open and close. The microcontroller on detecting the presence of an individual in the sitting room/ bedroom would switch on the main bulb(s) in the room, measure the temperature of the room with respect to programmed control with regards time of day/season and thus trigger the appropriate actuators to open the windows/blinds, switch-on heaters/fan/air conditioners, trun on music player etc. The system remains in this state till a preprogrammed voice signal tells it to open door “C” then the microcontroller triggers door “C” to open.

- **Module One:** AutoCAD is used to draw the design of the three bedroom apartment.
- **Module Two:** A microcontroller based design that can automate the apartment as required was developed.
- **Module Three:** The developed system is interfaced with the original building design to effect the control action.

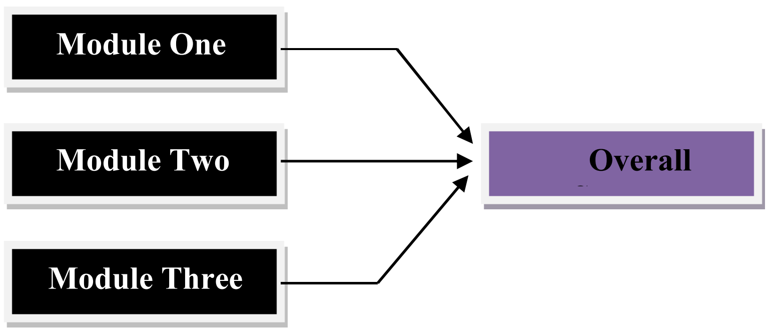

Fig. 2. Modular Framework of System

Source: Reference [4].

4 RESULTS AND DISCUSSIONS

The system operates by the microcontroller sensing a disruption at the receiver end of the infrared/motion sensor which indicates the presence of a human, thus prompting the system to trigger the appropriate actuators concerned to perform activities such as opening doors and windows/ window blinds, switching ON light bulbs, fan, air conditioners, heaters by using a timer circuit to turn ON the water heater in the bathroom whenever it is 6:00am in the morning.

A voice recognition device is also interfaced with the microcontroller so in the event, whenever the keyword which has been stored in memory is observed by the controller it triggers the appropriate actuator to open the associated door.

The microcontroller can be coded using assembly language or suitable high level programming language like C, in order to provide 24-hour service especially in a country like Nigeria which experiences incessant power outages an appropriate inverter could be employed to provide a back-up power solution.

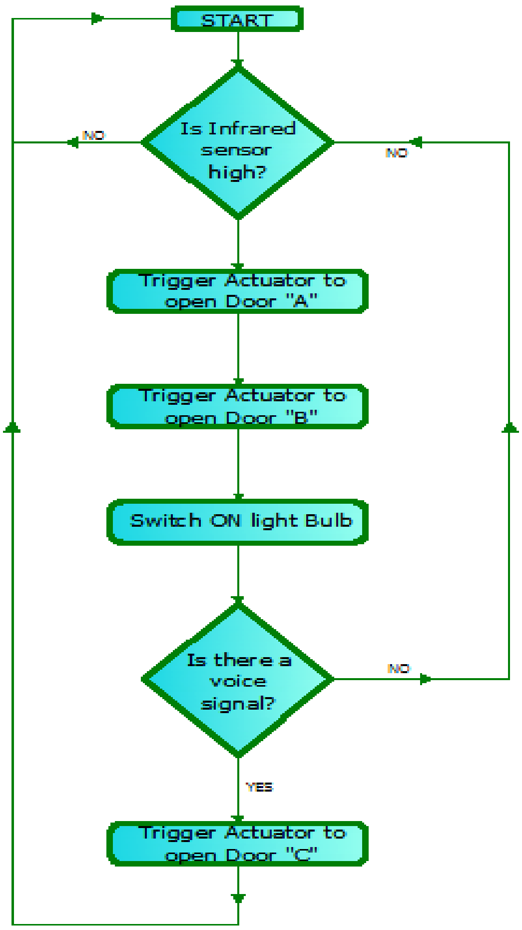

Fig. 3. Flow diagram showing the operation of the microcontroller

Source: Authors' research design

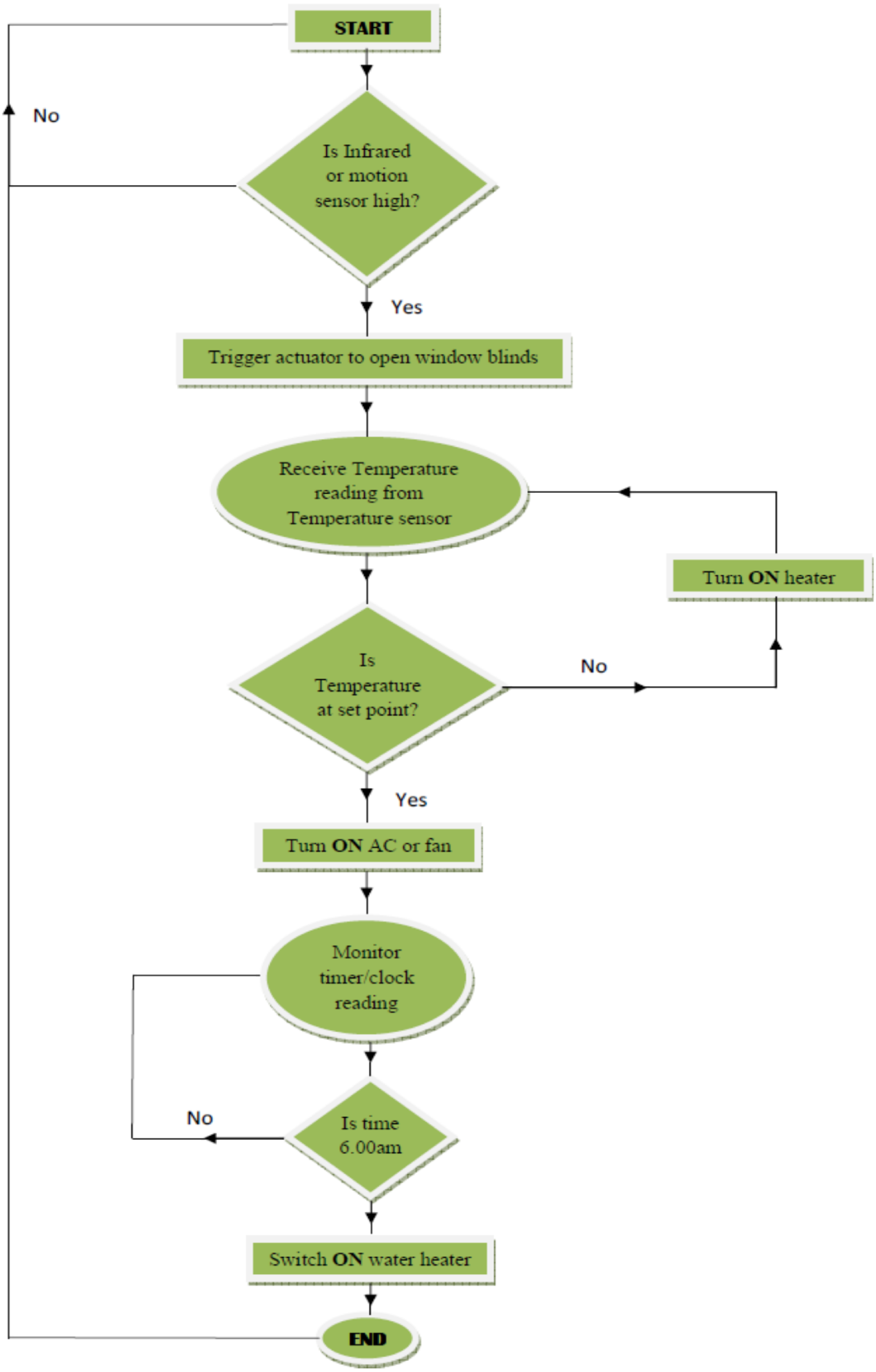

Fig. 4. Flow diagram showing the operation of the microcontroller

Source: Authors' research design

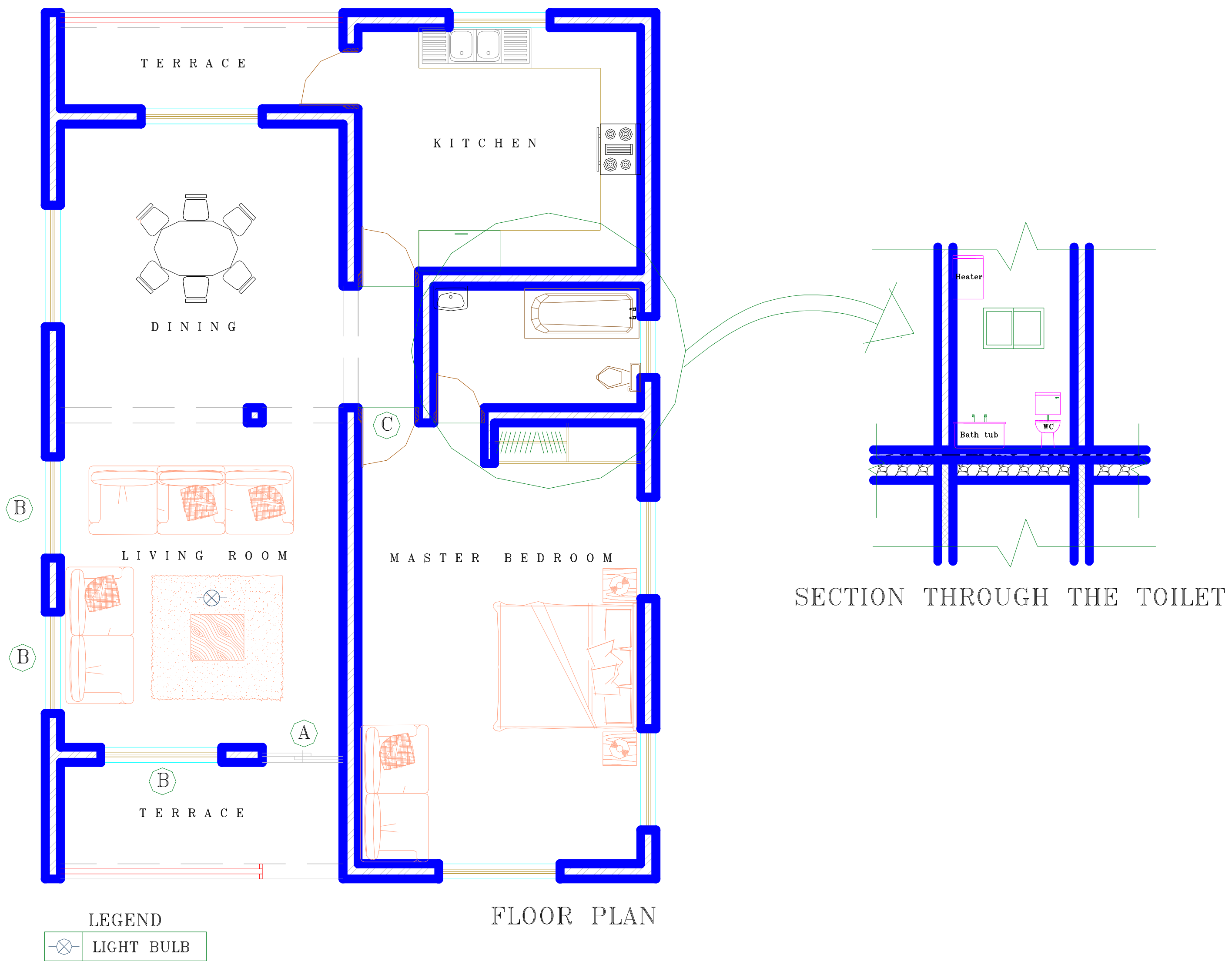

Fig. 5. Floor plan of the proposed building

Source: Authors' research design

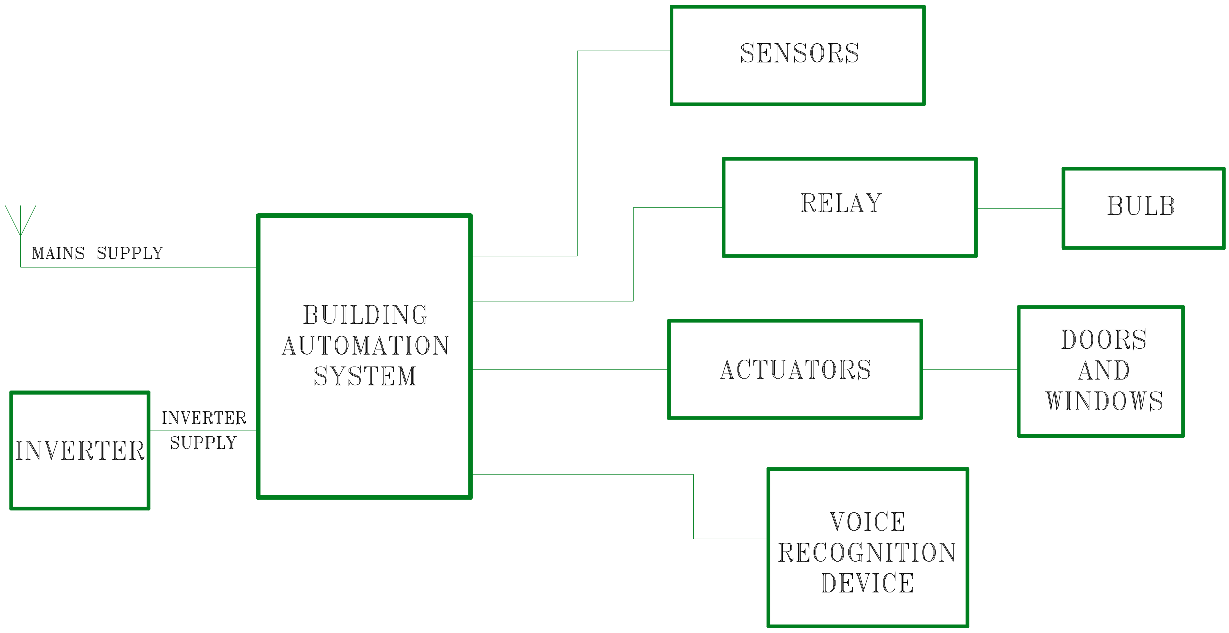

Fig. 6. Total system overview

Source: Authors' research design

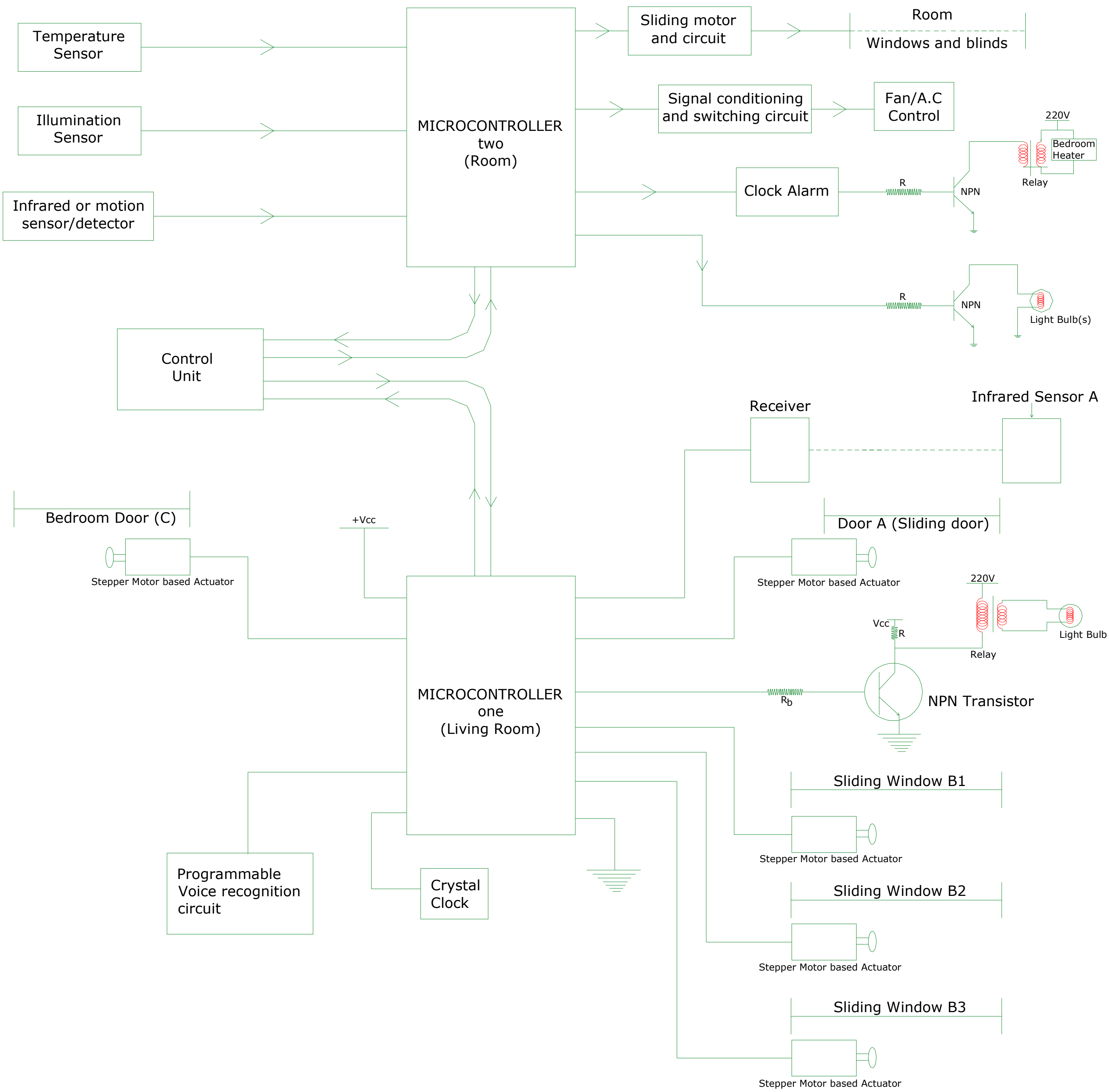

Fig. 7. A Microcontroller base BAS design

Source: Authors' research design

5 CONCLUSION

The research paper proposed a user activity based intelligent building design for full automation of a one bedroom apartment where an attempt was made to control doors, windows, lighting bulb, room temperature, alarm setting for water heater control.

The research endeavor attempts to develop an intelligent building based on user activity and as current situation has shown that building control is mainly done manually from switching lights and appliances to controlling heating systems. We have clearly shown that using appropriate technology the "Intelligent Building" concept can be applied using cheap off the shelf components applied to small residential homes.

6 FUTURE WORK

The researchers intend to carry out further research on the subject topic by incorporating security features that ensure authorized entry, complete automation of the building that incorporates remote monitoring and control functions using smart objects and internet-of-things as well as entire coverage of the entire building plan to achieve the "Intelligent Building".

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DESIGN OF U-SHAPE MICROSTRIP PATCH ANTENNA FOR BLUETOOTH APPLICATION AT 2.4GHz

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ABSTRACT: The Bluetooth technology becomes a rapidly growing area of research in the field of mobile charging, interference, recognition and profile. Bluetooth technology operates 2.400-2480MHz in unlicensed industrial scientific and medical (ISM) band and it cover short distances, typically up to 30 feet (10 meters). It can handle data and voice transmissions simultaneously. Bluetooth is designed to use very little power, low bandwidth wireless connections so simple to use in daily life. The objective of this paper to design of u-shape patch antenna for 2.4GHz and this is applicable (class2, range 10m) of Bluetooth technology. In this paper the design patch antenna using substrate material Rogers RT/duroid5880, its dielectric constant is 2.2 and dielectric loss tangent 0.0009.

KEYWORDS: HFSS13, U-shape microstrip antenna, Bluetooth.

1 INTRODUCTION

Microstrip patch antennas are widely used because of low profile, light weight. However, patch antennas have a main disadvantage- narrow bandwidth, and low gain. In microstrip patch increase the bandwidth [1][2],using air layer [3]. And also to increase the bandwidth and gain using u-shape microstrip patch antenna. The U-slot microstrip patch antenna was introduced in 1995 by Huynh and Lee [4]. The U-slot patch can significantly improve the bandwidth of microstrip antenna [5]. The U-slot patch antenna can be designed not only for wideband applications, but also for dual-band and, triple-band applications [6] with small and wide frequency ratio [7].

Bluetooth was invented in 1994 by L. M. Ericsson of Sweden. The standard is named after Harald Blaatand "Bluetooth". The Bluetooth Special Interest Group (SIG) was founded by Ericsson, IBM, Intel, Nokia and Toshiba in February 1998, introduced Bluetooth is a low-power, short-range, radio-based technology [8]. Bluetooth is a cable-replacement technology designed to wirelessly connect peripherals such as mice and mobile phones, desktop or laptop computer and to each other. Bluetooth devices operate at 2.4 GHz to 2.48GHz in the license-free, globally available ISM (Industrial, Scientific, and Medical) radio band [8]. The advantage of operating in this band is worldwide availability and compatibility. A potential disadvantage is that Bluetooth devices must share this band with many other radio frequency emitters. This range is far enough for comfortable wireless peripheral communication. It provides a high transmission rate and encrypts and authenticates for privacy.

1.1 VERSION

There are four versions (BT1.0, 1.1, 1.2, and 2.0) of Bluetooth given and its application - BT1.0/1.0B is the First Version of Bluetooth. BT1.1 it supports non-encrypted channels, can measured communicating signal strength, IEEE802.15.1—2002 standard created for 1.1. BT1.2 it provides higher practical speeds, better voice quality. BT2.0 including of enhanced data rate (3.0Mpbs), 100meter range even lower power usage ,better error handling, IEEE802.15.1—2005 standard created 2.0.

Currently Bluetooth specification v2.1 is used and the maximum data rate is 3 Mbps, with typical performance in the range of 1 Mbps. Bluetooth (BT 3.0) is developing and will provide a data rate up to 480 Mbps and will use less power [9].

1.2 Power

The equipments of transmission are qualified in 3 groups according to the level of power of emission, as we can see below [8].

Power class	Maximum power mw(dbm)	Range (meter)
Class1	100mw(20dbm)	~100m
Class2	2.5mw(4dbm)	~10m
Class3	1mw(1dbm)	~1m

2 ANTENNA STRUCTURE

The geometry of u-shape microstrip patch antenna is show in figure 1. The u-shape patch dimension are length (L) = 39.037mm, width (W) = 47.41 mm mm, and height (h) = 2.4mm. The u-shape patch antenna design using substrate material Rogger RT/duroid5800 and dielectric constant is$\varepsilon_r = 2.2$. The feed line also fabricated on RT/duroid5880 substrate material. The resonant frequency is 2.4GHz and simulated frequency 2.4 GHz which is applicable in Bluetooth application.

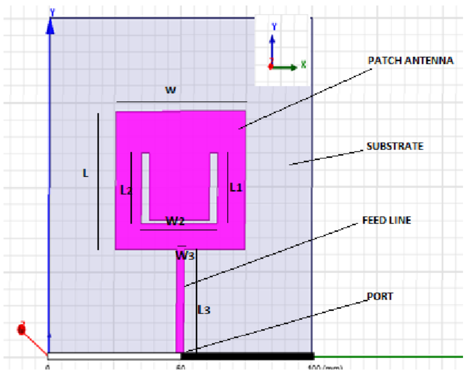

Fig. 1.geomatery of u-shape patch antenna.

Table 1: Specifications of the proposed u-shape microstrip patch antenna show in table.

Operating frequency	2.4GHz
Substrate	RT/duro5880
Dielectric constant of substrate	2.2
Hight of substrate	2.4 in mm
Patch width	47.41 mm
Patch length	39.037mm

2.1 Mathematics calculation

For design of microstrip patch antenna, the stander formula to calculate width and length of antenna at particular operating frequency as given bellow.

$$\mathrm{W} = \frac{V_{\circ}}{2f_r}\sqrt{\frac{2}{\varepsilon_r + 1}} \tag{1}$$

$$\Delta L = h \times o.421\left[\frac{(\varepsilon_{ef} + 0.3)(\frac{\mathrm{w}}{\mathrm{h}} + 0.264)}{(\varepsilon_{ef} - 0.258)(\frac{\mathrm{w}}{\mathrm{h}} + 0.8)}\right] \tag{2}$$

$$L = \frac{V_{\circ}}{2f_r\sqrt{\varepsilon_{ef}}} - 2\Delta L \tag{3}$$

$$\varepsilon_{ef} = \frac{\varepsilon_r + 1}{2} + \frac{\varepsilon_r - 1}{2}\left[\frac{1}{\sqrt{1 + 12\frac{h}{W}}}\right] \tag{4}$$

V_O= speed of light

ε_{ef} = Effective dielectric constant

ε_r= Dielectric constant of substrate

f_r= fringing frequency

h = Height of dielectric substrate

W = Width of the patch

ΔL=extension of the length

3 SIMULATED RESULTS

The simulation results of u-shape Microstrip patch antenna are shown bellow.

3.1 Return loss

U-shape microstrip patch antenna resonating at 2.4GHz having a return loss of -29.5db and impedance bandwidth at -10 db is 180MHz, it shows in figure 2.

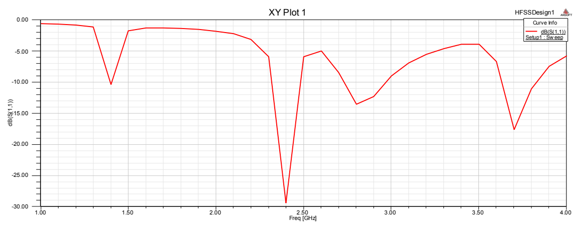

Fig. 2.Simulated return loss of antenna

3.2 Gain

Figure 3 shows the simulated result of gain of the proposed antenna. The maximum achievable gain is 5.5dB.

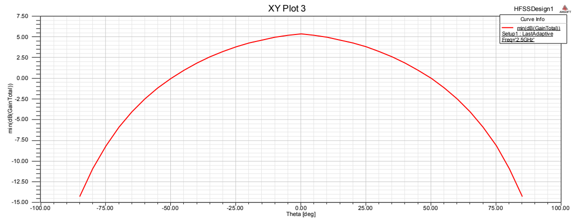

Fig. 3. simulated gain of antenna.

3.3 RADIATION PATTERN

The radiation pattern of the u-shape microstri patch antenna show in figure 4 and 5.

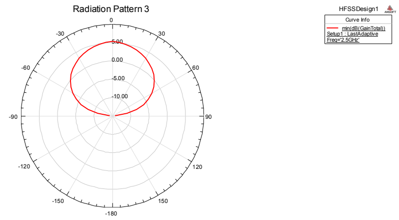

Fig. 4. Radiation pattern of antenna in theta.

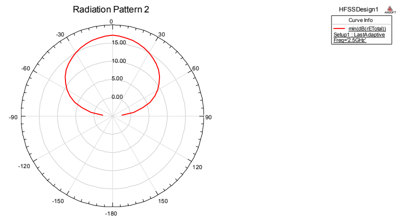

Fig. 5. Radiation pattern of patch antenna.

3.4 DIRECTIVITY

The directivity of the u-shape microstri patch antenna show in figure 6.

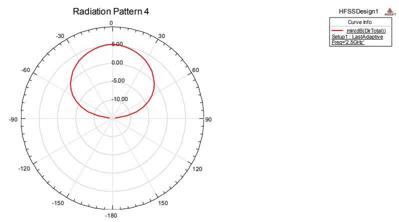

Fig. 6. directivity of patch antenna.

3.5 VSWR

The simulation result of Voltage Standing Wave Ratio, (VSWR) is shown in Fig.7, at operating frequency 2.4GHz, the VSWR value obtained is 0.8.

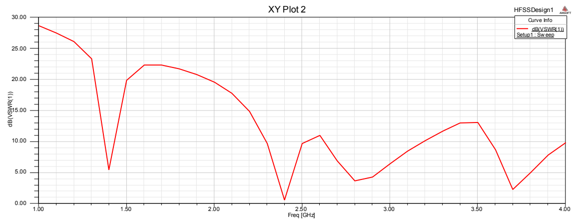

Fig. 7. VSWR of patch antenna.

4 CONCLUSION

In this paper, we design of u-shape microstrip patch antenna using high frequency structural simulator (HFSS) software. Because microstrip patch antenna is light weight, Small size, low cost, and it is easy to use in mobile, laptop, desktop and other device. The proposed antenna give a bandwidth is approximately 180MHz (7.5%) and gain 5.5dB .The VSWR is obtain equal 0.8 at operating frequency 2.4GHz.

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The Effectiveness of E – Book in Secondary Stage Students' Use of Syntactic Structures and Meta Cognitive Skills

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ABSTRACT: The problem of this study is represented by one main question: what is the effectiveness of e-books in using syntactic structures and meta cognitive skills of second year high school students?
This main question includes the following minor questions:
1. What are the meta cognitive skills there are suitable for teaching syntactic structures to second year high school students?
2. What is the form of the e-book used in developing the meta cognitive skills of second year high school students?
3. What is the effect of the e-book used in developing meta cognitive skills on teaching syntactic structures to students?

KEYWORDS: E – Book, Secondary Stage Students', Syntactic Structures, Meta Cognitive Skills.

Fayoum University

Faculty of Education

Department of Curricula & Methodology

This study is a Doctoral Thesis in Education,

Curricula & Methodology (Arabic Major)

REALIZING THE PROBLEM OF THE STUDY:

The researcher observes that there are a lot of students (especially secondary school students) (1) who suffer from weakness and difficulties in learning and applying rules of the Arabic syntax. This is due to a number of reasons such as:

- There are some defects in the traditional methodology which is still used in teaching the rules of the Arabic syntax.
- In addition, teachers are not interested in developing the different thinking skills of students when teaching them syntactic rules.
- Not to mention students' lack of some meta cognitive skills.

The findings of previous studies by (Abdel-Rahman Kamel, 2014, pp 8-13) [1] (Gina Jaeger, 2011, p 6) [18] &(Li- Li Lin, 2008, pp 4-5) [19] & (Gulin Yolageldili & Arda Arikan, 2011, pp 219-222) [20] & (Zeliha Demir & Mehmet Barıs, 2013, pp 1793 – 1794) [21] & (Maurizio Santoro, 2012, pp 167- 169) [22] (Abdel-Rahman Kamel, 2014, pp. 127-128) [6] mentioned these reasons.

All this led the researcher to choose the topic of his study. The researcher put the previous studies into two categories:

The first refers to the studies whose focus is using e-books in the educational process.

The second category refers to the studies whose concern is developing the meta cognitive skills in the different branches of language.

PROBLEM OF THE STUDY:

The problem of this study is represented by one main question: what is the effectiveness of e-books in using syntactic structures and meta cognitive skills of second year high school students?

This main question includes the following minor questions:

1. What are the meta cognitive skills there are suitable for teaching syntactic structures to second year high school students?
2. What is the form of the e-book used in developing the meta cognitive skills of second year high school students?
3. What is the effect of the e-book used in developing meta cognitive skills on teaching syntactic structures to students?

AIMS OF THE STUDY:

This study aims at the following:

1. Identifying the meta cognitive skills which are relevant for teaching syntactic structures to second year high school students.
2. Preparing an e-book for developing meta cognitive skills which are necessary for teaching syntactic structures to second year high school students.
3. Realizing the effect of using the e-book in developing meta cognitive skills on teaching syntactic structures to second year high school students.

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(1)The above remark is taken while observing teaching practice students in addition to the researcher's exploration of the finding of a large number of previous studies and papers written on the same topic.

SIGNIFICANCE OF THE STUDY:

The present study may be useful for the following:

1. High school supervisors and teachers of Arabic language and other experts will be able to identify the meta cognitive skills which are relevant for teaching syntactic structures to second year high school students.
2. The sample students will know how to use the e-book in learning the rules of the Arabic syntax
3. Researchers in the field of curricula and methodology of Arabic language will know how to use the e-book not only in the Arabic syntax but also in the other branches of Arabic language.

HYPOTHESES OF THE STUDY:

The hypotheses of the study are:

1. There are no statistically significant differences between the observed and expected frequencies of the marks of Arabic language teachers and supervisors in the items of the questionnaire of the meta cognitive skills relevant for teaching syntactic structures to second year high school students by using the e-book as k2 test shows.
2. There are no statistically significant differences between the means of the experimental and control groups in the pre-test of meta cognitive skills of teaching syntactic structures
3. there are no statistically significant differences between the means of students' marks in the experimental and control groups in the post-test of meta cognitive skills of teaching syntactic structures, students' marks in the post-test

LIMITS OF THE STUDY:

The study is limited to the following:

1. a sample of second year high school students in secondary school for Males and Sports Secondary School which are affiliated to Fayoum Directorate of Education.
2. a sample of high school supervisors and teachers of Arabic language
3. The syntactic topics of unit 4 in the Arabic language textbook school, for second year high school student in the unit whose title is "Opening second term of the academic year 2013-2014. And Eliding the conform verb."

STEPS OF THE STUDY:

The study follows the following steps :

Firstly: To answer the first question, namely, what are the meta cognitive skills that are suitable for teaching syntactic structures to second year High school students?

1. The researcher read and analyzed some of the previous papers and studies written on the topic of the present study extract their findings and how to use them in the present study.
2. He prepares a questionnaire on the meta cognitive skills that are relevant for teaching syntactic structures to second year high school students.
3. Giving the questionnaire in its initial form to a group of referees who are specialized in curricula and Arabic language methodology to check its reliability, objectivity and suitability for application.
4. Applying the questionnaire on a sample of Arabic language teachers and supervisors to identify the meta cognitive skills that have the highest values in a K test
5. Writing the questionnaire's results in special tables and analyzing them statistically.

Secondly: to answer the second question, namely, what is the form of the e-book used in developing the meta cognitive skills of teaching syntactic structures to second year high school students?

The researchers designed an e-book to be used in teaching syntactic structures for developing some meta cognitive skills of second year high school students. He designed it in the light of:

1. The findings of the previous step.
2. Identifying the essentials and standards of the e-book.

3. Setting the general aim of the e-book
4. Setting the behavioral objectives of the e-book for the sake of teaching syntactic structures to second year high school students.
5. Selecting a relevant design for the e-book
6. Preparing the contents of the e-book
7. Preparing the scenario of the e-book
8. Preparing the educational aids that are relevant for the required syntactic structures
9. Preparing the relevant means of evaluation
10. Setting a time plan for teaching syntactic structures by using the e-book
11. Producing and publishing the e-book
12. Checking the accuracy (editing) the e-book and referring it to a committee of referees.
13. Making a pilot study of the suggested e-book and putting it in its final, applicable form.

Thirdly: to answer the third question, namely, what is the impact of the e-book on developing the meta cognitive skills of teaching syntactic structures to second year high school students?

1. The researcher randomly selected a sample of second year high school students and divided them into an experimental group and a control group
2. He controlled the study's variables
3. He prepared a test of meta cognitive skills of teaching
1. Syntactic structures to second year high school students, and referred it to a group of referees specialized in curricula and Arabic language methodology; then he modified it in the light of their recommendations in order to ensure its suitability for application.
4. The researcher applied the test to the sample students to set the test time and the factors of easiness, difficulty and identification for each of the test items and to check the validity of the test.
5. He applied the test as a pre-test to the two sample group of second year high school students both experimental and control.
6. He trained the experimental group to do some syntactic activities by using the e-book in order to develop their meta cognitive skills.
7. He applied the test as a post-test to the two sample groups of second year high school students, both experimental and control.
8. He recorded the results of the pre and post-tests of meta cognitive skills in special tables and explained and analyzed them statistically.
9. He presented recommendations and suggested topics for further research in the light of the previous results.

SAMPLE OF THE STUDY:

Type of sample: second year high school students in Demo Secondary school for Males and sports secondary school for Males.
Group: two groups one experimental and another control.
Class 2-2 & **Number** 2-4 students
Total: 50 students secondary school + Arabic language teachers and supervisors
Number: 40 teachers and supervisors

Table no. 1 shows Sample of the study

Type of sample	school	Group	Class	Total
Second year high school students	Demo Secondary school for Males	Experimental	2-2	25
second year high school students	Sports secondary school for Males	control	2-4	25
Arabic language teachers and supervisors				40

TERMINOLOGY OF THE STUDY:

1)- **E-book :**

Sakine and Adnan (2010) define e-books as “books, prepared to be read via computers or e-book readers and they have some additional features besides printed books‘as; visuals, sound effects and interactive links.” [2] **Onder** (2011) defines e-book as “a digitalized form of some or all printed books or as one produced completely in the digital environment, which can be viewed and accessed on any portable device like computers or specially designed e-book readers”. [3] **Murat** (2014) defines e-book as “a software based electronic form with its rich text features (including bookmarker, highlighting, focusing and so on) that allow all the functions of conventional book reading.” [4] **Lam and Mcnaught** (2009) define e-book as “combination of software and hardware allowing texts to be designed in electronic environments or texts in the formats of doc, txt and pdf, which can be viewed with other devices besides computers.” [5] **Troy and Carol** (2011) define e-books as “books that have been completely converted to or originated in a digital format.” [7]

The researcher defines it as follow :

The e-book is a source of interactive e-learning essentially based on texts, sound, images and figures in addition to syntactic examples, exercises and activities. All this is integrated in a digital form and its content is presented in a complicated way aiming at developing some meta cognitive skills of teaching syntactic structures to second.

2) Metacognition :

Flavell (1979) defines metacognition as “thinking about thinking or monitoring one’s own cognition.” [15] **Andria** (2008) defines metacognition as “the activity of monitoring and controlling one’s cognition. It can further be defined as what we know about our cognitive processes and how we use these processes in order to learn and remember.” [8] **Linda and Rtlb** (2012) define metacognition as “the ability to understand and monitor one’s own thoughts; having knowledge and awareness of cognitive processes, and control of cognitive processes. [16] **Emmy et al** (2012) define metacognition as “the knowledge about and the regulation of one’s cognitive activities in learning processes and is positively related to students’ academic performances.” [17]

The present study adopts the definition of metacognition as plans used to centre, arrange and plan for, and evaluate language learning to facilitate comprehension.

3) Meta cognitive skills:

Annemie and Gokhan (2009) define metacognitive skills as “refer to the voluntary control people have over their own cognitive processes.” [9] **Lisa** (2008) defines metacognitive skills as “Cognitive skills include recall or recognition of knowledge and the development of intellectual abilities and skills and knowledge of self and ones personal cognition of thinking about thinking.” [13] **Brianna and Ashleigh** (2013) define metacognitive skills as “one’s ability to correctly predict performance, monitor whether individual answers are correct as one proceeds through a task, and correctly evaluate how well one has performed on a particular task.” [14] **Ahmad** (2006) defines metacognitive skills as “ the process of knowing or thinking about how we use strategies and skills to enhance our thought processes; thinking about how we think.” [10] **Muhittin and Ali** (2011) define metacognitive skills as “ involves the processes of individuals’ deciding what strategy to use in what situations as result of the metacognitive experiences they have lived, using the strategy, monitoring learning, changing the strategy if learning has not taken place and trying a new strategy.” [12]

The researcher defines them in the present study as those skills which help second year high school students (sample of the study) to produce correct syntactic structures. This can be done by making students have a good understanding of syntactic rules, organizing syntactic knowledge which includes syntactic planning, syntactic monitoring and control, syntactic organization, correcting syntactic mistakes, syntactic revision and evaluating understanding of syntactic rules by using the e-book.

FIELD STUDY:

A) The study is applied according to the following steps:

1. Applying the questionnaire of meta cognitive skills of teaching syntactic structures to second year high school students to a sample of Arabic language teachers and supervisors in order to identify the meta cognitive skills which have the highest values in a k2 test.

2. Recording the questionnaire's results in special tables to explain and analyze them statistically.

3. Applying the test of meta cognitive skills of teaching syntactic structures as a pre-test to experimental and control sample groups of second year high school students.

4. Training the experimental group to do some syntactic activities in the e-book to develop some of their meta cognitive skills.

5. Applying the test of meta cognitive skills of teaching syntactic structures as a post-test to the experimental and control sample groups of second year high school students.

6. Recording the results of pre and post-tests in special tables to explain and analyze them statistically.

Firstly : The results of the questionnaire of meta cognitive skills:

To prove the first hypothesis which states that there are no statistically significant differences between the observed and expected frequencies of the marks of Arabic language teachers and supervisors in the questionnaire items as the K2 test shows, the questionnaire was given to a number of the staff of Arabic Methodology and Curricula Department and was modified according to their remarks. Some of the questionnaire's expressions were re-phrased to ensure their reliability, comprehensiveness and relevance to the meta cognitive skills of teaching syntactic structures to second year high school students. After checking the questionnaire's reliability, it was applied to 40 Arabic language teachers and supervisors to test its reliability. The researcher used kuder -Richardson formula for test reliability. The following are the results of the questionnaire and the truthfulness of the first hypothesis:

Table (no.2): The observed and expected frequencies and the X^2 values for the opinions of Arabic language teachers and supervisors regarding the meta cognitive skills of teaching syntactic structures to second year high school students:

Skill no.	Appropriateness			(X^2) *	(Statistical significance) *	Relative Weight	Arrange
	High	Medium	Low				
1	26	8	6	18.2	**	0.833	14
2	20	18	2	14.6	**	0.817	22
3	21	18	1	17.45	**	0.833	15
4	27	10	3	22.85	**	0.867	8
5	18	19	3	12.05	-	0.792	30
6	16	23	1	18.95	-	0.792	29
7	22	13	5	10.85	**	0.808	28
8	21	17	2	15.05	**	0.825	18
9	20	17	3	12.35	**	80.8	27
10	22	15	3	13.85	**	0.825	19
11	38	2	0	68.6	**	0.983	1
12	37	2	1	63.05	**	0.966	2
13	34	3	3	48.05	**	0.925	4
14	35	3	2	52.85	**	0.944	3
15	4	3	33	43.55	-	0.425	32
16	6	4	30	30.14	-	0.366	34
17	24	11	5	14.5	**	0.825	17
18	25	12	3	18.35	**	0.850	10
19	24	13	3	16.55	**	0.842	13
20	27	10	3	22.85	**	0.867	9
21	27	12	1	25.55	**	0.883	7
22	8	10	22	8.6	-	0.448	31
23	28	10	2	26.6	**	0.883	6
24	22	15	3	3.85	**	0.825	20
25	25	10	5	16.25	**	0.833	16
26	29	10	1	30.65	**	0.900	5
27	24	14	2	18.2	**	0.850	11
28	4	3	33	43.55	-	0.425	33
29	23	15	2	16.85	**	0.842	12
30	23	13	4	13.55	**	0.825	21
31	24	10	6	13.4	**	0.816	23
32	20	17	3	12.35	**	0.808	26
33	17	22	1	18.05	**	0.800	24
34	25	7	8	15.35	**	0.808	25
Total	766	389	205				
Mean	22.5294	11.4412	6.02941				
S. deviation	8.158414	5.769256	8.99995				

( ) Statistically significant at the 0.01 level, 0.05. (-) The lack of a statistically significant.*

(∗) - The degree of freedom when the ratio 0.05 is equal to (5.991), and when the ratio 0.01 is equal to (9.210)

A) As table no. (2) shows, Arabic language teachers and supervisors realize the importance and relevance of the following meta cognitive skills:

According to the previous analysis of the observed and expected frequencies and k2 values of the views of Arabic language teachers and supervisors regarding the meta cognitive skills relevant for teaching syntactic structures to second year high school students, it becomes clear that n=34 and d.h=2, and that DF at the ratio of 0,05 is 5,991 to be statistically significant, and at the ratio of 0,01 is 9,210 to be statistically significant. This means that Arabic language teachers and supervisors realize the importance of meta cognitive skills relevant for teaching syntactic structures to second year high school students which has the following numbers (1,2,3,4,7,8,9,10,11,12,13,14,17,18,19,20,21,23,24,25,26,27,29,30,31,32,33, 34) at the ratios of 0,01 and 0,05. These are the skills which have the highest values in k2 test with a frequency more than 80% because these skills are the most relevant for teaching syntactic structures to second year high school students (sample of the study). Table no. (2) shows the meta cognitive skills which have frequency more than 80% in the five essential levels:

Table no. (3) :Meta cognitive skills relevant for teaching syntactic structures to second year high school students which have the highest values in k2 test regarding the views of Arabic language teachers.

No	Meta cognitive skills which have a frequency rate of 80% or more	Relative Weight
Firstly:	**syntactic planning skills :**	
1 -	Identifying background information about syntactic concepts	**0.833**
2 -	Identifying the characteristics of syntactic concept.	**0.817**
3 -	Forming questions about syntactic concept like the previously prepared questions.	**0.833**
4 -	Identifying the aims of studying the syntactic subject matter.	**0.867**
5 -	Identifying the usage of syntactic concept's expressions in language situations.	**0.808**
6 -	Identifying the significance of syntactic concept.	**0.825**
Secondly:	**Syntactic control and monitoring skills:**	
7 -	Using some syntactic structures in correct phrasing.	**0.833**
8 -	Identifying similarities between syntactic structures.	**80.8**
9 -	Identifying the types of grammatical analysis whether major signs.	**0.825**
10 -	Deducing the syntactic concept controlling syntactic	**0.944**
11 -	Identifying the relationship between the syntactic concept and other syntactic concepts.	**0.966**
12 -	Giving a relevant definition to the syntactic concept.	**0.925**
Thirdly:	**Syntactic organization skills :**	
13 -	Finding missing points in the syntactic concept which negatively affect its function.	**0.983**
14 -	Properly using the syntactic concept in language constructions.	**0.825**

No	Meta cognitive skills which have a frequency rate of 80% or more	Relative Weight
15 -	Categorizing syntactic concepts according to using them language constructions.	0.850
16 -	Transforming one syntactic structure to another.	0.842
17 -	Syntactic relations' analysis of the concept in language construction.	0.883
Fourthly:	**syntactic evaluation skills:**	
18 -	Correcting syntactic mistakes when using the expressions of a specific syntactic concept.	0.867
19 -	Setting clear criteria for syntactic judgement.	0.883
20 -	Selecting the correct language construction among suggested ones	0.825
21 -	Identifying the misuse of syntactic concept in some sentences.	0.833
22 -	Identifying the reason of including the syntactic concept in the mentioned example.	0.850
Fifthly :	**Syntactic reviews skills:**	
23 -	Modifying language constructions according to the use of a specific syntactic concept.	0.900
24 -	Determining the correct spelling and pronounciation of word endings in language constructions	0.842
25 -	Determining the declension of some words in syntactic structure.	0.825
26 -	Relating the student's language environment to the syntactic concept	0.816
27 -	Correcting some sentences according to their syntactic rules.	0.808
28 -	Giving evidence of the accuracy of syntactic judgments	0.800

As for skills no. (5,6,15,22,28), they have a frequency less than 80% in k2 test. Thus the researcher excluded them. The table no (4) shows the meta cognitive skills which have less than 80% in k2 test

Table no. (4): The meta cognitive skills which have a frequency less them 80% in k2 test according to the views of Arabic language teachers and supervisors.

No	the meta cognitive skills which have less than 80% in k2 test	Relative Weight
1 -	Identifying the points of syntactic concept.	0.792
2 -	Observing the accuracy of the sentence which includes the syntactic concept.	0.425
3 -	Distinguishing between what is related to the syntactic concept and what is not.	0.366
4 -	Determining how far the steps the student takes for the declension of words in the sentence are correct.	0.448
5 -	Identifying the sections of a specific syntactic concept.	0.425
6 -	Identifying the misinterpretations of some of the expressions of syntactic concepts in the examples.	0.792

The previous tables of k2 values for the views of Arabic language teachers and supervisors regarding the meta cognitive skills for teaching syntactic structures to second year high school students show that there are statistically significant differences between the observed and expected frequencies of the marks of Arabic language teachers and supervisors. Thus the researcher tested the truthfulness of the first hypothesis which states that there are no statistically significant differences between the observed and expected frequencies of the marks of Arabic language teachers and supervisors in the items of the questionnaire of the meta cognitive skills relevant for teaching syntactic structures to second year high school students by using the e-book as k2 test shows. The alternative hypothesis is adopted. It states that there are statistically significant differences between the observed and expected frequencies of the marks of Arabic language teachers and supervisors in the items of the questionnaire of the meta cognitive skills relevant for teaching syntactic structures to second year high school students by using the e-book as k2 test shows.

Secondly: Results of the test of meta cognitive skills for teaching syntactic structures to second year high school students.

A) The second hypothesis which states that there are no statistically significant differences between the means of the experimental and control groups in the pre-test of meta cognitive skills of teaching syntactic structures, is proved and adopted. The students' marks in the pre-test were recorded and the mean and standard deviation were given. The T values of the experimental and control groups in the pre-test of meta cognitive skills of teaching syntactic structures were also given as the following table shows.

Table no. (5) Means, standard deviations and T values and their significance between the experimental and control groups in the pre-test of meta cognitive skills of teaching syntactic structures:

Skills	Type of application	The control group		The experimental group		calculated (T) value*	level of significance
		Mean	s. deviation	Mean	s. deviation		
1- Syntactic planning	**Pre- test**	2.4	0.912871	2.48	0.962635	0.295	**statistically insignificant**
2- Syntactic monitoring and control		3.12	1.129897	3.2	0.866025	0.275	
3- Syntactic organization		2.16	0.746101	2.08	0.702377	0.382 -	
4- Syntactic evaluation		2.12	0.927362	2	0.645497	0.520 -	
5- Syntactic revision		2.36	0.860233	2.48	0.822598	0.493	

The previous table shows that there are no statistically significant differences between the means of students' marks in both experimental and control groups in all meta cognitive skills included in this study. This is because the value of calculated T is less than that of tabulated T at the level of 0,01 which is 2,40,and at the level of 0,05 which is 1,67. This indicates the idea that there is no development in the meta cognitive skills of teaching syntactic structures to students of the experimental group whose skills are targeted to be developed by using the e-book. Thus this hypothesis is accepted.

B) To prove the third hypothesis which states that there are no statistically significant differences between the means of students' marks in the experimental and control groups in the post-test of meta cognitive skills of teaching syntactic structures, students' marks in the post-test, the mean and standard deviation were recorded and the values of T is calculated for the experimental and control groups in the post test as the following table shows:

(*) - Tabulated T value at the level of 0,01 is equal to (2.40) and at a level of 0.05 is equal to (1.67)
DF = 48.

Table no. (6): The Means, standard deviations and T values and their significance for the experimental and control groups in the post-test of meta cognitive skills of teaching syntactic structures:

Skills	Type of application	The control group		The experimental group		calculated (T) value[*]	level of significance
		Mean	s. deviation	Mean	s. deviation		
1- Syntactic planning	**Post - test**	3.32	0.748331	4.24	1.331666	2.950	Significant at 0.01 level
2- Syntactic monitoring and control		4	1.190238	5.84	1.106044	5.547	
3- Syntactic organization		3.2	1.040833	4	1	2.715	
4- Syntactic evaluation		2.76	0.778888	3.4	0.645497	3.099	
5- Syntactic revision		3.68	0.748331	4.52	1.045626	3.200	

Table no. (6) shows that there are statistically significant differences between the means of students' marks of the experimental and control groups in the post-test of meta cognitive skills of teaching syntactic structures and that these differences are in favor of students of the experimental group. These skills are :

(Syntactic planning skills, syntactic control and monitoring skills, syntactic organization skills, syntactic evaluation skills, and syntactic revision skills). It is also shown that these differences are not out of chance because the value of calculated T is more than that of tabulated T at the level of 0,01 which is 2,40, and at the level of 0,05 which is 1, 67. This indicates the development of meta cognitive skills of teaching syntactic structures to students of the experimental group whose skills are targeted to be developed by using the e-book such development is due to using the e-book in teaching the unit. Thus, this hypothesis is not accepted. The alternative hypothesis which states that there are statistically significant differences between the means of students' marks of the experimental and control groups in the post-test of meta cognitive skills of teaching syntactic structures is accepted. The differences are in favor of students of the experimental group.

(*) - Tabulated T value at the level of 0,01 is equal to (2.40) and at a level of 0.05 is equal to (1.67)
DF = 48.

Table no. (7) The calculation of T value and its significance for the experimental and control groups in the post-test of meta cognitive skills of teaching syntactic structures.

statistics / group	mean	S.D	Calculated(T)	DF	Tabulated(T)		Statistical significance	
					0.01	0.05	0.01	0.05
Experimental N= 25	22	2.081	7.58	48	2.40	1.67	Significant	
Control N= 25	16.96	2.507						

The previous table shows that the value of calculated T as a whole for the experimental and control groups in the post-test of meta cognitive skills is (7,58). This means that the experimental group is superior to the control group in the meta cognitive skills included in the study. To show the effect of the e-book on developing the meta cognitive skills of teaching syntactic structures to students of the experimental group, the researcher applies the following formula:

$$D = \frac{2T}{\sqrt{FD}}$$

T means, The value of calculated T for the two groups in the post-test

FD is the degree of freedom (n1+n2)-2). The effect is weak if D is less than or equals 0,2 and moderate if it is 0,5 and strong if it is more than or equals 0,8. Applying the previous formula shows that the effect is 2,19. This means that the e-book has a deep effect on developing the meta cognitive skills of teaching syntactic structures to second year high school students.

Table no. (8) shows the effect of the e-book on developing the meta cognitive skills of teaching syntactic structures to second year high school students:

statistics	Value of calculated (T) in post-test	effect	The significance of the effect
Experimental N= 25	7.58	2.19	is very clear because it is more than,8
Control N= 25			

The previous table shows that the effect is (2,19). This means that the e-book is very effective in developing the meta cognitive skills of teaching syntactic structures to second year high school students.

Table no. (9): The degree of the effect for each of the meta cognitive skills in the post-test:

group / Skill	statistics	Calculated (t) value	D	The degree of influence
1- Syntactic planning	**Experimental** = 25 **Control** =25	2.95	0.9	Great
2- Syntactic monitoring and control		5.55	1.60	
3- Syntactic organization		2.67	0.8	
4- Syntactic evaluation		3.09	0.9	
5- Syntactic revision		3.2	0.92	

FINDINGS AND RECOMMENDATIONS OF THE STUDY:

In view of the study's results, the researcher recommends the following:

1. Using the e-book in the other branches of Arabic
2. Using the modern methods of teaching syntax, those methods which help develop the differentthinking skills-and avoiding traditional rather than thinking skills.
3. Preparing a training program for in-service teachers, training them on how to use e-book in teaching the branches of Arabic skills and the different thinking skills of teachers.
4. Using the various services available on the web in teaching the different branches of Arabic language.
5. Using the methods of developing meta cognitive skills in teaching the branches of Arabic language to all educational stages
6. Preparing training programs integrating the teaching of the branches of Arabic language for both the development of students, meta cognitive skills and their creative thinking
7. Reconsidering the current methods of evaluation by including questions measuring students' meta cognitive skills and the different thinking skills in Arabic language exams
8. Realizing the importance and usefulness of computer labs by using them in teaching the different knowledge
9. Establishing a special unit in the ministry for producing educational software, and software programs which educational software, and courses at reasonable prices especially in the branches of Arabic language

SUGGESTED FURTHER RESEARCH:

In view of the study's results, the researcher suggests making the following research studies:

1. The efficiency of using the e-book in developing some reading and thinking skills of first year high school students.
2. Making a comparison between using the e-note and the e-book in teaching the different branches of the students' thinking skills.
3. Studying the computer's ability to develop the composition and writing skills of prep stage students.
4. Studying the obstacles hindering the use of technological aids in teaching the branches of Arabic language.
5. The effect of free reading on developing some meta cognitive and creative thinking skills of second year high school students.
6. Studying the best methods of teaching Arabic language in general and Arabic syntax in particular.

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