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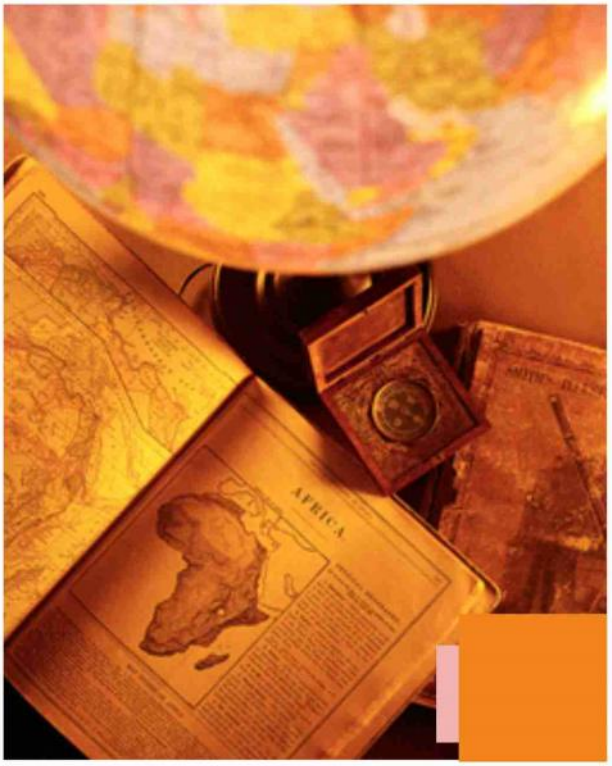

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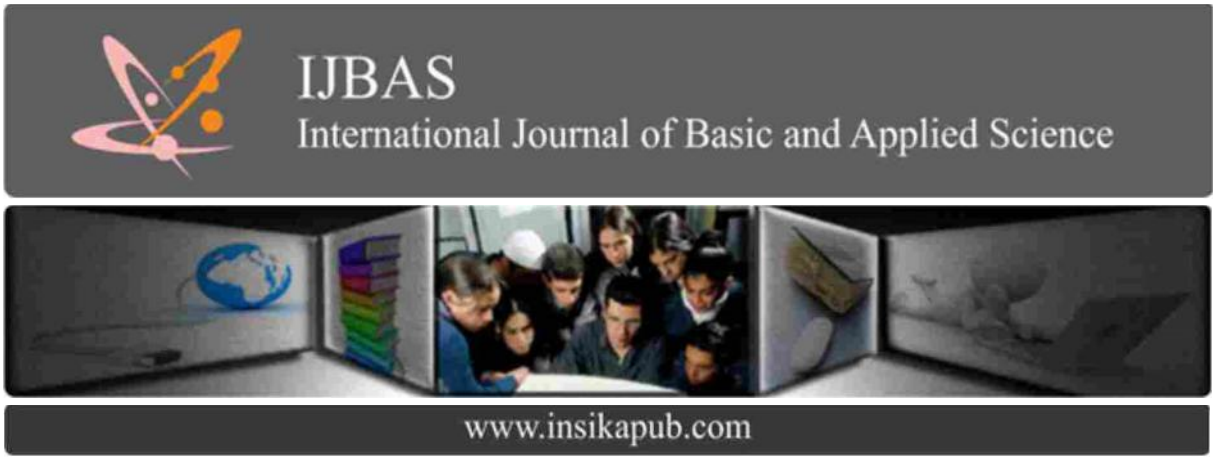

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Content

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Daily Report Cards: A Recommended Intervention in the Schools

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Abstract – *The purpose of this paper was to review and evaluate the available and current literature regarding the use of daily report cards. Literature was gathered using computer searches of the ERIC, Psych Info, and Google Scholar databases. Also, the reference sections found in the articles from the computer searches were also searched. The overview, history, summary of components, sample models, and issues surrounding daily report cards were provided. Sample outcome studies using daily report cards were reviewed. These studies and others reported daily report cards to be an effective intervention for both elementary and middle school students. This was also found across both social and academic behaviors. The limitations and concerns regarding the use of daily report cards were discussed*

Key Words – *Daily report cards, Home communication, Contingency management, Evidence-based intervention, Home consequences, Students with disabilities, Academic intervention, Home/ school linkage.*

1 Introduction

There have been numerous studies seeking the effectiveness of the use of the daily report card method in the classroom to improve classroom behavior and academic work. The analysis of this procedure involves many recent and older studies, which will give educators a more in-depth look over this intervention model. One of the earliest noted studies of a home reinforcement package was a study conducted at the University of Kansas that examined young pre-delinquent boys' behavior during a summer school math course. This early home reinforcement system was quite simple. Each participant carried his own report card to class and the teacher marked yes or no, in response to if the student "studied the whole period" and "obeyed the rules" (Bailey, Wolf, & Phillips, 1970).

Daily report cards have been successfully implemented and used with students of all ages and abilities. The populations employed have ranged from kindergarten children (Bushrod, Williams, & McLaughlin, 1983), to junior high school students (Bailey et al., 1970; Newstrom, Sweeney, & McLaughlin, 1999; Schumaker, Hovell, & Sherman, 1977). Parents of children with disabilities often feel disconnected to their child's schoolwork. They have experienced high frustration levels with their student both behaviorally and academically. The parents may have given up working with their student at home as a result of this frustration, or they simply may not know how to help their child, or how to respond properly to their behavior. The daily report card can be a clear link between the classroom and home (Kelly & Carper, 1988). The daily report card is not simply a few lines passed between the teacher and parent that lists daily activities or states simply that the child had a "good" or "bad" day. The daily report card is a vehicle to transport information regarding specific target behaviors that a student needs to work on, or to include the parent as much as possible in the student's academic life. A low score on a particular section of the report card may prompt the parent to intervene at home. A visual sample of various report cards is presented in figures 1, 2 and 3.

Daily report cards have been referred to by a number of different titles, including home note, home-based reinforcement, daily behavior report cards, and home-school notes. (Jurbergs, Palcic & Kelley, 2007, 2010; Kelly & Carper, 1988). There is currently no one set definition, but there are common characteristics between all of these variations. These characteristics typically include (a) specification of a behavior(s), (b) at least daily rating of the occurrence of behavior(s), (c) sharing obtained information across individuals (e.g. parents, teachers, and students), and (d) using the card to monitor the effects of an intervention and/ or as a component of an intervention. Not having a firm definition allows flexibility for individual needs of students, parents, and situations. (Chafouleas, Riley-Tillman, & McDougal, 2002).

There are four types of feedback forms that fall within the daily report card category. The first one is the "Good Day Card." Students receive a signed and dated card to take home that says, "Your son/ daughter had a good day today." No additional information is provided and no cards are issued on the days that had less-than-satisfactory work and behavior. Another type of card is a comprehensive report. This includes a checklist where the teacher circles positive or negative outcomes, which is totaled at the bottom. The third method is a personal letter. Students are given a handwritten letter from the teacher summarizing the student's day. If a parent does not receive a letter, this is considered an unsatisfactory day. The last method is a telephone call. The teacher directly contacts the parents by phone (e. g. Trice, Parker, Furrow, & Iwata, 1983).

The card can be constructed so some type of a scale, point system, or assignment scores can be employed. Also, cards can look just like a note from the teacher to inform the parent. It is also suggested that there should be an area at the bottom of these notes for both teacher and parent comments.

One of the critical components when employing daily report cards is the determination and selection of consequences (Alberto & Troutman, 2012; Morgan & Jensen, 1988). The effectiveness with the reinforcement items varies child by child. The age of the child will also be helpful in the determination of a desired and/ or appropriate item to use as a possible reward. These consequences can be delivered daily, weekly, or when the target amount of points has been earned. The method of delivery should be chosen by both the parent and teacher to meet the individual needs of the child (Jurbergs et al., 2007). As Alberto and Troutman (2012) suggest, educators are strongly urged to know how to carry out a preference assessment to determine which items might function as a reward. A sample of those suggested by Morgan and Jenson (1988) and Yell, Meadows, Drasgow, and Shriner, (2009) can be found in figure 4.

Rewards can be assigned different values and the items could also be chosen from a bank dependent on the points earned. Immediate reinforcers include praise and point tallying at school. This pairs contingent praise and tangible reinforcement. Based on the age or developmental level of child, the complexity of the report card changes. This is a surface intervention, which means that it is easily learned and taught. It can be implemented across a wide array of environments without extensive behavior knowledge.

2 Advantages of Daily Report Cards

Advantages of using a daily report card include minimal effort in preparing the note, usually taking less than one minute, and this method does not require lengthy or costly training for the teacher. Frequent communication with the home about the student's progress is a benefit openly discussed by many parents (Strukoff, McLaughlin, & Bialozor, 1987). This is an effective method of changing academic behavior. Programs such as the daily report cards eliminate the necessity for drastic change in institutional policy/ procedures (Bornstein et. al.).

Daily report cards possess many appealing aspects, such as the flexibility of the program, and the dual purpose to monitor and serve as an intervention to increase home-school communication (Chafouleas et al., 2002). The use of daily report cards appear to be a valuable tool, appropriate for combination with other management techniques to positively influence classroom behavior (Dolliver, Lewis, McLaughlin, 1985). Daily report cards are feasible, acceptable, effective in promoting a positive student, effective in producing change across behaviors and population, and a way to increase parent/ teacher communication (Chafouleas et al., 2002).

Daily report cards can be used to provide feedback in three areas of school performance: schoolwork, homework, and classroom behavior. It can also be used on several different levels of complexity, ranging from simple rating scales to precise behavioral definitions. This package may also be adapted for individual learning and behavior problems, with specific behavioral definitions written for different children and altered as intervention proceeds (Dougherty & Dougherty, 1977).

The daily report card can be used for social behaviors that need to be eliminated or strengthened, as well as to monitor and track academic performance. The daily report card can be individually tailored to report about a particular behavior or academic area for each student. The teacher may have a target behavior for the class as a whole to reach; it could be a group contingency with individual consequences received at home (Kelly & Carper, 1988).

The use of a daily report card procedure has been known to produce sharp decreases in the number of rule violations and strong increases in the amount and accuracy of work completed (Kelley, Reitman, & Noell, 2003; Lahey, Gendrich, Gendrich, Schnelle, Gant, & McNees, 1977). Parent participation in behavioral interventions has been found effective across a variety of target behaviors (Witt, Hannafin & Martens, 1983). In cases where parent support is not forthcoming, home-based interventions are not likely to succeed.

The daily report card provides a link between parents and teachers. Since it is a home-based reinforcement system it is extremely practical for the classroom teacher to use. It is a very simple procedure that can be explained quickly to parents with minimal time and effort. If the teacher implements the daily report card system for each of his or her students, then that eliminates the need to provide rewards for each student, which could prove to be quite costly.

There have been studies emphasizing the acute relationship between home and school in that the home serves as the primary setting for delivery of a positive consequence. The child's home offers an

opportune setting to increase the number of potential contingencies and promote generalization of any school-based intervention (Chafouleas et al., 2002). A home component to behavioral intervention may relieve some of the burden on the teacher to be responsible for the entire treatment program (Chafouleas et al., 2002). A behavioral home-school intervention can benefit early-identified high-risk students without segregating them from their classmates (Blechman, Taylor, Schrader, 1981). Research results strongly suggest that the use of daily report cards by teachers represents a highly efficient method of indirect intervention with the behavior problems of children (Lahey et al., 1977).

The social validity of daily report cards is not available, however, daily report cards have been developed to include a positive consequence, and overall, parents have indicated their support for the use of these cards (Chafouleas et al., 2002). In 54 out of 55 instances of positive reports, the parent received the reports 98% of the time. In the instances of negative reports, only 10 (56%) were delivered (Trice et al., 1983). The percent of failing grades in one study decreased from 31% to 6% (Trice et al., 1983). The technique of classroom behavior modification work, but only if they are carried out correctly (Lahey et al., 1977), making daily report cards a better option for classroom management.

The daily report card could be faded into a weekly report card once the desired behavior has been strengthened or met. The fading process must be done gradually. The decrease continues after the report card is rated daily and only sent home at the end of the week (Chafouleas et al., 2002). Daily report cards have been used to reduce talk-outs, increase compliance, and improve academic performance across subject areas such as math, spelling, and handwriting.

A great deal of research has been carried out with children and adolescents with ADHD as to the efficacy of employing daily report cards (Barkley, 2006; Power, Mautone, Soffer, Clarke, Marshall, Sharman, J., & Jawad, 2012). Power et al., conducted a randomized clinical trial with students with ADHD and found that their intervention program, Family-School-Success (FSS), which employed a daily report card as a component of their program, had a positive effect on the family as well as on homework completion.

3 Cost Effectiveness

Daily report cards are the least costly and simplest form of feedback to employ in the classroom (Trice et al., 1983). Teachers respond favorably to the daily report card system (Davies et al., 1989). Extensive record keeping is not necessary for the teacher and time is saved by not needing to hand out tokens or points during class. Teacher involvement has been noted to use 10-15 minutes total to manage the entire general education class' report cards. However, less time may be used in a self-contained room and may be a great service for the teacher's aid to provide. For one student's report card, it has been said it will only take one minute for the teacher to complete. Therefore, they are cost effective because no outside materials are required and little time is involved.

4 Disadvantages of the Daily Report Card

The daily report card system relies on parental involvement. If the parent does not wish to become involved in the students education, the parent may refuse to cooperate with the teacher. An even more disturbing issue is the abusive parent who may punish or even beat a child who brought home a poor report card. If the teacher discovers this is the case, than arrange privately with the child to have the daily report card between the student and teacher. If a negative report card was sent home with a child who is at risk of abuse, some sort of monitoring of parental reactions will be necessary to ensure the

safety of the student (Dolliver et al., 1985; Lahey et al., 1977). This aspect deserves close monitoring and attention by school personnel.

Even in the case of good parents, a child may avoid bringing a poor report card home. Teachers may wish to have a parent signature included on the daily report card; however, this could potentially lead to student forgeries. In the initial implementation of the daily report card, teachers should explain to the parents that a report card will be coming home every day. Failure to bring the report card home on any particular day should result in a loss of privileges greater than the consequence for simply bringing home a poor report card.

5 Who Benefits from the Implementation of Daily Report Cards

Teacher, peer, and parent ratings, as well as student self-rating, revealed that the daily report card was viewed as an effective intervention technique (Kelley et al., 2003; Strukoff et al., 1987). The effects of a daily report card transcend that of the student who is using it. Not only is it likely that the target behavior will improve, but the results of this improvement will benefit all people around this student, especially if the target behavior is behavioral in nature. Teachers benefit from reduced stress in the classroom as a result of talk outs or other disruptive behavior that are improved by the report card. If a student performs well academically, teachers feel more competent in their role. The student's peers benefit from a lack of disruptive behavior, they are not annoyed, and they remain undistracted. The parents benefit as well. Poor academic performance and disruptive behavior are all high stressors on behavior. Parents may grow weary not knowing what to do to help their child. A simple reinforcement system such as the daily report card can empower the parent, as well as creating a friendlier home atmosphere.

6 Student Populations that Have Used Daily Report Cards Successfully

Within a general education setting, off-task behavior is exhibited more often by students with learning disabilities (Truesdell, 1990). When a daily report card system is in effect, this allows for the students to have a contingency that they work for and they try to excel in the classroom environment. Home-notes provide contingent feedback to students and parents regarding performance at or above the child's baseline mean (Blechman et al., 1981).

With daily report cards, parents are instructed to simply discuss the contents of the report card with their child and to provide positive social praise when the report was good, or discuss ways to improve a negative report (Burkwist, Mabee, McLaughlin, 1987). There have been suggestions that the daily report card could be used for behaviors that should be shaped gradually rather than reduced in a few sessions (Burkwist et al., 1987).

When the traditional school disciplinary and incentive programs have failed, daily report cards are a productive procedure for both elementary school and secondary school students (Trice et al., 1983). This program regularly monitors the students' behaviors and progress. In order for a classroom intervention to be successful and used consecutively, it must be efficient in terms of time and person resources, and it must be effective in modifying classroom behavior. Daily report cards have proven useful for controlling a wide variety of students across a wide array of situations and require less effort than other contingency models (Witt et al., 1983).

Research suggests that daily report cards are a successful intervention in a variety of age groups and disability designations. McLaughlin, Williams & Howard, 1998 urge that daily report cards be implemented with students who show behavioral characteristics of prenatal exposure to drugs. They

concluded that the daily report card shows positive results, with tangible reinforcers being more effective with most children than contingent praise.

Junior high school students who are struggling academically have shown positive results following the implementation of daily report cards. Students could earn points not only by completing assignments correctly, but also by demonstrating proper study and social skills such as promptly asking for help if necessary, speaking courteously to the teacher, bringing proper materials and coming to class on time (Martin & McLaughlin, 1981). The appropriate working habits learned in this study may generalize to other subjects and benefit students in future school and even vocational pursuits.

The implementation of daily report cards in a regular-education fourth grade classroom with all of the students has been shown to improve their academic work completion as well as reduce the amount of talk-outs during class. (Dougherty & Dougherty, 1977; Witt et al., 1983). Daily report cards have been used in classes with students who are above average intelligence but who show difficulty in completing assignments (Drew, Evans, Bostow, Geiger, & Drash, 1982). Other studies explored the effectiveness of the daily report card on learning disabled and or inconstant performers in upper elementary school (Blechman, et al., 1987). Several studies have been shown using daily report cards in a simplified version in a primary school resource room (Davies, Williams, & McLaughlin, 1989). The inappropriate and disruptive behavior of kindergarten boys decreased after the daily report card system was implemented (Lahey et al., 1977; Strukoff et al., 1987).

The daily report card has even been implemented with adult men serving time in prison as convicted felons who display severe behaviors such as abusive language, poor hygiene, refusal to comply with verbal or written commands by the prison personnel, or damaging or destroying personal property (Bornstein et al., 1980). There was an increase in appropriate inmate behavior with the daily report card program. High school students with severe misconduct have demonstrated improvement following a daily report card program (Trice et al., 1983). The daily report card has been shown to be effective across a wide range of ages and school settings.

7 Areas for Future Research

There is little data that explains whether the daily report card without formal home-based contingencies can actually alter behavior. The amount of parent contact and involvement that is needed to achieve behavioral change requires more exploration (Strukoff et al., 1987). However, recently Jurbergs, Palcic, & Kelly (2010) compared the effectiveness of daily report cards with low income minority students with parents who were involved with their children and those who were not. They found that daily report cards improved student performance in both arrangements. However, the effectiveness of the daily report card was greater when parents were involved in this process.
Little research has been carried out regarding the effects of daily report cards for persons with developmental disabilities or for children with autism. The only research published in the peer-reviewed literature involved adults with autism in a vocational work setting (Smith & Colemen, 1986). With the recent increases in the incidence of autism (B. Williams & R. Williams, 2011), research on the use of daily report cards with such children and youth needs to occur. The daily report card is a delayed reinforcement procedure, and frequently these students respond best to immediate reinforcement. However, the daily report card could potentially be a valuable tool in a fading procedure to thin out the use of rewards or consequences in a classroom token economy or some other contingency management procedure. Finally, a comparison of detailed versus simple report cards could be carried out. In this way, the amount and type of information that needs to be on a daily report card can be empirically determined.

8 Conclusions and Recommendations

Everybody benefits from a daily report card. In addition to increased awareness and involvement of the parent in their offspring's education, parent-child contact seems to be a positive side effect of implementation of the system. Use of this system also provides a sense of consistency between the school environment and the home. The use of a daily report card in the classroom can improve performance both academically as well as behaviorally.

Studies have shown that both behavior and academic performances can be affected positively with the use of daily report cards (Witt et al., 1983). Behavior and academic performance are highly related, i.e., changes in one dimension are likely to be characterized by corresponding changes in the other dimension. Academic interventions are likely to affect both academic performance and behavior of target subjects by systematically reducing the time allotted for negative behavior (Witt et al., 1983).
Classroom problems such as disruptive behavior and failure to complete assigned work traditionally are difficult problems for teachers to control. Reinforcement procedures such as token economies and point systems with privilege and item exchange have, in many cases, provided an answer to such problems. However, such techniques are frequently time consuming, and, therefore, not economical for the classroom teacher (Drew et al., 1982). Daily report cards provide a cost effective and extremely efficient system that not only improves classroom behavior, but helps improve academic work as well. This is a researched based teaching technique that should be utilized in both the special education and general education classroom

Sample Daily Report Card for Use at the Middle or High School Level

Student's Name : _____

Grade : _____ (Date) _____

To Teacher : Please evaluate this student in the areas stated during your class. Use appropriate words such as:

Poor Fair Good Outstanding

To the Student : This form is to be presented to each of your teachers at the beginning of class and is to be picked up at the end of the class. The completed form is to be returned to:

(name of counselor/ teacher/ administrator)

Behavioral Criteria:
a = On time for class
b = Brought materials to class
c = Completed homework
d = Conduct in Class
e = Other (Specify)

Teacher's Signature for each class period:

(Place a "+" in spaces of behaviors demonstrated in your class)

	a	b	c	d	e	comments
1.						
2.						
3.						
4. Lunch						
5.						
6.						

Parent Signature : _____ Comments : _____

Figure 1: Sample Daily Report Card for Middle or High School

Weekly Goal Card Intermediate Grades

Child's Name :
Teacher :
Grade : School : Home Room :
Week of :

Figure 2: Sample of a Daily Report Card

Child's Name :
Teacher :
Grade : School : Home Room :
Week of :

GOAL CARD	MON	TUE	WED	THU	FRI
1. Paid attention in class					
2. Completed work in class					
3. Completed homework					
4. Was well behaved					
5. Desk & notebook neat					
Totals					
Teacher's Initials					

Rating Scale

N/A = Not applicable

0 = Losing, Forgetting or Destroying Card

CHECK SCALE TO BE USED

1 = Very Poor
2 = Poor
3 = Fair
4 = Good
5 = Excellent

1 = Poor
2 = Better
3 = Good

Try For _____ Points

Figure 3: Sample of a Daily Report Card

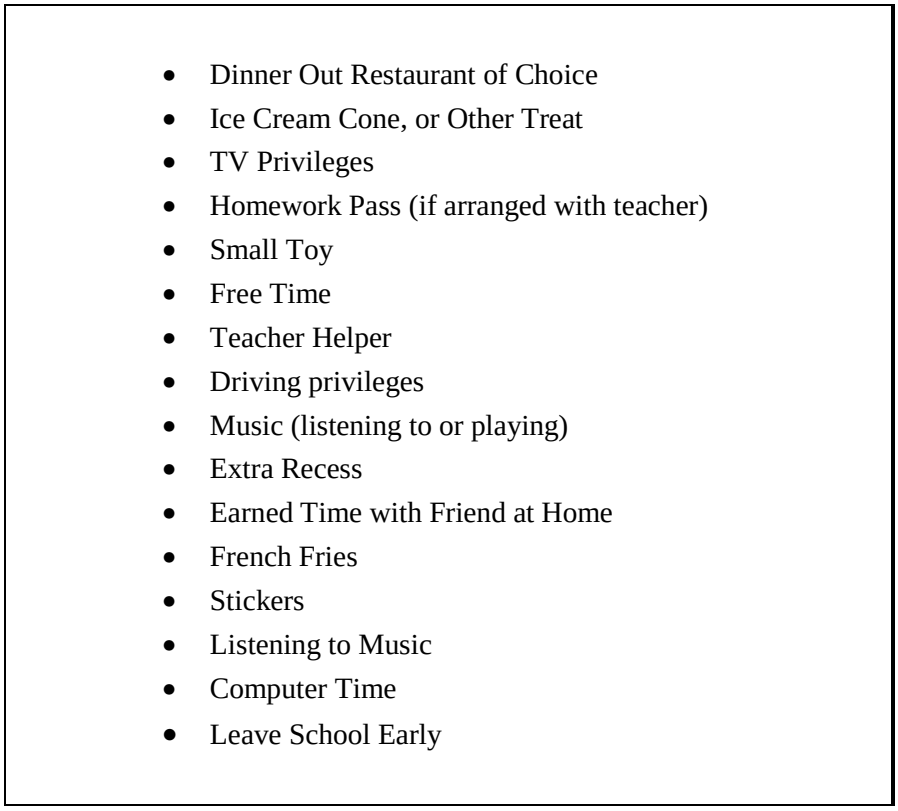

Figure 4: An example of sample rewards to be used with daily report cards

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Comparing Developed Runoff Coefficients for Some Selected Soils of Gidan Kwano with Exiting Values

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Abstract *– An analysis of the rainfall-runoff relationship and subsequently an assessment of relevant runoff coefficients should best be based on actual, simultaneous measurements of both rainfall and runoff in the project area. Models that describe watershed hydrology are classified according to several criteria. A non-pressure rainfall simulator with a dimension of 22.9m by 2m and adjustable feet with minimum height of 1.5m was used for the research. The five runoff plots were set up to measure surface runoff for the five types of soil under controlled conditions. The plot was established directly in the project area with a slope size of 9%. The various types of soil were determined and excavated where necessary at 20cm depth and replaced with the current type of soil existing within the runoff plots. Based on the available parameters, three runoff equations were considered. The calculated values using the rational formula ranged between 0.01 and 0.026; FAA values ranged between -0.162 and -1.321 while for that of Izzard method, the values ranged between 0.212 and 0.458. It was concluded that if the slope of 6% is maintained the values of runoff coefficient will be the same as those that are in existence.*

Key Words *– Runoff, soil, time of concentration, travel time, lag time, water*

1 Introduction

Surface runoff is part of rainfall which after compensation of evaporation, abstraction, surface detention and infiltration flows over land and concentrates in stream network and finally discharges from the through the main river (Vahabi and Ghafouri, 2009). The transformation of rainfall into runoff over a catchment is a complex hydrological phenomenon, as this process is highly nonlinear, time-varying and spatially distributed (Zakarmoshfegh, *et al.*, 2008). A number of models have been developed to simulate this process. Depending on the complexities involved, these models are categorized as empirical, black-box, conceptual or physically-based distributed models (Rajurkar *et al.*, 2002; Singh, 1997: Darbandi, *et al.*, 2008; Verbist, *et al.*, 2010). Vegetation, especially in the case of forests, plays an important role in regulating runoff, as it reduces dramatically surface water volume, runoff velocity and peak discharge (Chifflard *et al.*, 2009). Many studies showed that the

variation in runoff is attributed to the vegetation cover and land use management changes. Removal of forest coverage causes important changes in the hydrological balance of a watershed, although the magnitude of the response is highly variable and unpredictable (Shi *et al.*, 2007). Increased forest coverage, replacing pasture areas, can trigger a reduction of annual flow of up to 40% (Zhang *et. al.*, 2009).

The proportion of total rainfall that becomes runoff during a storm event represents the runoff coefficient. In the classical 'rational method' it is considered to be a constant, depending on characteristics of the drainage basin, such as surface cover.

Determination of runoff coefficient is dependent on some parameters such as soil infiltrability, rainfall intensity, slope, antecedent moisture conditions, land use, and soil texture (Sivakumar, *et al.,* 2001). Having the runoff coefficient over different soil types and condition and considering the effective parameters enables users to design various structures within and outside the farm. Most drainage systems concepts need to be addressed properly in order to maintain their efficiency (Abustan, *et al.,* 2008).

The rational method is one of the earliest and best known techniques for estimating peak flows for small watersheds. Despite its age and considerable criticism about its adequacy, it is still widely used for estimating peak flows of small rural watersheds and for urban drainage design throughout the world. Application of the rational method requires estimates of time of concentration (T_c) and runoff coefficient (*C*). In practice, designers always have to use a formula for estimating time of concentration. Numerous empirical formulae for time of concentration have been developed (Sikka and Selvi, 2005).

The primary objective of this study is to develop runoff coefficient for some selected soils in Gidan Kwano area of the Federal University of Technology, Minna, Nigeria and to compare the obtained values with existing values of the coefficient.

2 Materials and Methods

2.1 Study Area

Simulated rainfall studies were conducted on the permanent site farm of the Federal University of Technology, Minna, Gidan Kwano which is known to have a total land mass of eighteen thousand nine hundred hectares (18,900 ha). Located along kilometer 10 Minna – Bida Road, South – East of Minna in Bosso Local Government Area of Niger State. It has a horse – shoe shaped stretch of land, lying approximately on longitude of 06^0 28' E and latitude of 09^0 35' N. The site is bounded Northwards by the Western rail line from Lagos to the northern part of the country and the eastern side by the Minna – Bida Road and to the North – West by the Dagga hill and river Dagga. The entire site is drained by rivers Gwakodna, Weminate, Grambuku, Legbedna, Tofa and their tributaries. They are all seasonal rivers and the commonest among them is the river Dagga. The most prominent of the features are river Dagga, Garatu Hill and Dan Zaria dam (Musa, 2003). Figure 1 shows the extracted map of Minna form that of Niger State and Nigeria while Figure 2 shows the map of the permanent site of the Federal University of Technology, Minna, Nigeria.

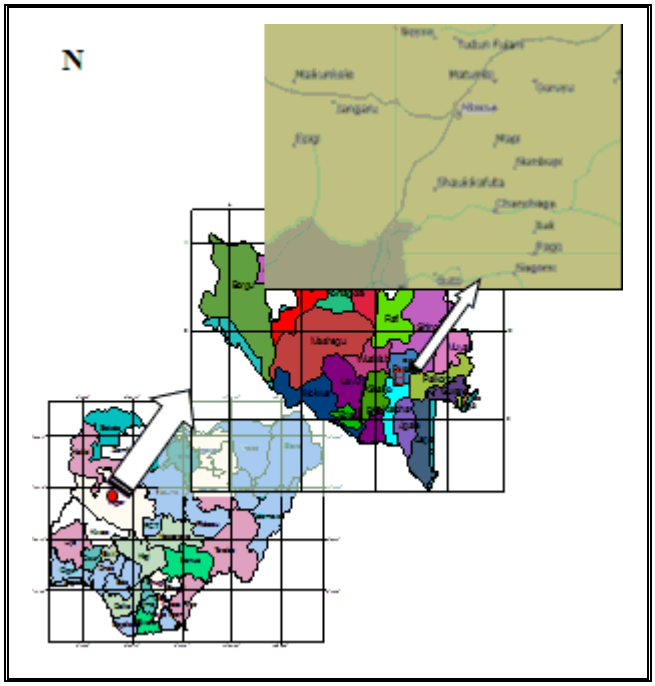

Fig. 1: Extracted map of Minna from Niger State, Nigeria

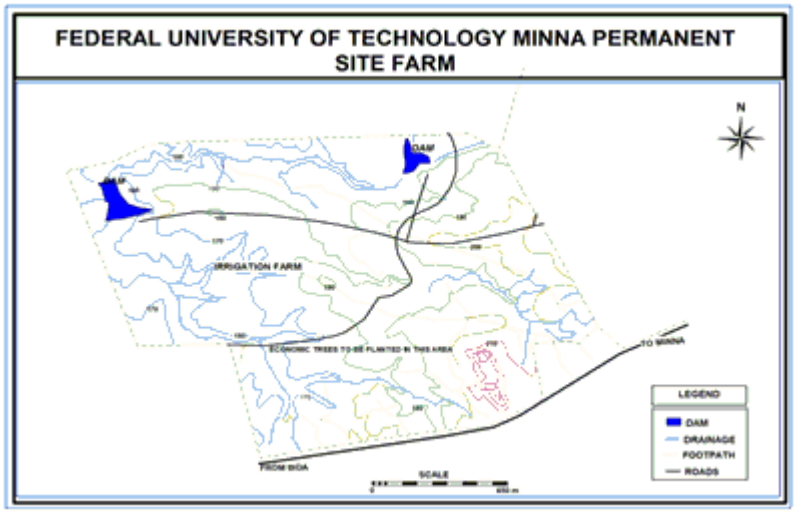

Fig 2: Map of the permanent site farm of the Federal University of Technology, Minna

The major soil found in this area is the sandy loam type with a sparse distinction of the sandy–clay soil and sandy soils. This has so far encouraged the residents of Minna metropolis and neighbouring villager to use the land for agricultural activities such as farming and grazing by the nomadic cattle rearers (Musa, 2003). Figure 3 here shows the soil distribution map of the Permanent site irrigation farm of the Federal University of Technology, Minna.

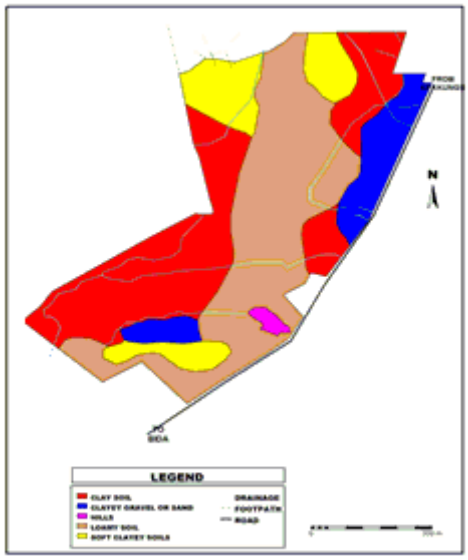

Fig. 3: Soil map of a section of the Federal university of Technology, Minna

A non-pressure rainfall simulator with a dimension of 22.9m by 2m and adjustable feet with minimum height of 1.5m was used for the research. The five runoff plots were set up to measure surface runoff for the five types of soil under controlled conditions. The plot was established directly in the project area with a slope size of 9%. The various types of soil were determined and excavated where necessary at 20cm depth and replaced with the current type of soil existing within the runoff plots. The soils were then ramped to the initial bulk density measured in the field.

Care was taken to avoid study areas with special problems such as farmlands, rills, cracks, or gullies crossing the plot. These would drastically affect the results and will not be a representative for the soil types of the whole area. During construction of the plots, the initial soil cover was removed to a depth of 20cm and replaced with fresh soils of which the studies was to be conducted; care was taken to allow the nature conditions to be in existence that is even after replacing the top soils some time lag was allowed for the soil to fit into the environment. Grasses were allowed to grow on all the plots to create an undisturbed nature of the various soils under consideration while for the disturbed soils, every form of shrubs that must have grown on the various plots are removed and the plot completely cleared of grasses. It is important to note that every effort was made to use the same operations as would normally be used on the farm by the local farmers to have an identical condition of disturbed soil. Several runs of the experiments in the study area were performed which would permit comparison of the measured runoff volumes and to judge on the representative character of the selected plot sites.

Around the edges of the plots, wooden planks were driven into the soil with at least 15 cm of height above ground to stop water flowing from outside into the plot and vice versa. The box was sealed by compacting soil all around it to ensure that only soil and water from the plot could enter into the collecting tank and sampled. A rain gauge was installed near to the plot in areas where there are no obstructions. At the lower end of the plot, a collecting sprout was provided to collect the runoff. The sprout had a gradient of 1% towards the collection tank. The soil around the sprout was backfilled and compacted. The joint between the sprout and the lower side of the plot was cemented to form an apron in order to allow a smooth flow of water from the plot into the collecting tank. The collection tank was

made up of plastic tank of 0.25m3capacity which was buried inside the earth at the lower end of the study area.

In determining runoff coefficients for the five types of soils in the study area, three runoff equations were considered based on the available parameters that were determined on the various plots. Table 1 presents the various types of equation considered for the determination of the various runoff coefficients for the types of soils considered during the study period.

Table 1: Various equations considered for the estimate of runoff coefficient

No	Name of equation considered	Equation	Source of equation
1	Rational	$Q = 0.00278CIA$	Eliasson,1996
2	Federal Aviation Administration	$T_c = \frac{1.8(1.1 - C)L^{0.5}}{S^{0.33}}$	Abbott and Refsgarrd, 1996
3	Izzard	$C = \left(\frac{T_c i^{0.67} S^{0.33}}{4iL^{0.33}}\right) - 0.0007i$	Fang et. al., 2008

3 Results and Discussion

3.1 Determining runoff coefficient

It is important to note that the physical conditions of a catchment area are not homogenous even at the micro level there are a variety of different slopes, soil types, vegetation covers etc. Though in this study, a standard slope size of 9% was chosen and other physical conditions that exist in the natural environment were replicated as much as possible but each plot had its own runoff response and responded differently to the simulated rainfall events. A total of five runoff plots were analysed for the Gidan Kwano soils of the Federal University of Technology, Minna. There is a large variability in the runoff coefficient determined on the various soils of Gidan Kwano. Table 2 presents the various values of runoff coefficient calculated for the Gidan Kwano soils in comparison with the natural exciting values of slopes ranging between 0 and 6% while Table 3 shows the various values of runoff coefficient calculated for the same study area.

Table 2 here shows that the calculated values of runoff coefficient for slopes of 9%. It was observed that the calculated values using the rational formula ranged between 0.01 and 0.026. The FAA values ranged between -0.162 and -1.321 which is a strong indication for all the soils studied at Gidan Kwano area of the Federal University of Technology Minna no surface runoff was observed while for that of Izzard method, the values ranged between 0.212 and 0.458.Using the existing natural maximum slope value of 6%; it was observed from Table 3 that rational formula had values ranging between 0.010 and 0.026; FAA values ranging between -0.226 and 0.661 while that of Izzard ranged between 0.00 and 0.37. This implies that the undisturbed sandy loam and disturbed clay soil did not experience any form of surface runoff. The Izzard calculated coefficients showed a closer range of values when compared with the existing values of runoff coefficient. The calculated values for Izzard formula ranged between 0.163 and 0.362. In determining these values, it was observed that the results of the rational formula for both the 6 and 9 per cent slope were the same as it did not consider the effect of slopes in the determination of the runoff coefficients. Therefore rational formula is not a better equation for calculating runoff coefficients.

Table 2: Calculated values of Runoff Coefficients (*C*) some selected soil conditions in Gidan Kwano area of Niger state using a slope of 9% and a standard plot length of 22.9 m

No	Type of soil	Soil Condition	Rational	FAA	Izzard
1	Sandy	Undisturbed (Vegetal)	0.014	-1.321	0.452
		Disturbed (Bare)	0.010	-1.252	0.438
2	Sandy Loam	Undisturbed (Vegetal)	0.021	-0.655	0.314
		Disturbed (Bare)	0.017	-0.979	0.381
3	Clay	Undisturbed (Vegetal)	0.026	-0.162	0.212
		Disturbed (Bare)	0.024	-0.345	0.250
4	Loam	Undisturbed (Vegetal)	0.025	-1.321	0.452
		Disturbed (Bare)	0.020	-1.252	0.438
5	Sandy Clay	Undisturbed (Vegetal)	0.023	-0.655	0.314
		Disturbed (Bare)	0.021	-0.979	0.381

Table 3: Calculated *C* values for the various types and condition of soils in Gidan Kwano area of the Federal University of Technology, Minna under existing natural slope.

No	Type of soil	Soil Condition	Rational	FAA	Izzard
1	Sandy	Undisturbed (Vegetal)	0.014	-0.226	0.362
		Disturbed (Bare)	0.010	0.084	0.320
2	Sandy Loam	Undisturbed (Vegetal)	0.021	0.056	0.257
		Disturbed (Bare)	0.017	0.109	0.288
3	Clay	Undisturbed (Vegetal)	0.026	0.428	0.163
		Disturbed (Bare)	0.024	0.331	0.194
4	Loam	Undisturbed (Vegetal)	0.025	0.272	0.303
		Disturbed (Bare)	0.020	0.452	0.269
5	Sandy Clay	Undisturbed (Vegetal)	0.023	0.661	0.181
		Disturbed (Bare)	0.021	0.554	0.228

The difference observed between the values in Tables 2 and 3 is attributed to the difference in the slope gradient of the experimental plots. Despite this, some of the soils showed a good correlation between calculated values and the observed values of the runoff coefficient. Though the FAA determined runoff coefficient showed negative results for all the soils in Table 2 while only the undisturbed sandy soil gave a negative result in Table 3 for soils studied at Gidan Kwano area of Federal University of Technology, Minna which implies that no runoff occurred on the various soils

within the study area. Some of the calculated values for FAA in Table 2 showed a close correlation to the existing values of *C*. The izzard calculated values in Table 3 were higher than the already existing values which can be because of the slope gradient difference but when 6% slope gradient was used to determine the runoff coefficient values for the soils considered, they were found to be very close to those values which had already being determined as seen in Table 4.

Considering the runoff coefficient "*C*" values of the maximum slopes for the already existing *C* in comparison with the calculated values of those obtained from Izzard equation, it was observed that the values of Izzard were higher than that the observed or existing values of *C* which can be as a result of the differences in the slope and the condition of the soil of Gidan Kwano area of the Federal University of Technology, Minna. The calculated values of *C* using the rational method or equation showed a slight correlation with the observed data from the existing values of *C* though the existing values of *C* were found to be higher than those of the calculated value. This may be as a result of the antecedent moisture content of the various soils and the slope of the study area.

Yadav *et al.*, (2007) observed that using too many properties simultaneously often results in a rejection of all models which was also experienced during the course of this study. Thus the antecedent moisture content of the any soil under consideration for the calculation or determination of *C* is of paramount importance. Although the study area considered here is comparatively small with a slope of 9% but when the natural slope of the study area which ranges between 2% and 6% is applied the various equation, it was observed that the results obtained from the calculation were very close to that of already existing values *C*. Table 4.16 shows the calculated *C* values for the various types and condition of soils in Gidan Kwano area of the Federal University of Technology, Minna.

Table 4: Existing values of *C* for some types of soil condition

	Sandy			Sandy loam			Loam			Clay		
Land Use	0-2%	2-6%	6%	0-2%	2-6%	6%	0-2%	2-6%	6%	0-2%	2-6%	6%
Cultivated Land	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
	0.14	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Forest Land	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25

4 Conclusion

In the present study, the objective is to develop runoff coefficient for some selected soils in Gidan Kwano area of the Federal University of Technology, Minna, Nigeria and to compare the obtained values with existing values of the coefficient. In a small agricultural and guinea savannah woodland of the study area, the developed empirical runoff coefficients using the developed empirical mathematical model of time of concentration, various values obtained for the various types of soils within the Gidan Kwano area of the Federal University of Technology, Minna can be applied to other soils with similar characteristics in Nigeria as the difference observed between the determined values and the existing values of the runoff

coefficients were very close. The difference observed as pointed out could be attributed to the difference in the slope gradient of the study area. It can therefore be concluded that if the slope of 6% is maintained the values of runoff coefficient will be the same as those that are in existence.

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Optical, Electrical and Thermal Properties of Jute and Glass Fiber Reinforced LDPE Composites

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Abstract *– Jute and glass fiber reinforced low density polyethylene (LDPE) composites were prepared using compression molding technique at 120° C with various percentage of fiber content. Thermal, optical and electrical properties of both composites were studied in this article. Thermal analysis of the composites confirmed the better thermal stability of glass fiber LDPE composites than that of the jute composite. Superposition of the absorption of LDPE and glass fiber in the composites has been confirmed by the peak and line shape of absorptions. The absorption peaks also indicates a better conjugation between the elements of composites. Electrical studies suggest that for both composite capacitance decreases with increase in frequency and voltage, which suggests good electrical properties of LDPE based composites.*

Key Words *– Fiber content, thermal stability, absorption peak, electrical properties, composites*

1 Introduction

Even though there are lots of conventional materials such as metal alloys, ceramics, and polymeric materials that are widely used in various branches of modern technology, however, researches on the development of new materials have never been stopped. Now a day, many of our modern technologies require materials with unusual combinations of properties that cannot be meet by conventional materials. In this perspective it can mentioned that aircraft engineers are searching for development of new structural materials with low densities, abrasion, high mechanical stability, and impact resistant that are not easily corroded.

It is known that stronger materials are denser, and denser materials have a low impact strength [1-2]. Generally, composites are comprised of types of materials reinforcing material in the form of fibers, sheets, or particles, and another material know as matrix phase. Fibers are embedded in the matrix phase. These materials can be metal, ceramic, or polymer. However, reinforcing materials are stronger with low densities while the matrix is usually a tough or ductile material. Well fabricated composites combine the strength of the reinforcement with the toughness of the matrix in order to achieve

desirable properties that are not available in a single component of the composite. Composite materials have a large spectrum of uses in the brake-shoes, pads, tires and the diesel piston aircraft [3]. In the recent few years, there has been a growing up interests for natural fibers as a substitute for glass, motivated by potential advantages of weight saving, lowers raw materials price, and ecological or thermal recycling advantages of using resource, which are renewable. Most common concerns about the use of these fibers are their coupling with a polymeric matrix, which need to be compatible with the cellulose contained in the fiber [4].

Among the reinforcement materials, glass fibers are popular candidates owing to their improved physical and mechanical properties, good corrosion resistance, insulation and sound absorption properties. Glass fibers are widely used as mats, insulator, reinforcement, sound absorption, heat resistant fabrics, corrosion resistant fabrics and high strength fabrics [5-6]. In Ref. [7], quite a few numbers of practical applications of natural fiber reinforced composites reported. Among existing natural fibers, jute has been used over a large scale around the world which is inexpensive and abundant. Jute fibers can be used as reinforcement in thermoplastics e.g., polyethylene, polyvinyl chloride and polypropylene and thermosets like unsaturated polyester and epoxy resin [8]. Jute fibers are susceptible toward moisture absorption from the surroundings. Jute fibers are renewable, non-abrasive, versatile, biodegradable, and compatible [9]. Socioeconomic benefits of using the natural fibers have been reported in ref. [10]. Properties of polyethylene can be modified and improved remarkably by using additives [11]. In the present investigation, we discuss thermal, optical and electrical properties of jute and glass fiber reinforced composites with increase in fiber percentage. Frequency and voltage dependent electrical capacitance of jute and glass composites also have been presented in details.

2 Experimental Details

Paul-Otto (P/O) Weber Press machine has been used to prepare the jute composites with different weight percent of fibers 0, 34, 44, 55 and 65%. Each layer of LDPE was Pre-impregnated LDPE layer were placed one by one with jute fibers as a sandwich-making system. So made sandwiches were placed between two molds. Thermal treatment over the sandwiches (at 120^0 C for 20 minutes) were followed by pressure in a single stoke. This has been accomplished by placing the molds between two steel plates of 450 KN Weber-press. Later on, the system was allowed to cool by water through the outer area of the heating plates of the P/O Weber machine. Composites of jute fiber reinforced low density polyethylene (LDPE) matrix were prepared by compression molding at 120^0 C and 100 KN pressure. Following the similar procedure, glass fiber reinforced LDPE composites were made by compression molding at 120° C and 100KN. Thermal properties of the samples were monitored by a coupled Differential Thermal Analyzer (DTA) and Thermo Gravimetric Analyzer (TGA). Composites were taken using a computer controlled to an EXSTAR 6000 STATION, Seiko Instrument Inc. Japan. The TGA/DTA module uses a horizontal system balance machine. The specifications of the instruments were: heating rate: 0.1 K/min. to 100.00 K/min, TGA measuring range: ±200 mg (0.2µg), DTA measuring range: ± 100µV (0.06 µV), Gas flow: $\leq$ 1000m/min. For UV-Visible measurements, LDPE and LDPE based composites were obtained in absorption mode with a Shimadzu UV-160A Spectrometer (Shimadzu Corporation, Tokyo, Japan) in the wavelength 200-1100 nm at room temperature. Optical properties were measured in the above wavelength range for different wt% of LDPE based composites. For electrical studies, samples were cut into very small pieces by a scissors. The length of the fibers was 10 mm and thickness was 0.5080-0.6858 mm. Capacitance of the samples was measured at different voltage and frequency with the help of LCR meter.

3 Results and Discussion

The Ultraviolet-Visible absorption spectra for LDPE jute and glass composites have been recorded at room temperature are presented in Figs. 1 and 2 respectively. The absorption spectrum of LDPE shows a number of absorption bands corresponding to structural groups within the molecule. In the absence of fiber (for pure LDPE), the absorption starts decreasing linearly however, with introduction of fiber to the jute composites the absorption initially increases with the increase in wavelength up to 240 nm and continuously decreases. The peak and line shape of absorptions indicates the superposition of the absorption of LDPE and jute in the composites. The absorbance peak around 320 nm indicates a better conjugation between the elements of composites. In the case of glass composites, for pure LDPE, the absorption decreases linearly with the increase in wavelength but with inclusion of LDPE glass composites the absorption gets increased with wavelength but after 250nm it shows a decreasing trend. The peak and line shape of absorption might be taking place due to the superposition of the absorption of LDPE and glass fiber in the composites. For glass composites, absorption peak around 220 nm shows a better conjugation between the elements of composites.

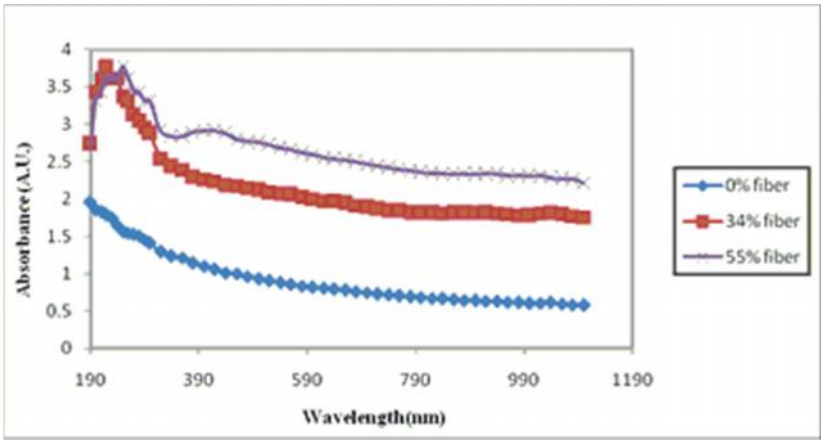

Fig.1: Effect of variation of absorbance with wavelength for LDPE jute composites

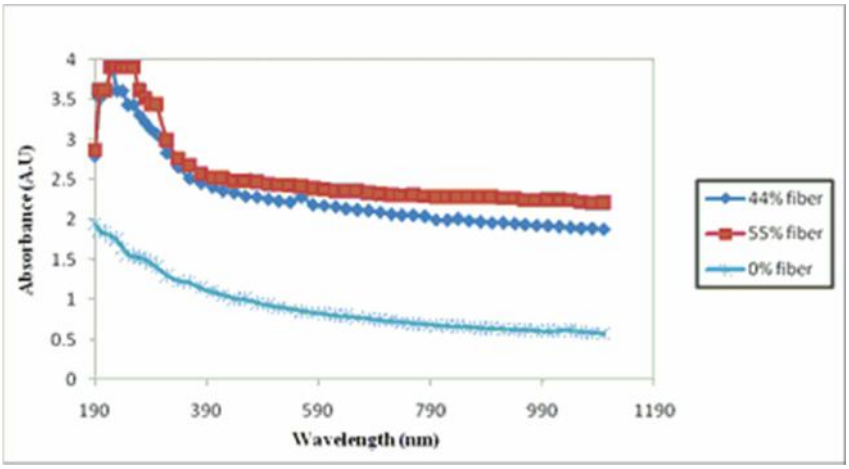

Fig.2: Effect of variation of absorbance with wavelength for LDPE glass composites

Figs. 3 and 4 show the variation of electrical capacitance of LDPE jute and glass composites for various wt% of fiber (0-65 wt%) respectively with frequency. The measurements were done in the frequency range from 100 Hz to 100 KHz at room temperature. For both samples, all the compositions (with and without fiber) have higher capacitance in the low frequency side. Figures also show that the capacitance decreases slowly with the increase in frequency up to 10 KHz then it remains nearly constant. This is because, at higher frequencies, the interfacial polarization is less sensitive to rapidly changing electric field. This leads to a decrease or steady value in capacitance. According to the data, it has been also observed that the electrical capacitance of both samples increases with the introduction of fiber percentage to the pure samples. Thus, significant improvements of the electrical capacitance have been noticed with the fiber addition on both samples.

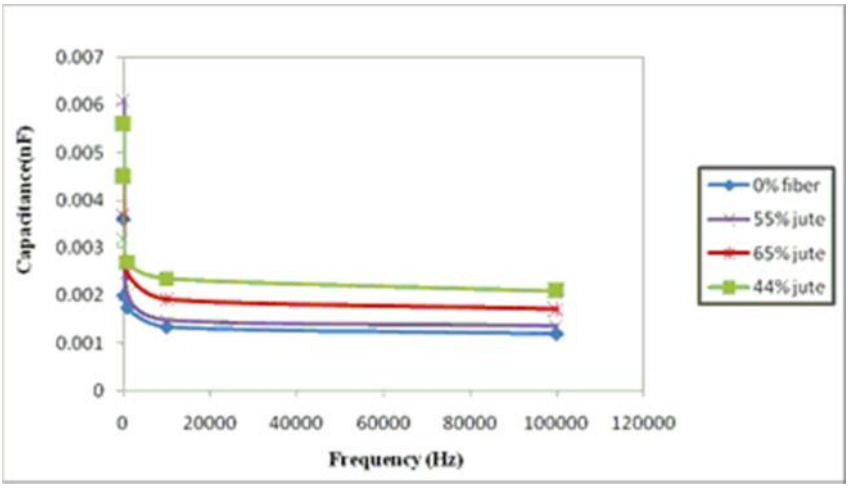

Fig.3: Effect of frequency of LDPE jute (0-65 wt %) composites on capacitance

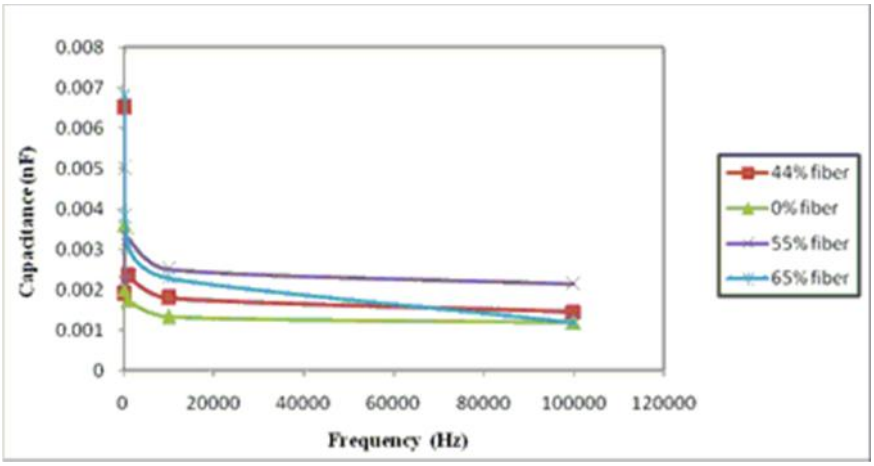

Fig.4: Effect of frequency of LDPE glass (0-65 wt %) composites on capacitance

Effect of voltage on the electrical capacitance of jute and LDPE glass fiber for different wt% of fiber content have been presented in Figs. 5 and 6 respectively. Data presented in these figures show that

capacitance of both samples increases with the increase in fiber content. At the same time, it has been also recorded that glass fibers are better capacitor than that of jute composites. These Figs. also show that the capacitance shows a slight increase with the increase in voltage up to 50mV. Above 50mV, capacitance becomes invariant with further enhance of the applied voltage for all the samples. Therefore, jute and glass composites show a good level of charge storage capability.

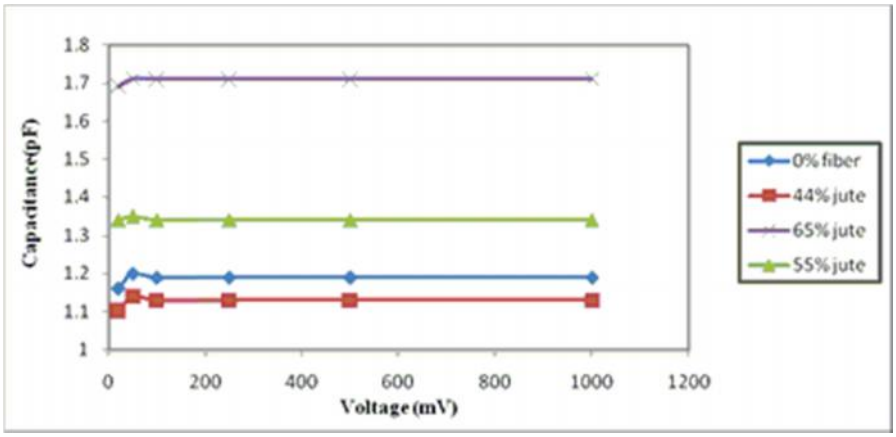

Fig.5: Effect of voltage of LDPE jute (0-65 wt %) composites on capacitance

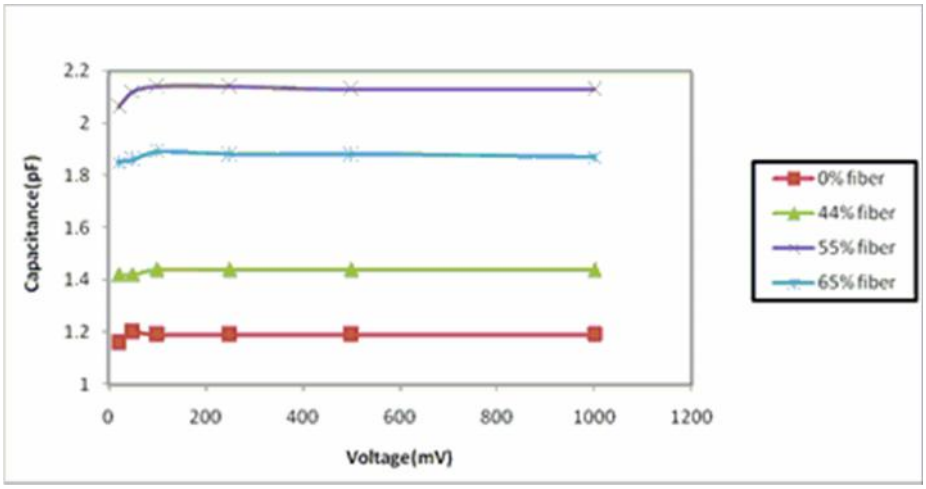

Fig.6: Effect of voltage of LDPE glass (0-65 wt %) composites on capacitance

Figs. 3 and 4 show the variation of electrical capacitance of LDPE jute and glass composites for various wt% of fiber (0-65 wt%) respectively with frequency. The measurements were done in the frequency range from 100 Hz to 100 KHz at room temperature. For both samples, all the compositions (with and without fiber) have higher capacitance in the low frequency side. Figures also show that the capacitance decreases slowly with the increase in frequency up to 10 KHz then it remains nearly constant. This is because, at higher frequencies, the interfacial polarization is less sensitive to rapidly changing electric field. This leads to a decrease or steady value in capacitance. According to the data, it has been also observed that the electrical capacitance of both samples increases with the introduction

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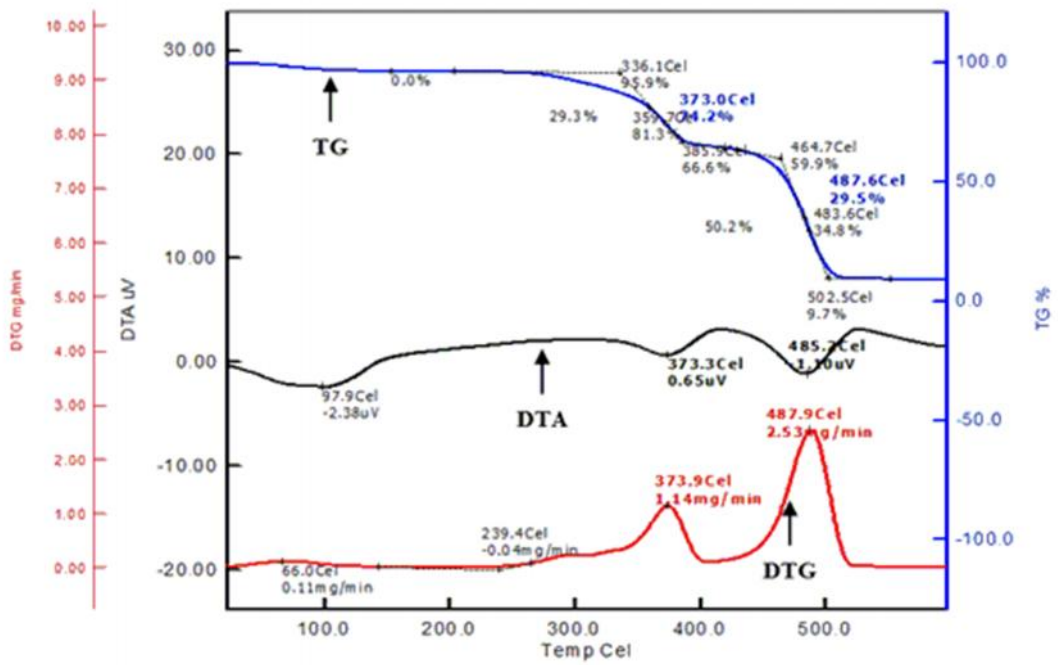

Fig.7: TG, DTA and DTG of LDPE jute composites

Fig. 7 shows the thermo gravimetric (TG), differential thermal analysis (DTA) and differential thermogravimetric (DTG) analysis for LDPE jute fiber composites. The top curve shows the TG, bottom one is for DTG and middle one is the DTA curves for the jute composites. According to the TG analysis it is observed that the major degradation occurs at two steps for the LDPE jute composites: first one is related to fiber degradation while the second one is due to polymer degradation. DTA study shows that the onset temperature, 50% degradation temperature and maximum slope are at 373.0° C and 487.6° C respectively.

The total degradation loss has been observed to be 50.2%. DTA curve shows the three endothermic peaks at 97.9° C, 373.3° C and 485.2° C which are due to removal of moisture and thermal degradation respectively. DTG curve also reveals that there are three peaks at three temperatures 66.0° C, 373.9° C and 487.9° C. DTG curve of jute composites depicts two predominant peaks at 373.9°C and 487.9°C where maximum degradation rate is 1.14mg/min and 2.53mg/min respectively which correspond to lighter and heavier materials.

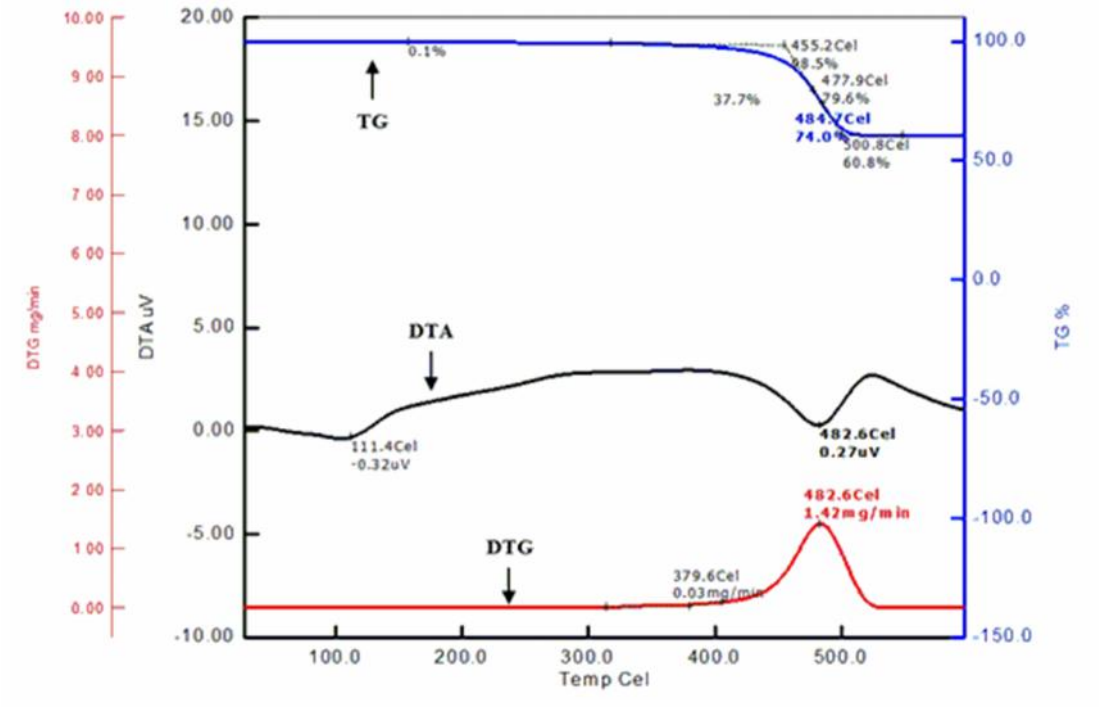

Fig.8: TG, DTA, and DTG of LDPE glass composites

Fig. 8 shows the TG, DTA and DTG curves for LDPE glass composites. The top curve shows the TG, middle one is the DTA while the bottom one is the DTG analysis for glass composites. From Fig. 8 it is seen that the TG curve shows the initial loss 0.1%, which is due to moisture content. TG analysis show that the onset temperature, 50% degradation temperature of glass composites occurs at 455.2° C and 477.9° C respectively. The total degradation loss recorded was 37.7% while the remaining 62.3% is the residue. Differential thermal analysis (DTA) shows two endothermic peaks at 111.4° C and 482.6° C. First peak is due to the fiber degradation and the second one is related to polymer degradation. The DTG analysis shows the maximum degradation rate was at 482.6° C with the rate of 1.42mg/min. The maximum slope of TG (at 484.7° C), second peak of DTA (at 482.6° C) and the maximum degradation rate (at 482.6° C) are closely related to the degradation of polymer. Fig. 9 shows the comparative study of TG, DTA and DTG analysis data of LDPE jute and glass composites. Initial losses of glass and jute composites are 0.1% and 4.5% respectively. This attributes the fact that the thermal stability of glass composites is better than that of jute. The onset temperature and 50% degradation of glass composites is higher than that of the LDPE jute composites. According to the DTA analysis, jute composites show endothermic peak due to moisture content. DTG study shows that the degradation rate of jute composites is higher than glass fiber composites. DTG investigations also show that major degradation for glass composites occurs at a single stage however, it occurs at two for the jute composites.

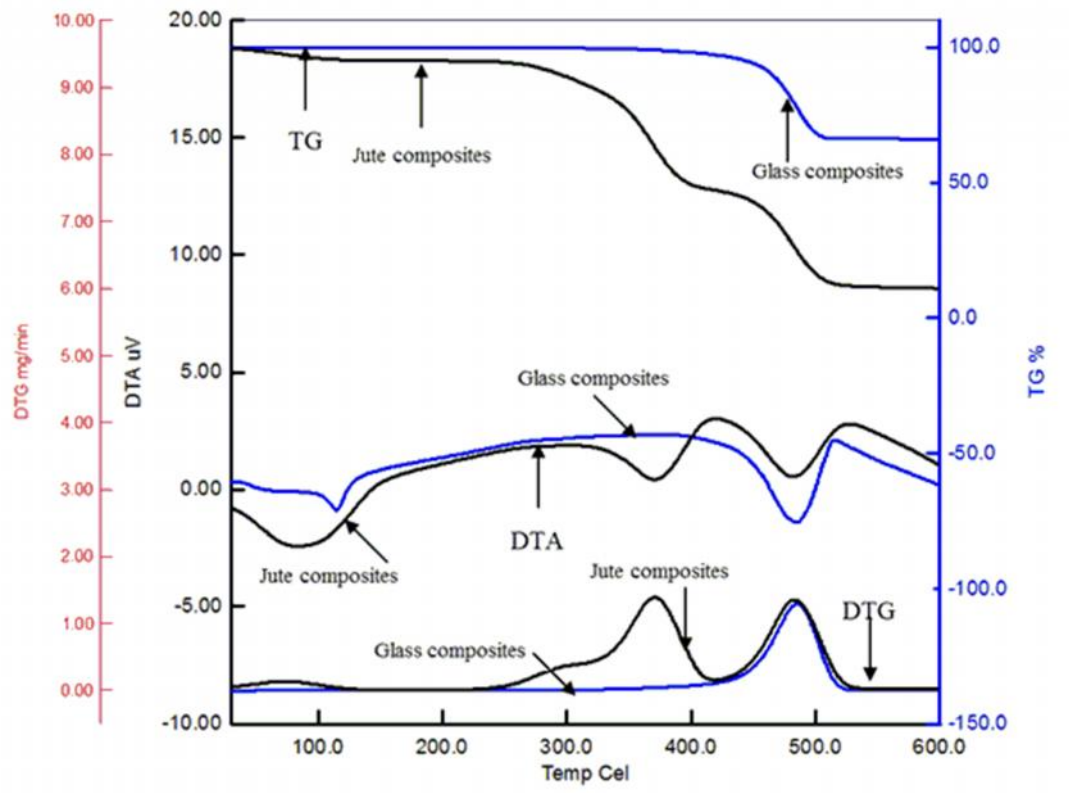

Fig.9: Comparison of TG, DTA and DTG analysis between LDPE jute and LDPE glass composites

4 Conclusions

From optical properties it was seen that the absorbance of LDPE decreased with increasing wavelength. Absorption for LDPE glass composites increases with the increase of wavelength at a certain level and then decreases rapidly with the increase in wavelength. The greater the absorption, the smaller the emission and transmission. From electrical properties it is seen that capacitance decreases with the increase of frequency but capacitance increases slightly with voltage up to 50mV then remain constant in the case of both composites. It is seen that TG, DTG and DTA curves of composites, jute fiber, glass fiber and LDPE. The degradation of jute composites was occurring in two stages but glass fiber composites were occurring in one stage. Thermal stability of glass composites is higher than that of jute composites..

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Development and Testing of an Animal Feed Mixing Machine

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Abstract *– An animal feed mixing machine was designed, developed and tested. The machine was tested using a feed components divided into three equal measures of 50 kg for ground corn, 0.265 kg for cassava flour and 2.65 kg for shelled corn replicated thrice at four mixing durations of 5, 10, 15 and 20 min. The average CV is 4.84% which shows a significant reduction in feed components for the samples tested. The degree of mixing attained was 95.16% which portrays an improvement of about 7.8% reduction in non-uniformity of components among samples when the mixing duration was 10 min. The result further indicates an increase in the level of difficulty associated with intimate blending as the mixture approaches its equilibrium level (from 78.15% at 5 minutes increase by 9.21% at 10 minutes and by 7.8% at 15 minutes). Also the average weights of ungrounded corn of 24.90 g, 24.80 g and 24.40 g recovered from the three replicates had corresponding coefficient of variations of 4.81%, 5.31% and 3.96% respectively during a 20 minutes mixing process. The average value of coefficient of variation for the three replicates here was 4.69% indicating that, the mixer's performance was pegged at 95.31%..*

Key Words *– Cassava Flour, Ground Corn, Mixing Machine, Degree of Mixing, Coefficient of Variation*

1 Introduction

Feed production for livestock, poultry or aquatic life involves a range of activities, which include grinding, mixing, pelleting and drying operations. New (1987) gave a summary of the different types of machinery needed for the production of various types of feeds and they include grinders, mixers, elevators and conveyors, mixer, extruders, cooker, driers, fat sprayers and steam boilers.

The mixing operation in particular, is of great importance, since it is the means through which two or more ingredients that form the feed are interspersed in space with one another for the

purpose of achieving a homogenous mixture capable of meeting the nutritional requirements of the target livestock, poultry or aquatic life being raised.

Essentially, feed mixing can be done either manually or mechanically. The manual method of mixing feed entails the use of shovel to intersperse the feed's constituents into one another on open concrete floors. The manual method of mixing feed ingredients is generally characterized by low output, less efficient, labor intensive and may prove unsafe, hence, hazardous to the health of the intended animals, birds or fishes for which the feed is prepared. The mechanical method of mixing is achieved by using mechanical mixers developed over the years to alleviate the shortcomings associated with the manual method. A wide variety of mixers are available for use in mixing components, the selection of which depends mainly on the phase or phases the components exists such as solid, liquid or gaseous phases. Some commonly used solid mixers as discussed by Brennan *et al*. (1998) includes: Tumbler mixers**,** Horizontal trough mixers, Vertical screw mixers etc. These are quite quick and efficient particularly in mixing small quantities of additives into large masses of materials. Brennan *et al.,* (1998) observed that regardless of the type of mixer, the ultimate aim of using a mixing device is to achieve a uniform distribution of the components by means of flow, which is generated by mechanical means.

In most developing countries including Nigeria, a major common problem facing farmers raising livestock, poultry and/ or aquatic life is the lack of access to proper feeds that can meet the nutritional requirements of their flocks at the right time and in the right quality and price. Dogo (2001) observed that the rate of poultry production in Nigeria is not commensurate with human population growth and demand. He therefore, opined that the major constraint is the high cost of feeds in the market. Similarly, Oyenuga (1973) cited that protein from animal sources contribute about 17% of the total protein consumption in the average Nigerian diet compared to a contribution of approximately 68% of the total protein consumed in New Zealand, 71% in USA, 67% in Denmark and 60% in the UK. The reason for the low level intake of animal product in African countries he argued is due, partly, to the low population of cattle in some regions in relation to human population and requirements, but primarily due to low level of animal productivity in terms of slow growth, long calving intervals, slow reproductive cycle and low milk yield all occasioned by poor quality and or insufficient feeds. Augusto *et al*. (1973), Fagbenro (1988), Kwari and Igwebuike (2001), Diarra *et al*. (2001) and many other researchers have indicated the feasibility of the utilization of various forms of farm and agro-industrial wastes and by-products in the formulation of complete feeds for livestock, poultry and aquatic life. Although the major essential raw materials required for the formulation of complete feeds from the results of such researches are within easy reach of the farmers and at low cost, the major limiting factor to taking the full advantages offered by the results of such researches has been the lack of available appropriate equipment to process the identified raw materials into the required feeds.

This study is an attempt towards designing and fabricating a machine capable of mixing feed constituents. The design incorporates the used of local raw materials for the construction.

2 Methodology

2.1 Materials

The materials for the construction of the machine are to be sourced locally so as to be cheap to own and use by the stock raisers. This should serve as a guide in material selection. Also the materials are chosen on the basis of their availability, suitability, economy, viability in service among other considerations (Sharma and Aggar-Wal, 1998).

2.2 Design Calculations

(1) Volume of mixing chamber

The mixing chamber consists of two unequal cylinders (upper and lower cylinders) that are connected by a frustum as shown in Fig.1.

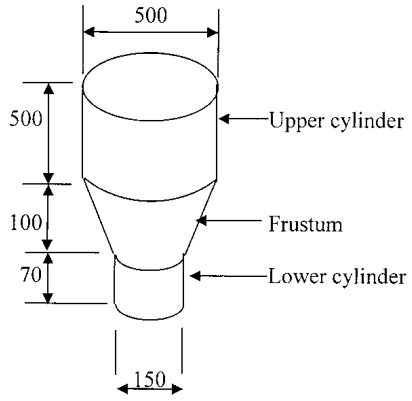

Fig.1: Mixing Chamber

The total volume of this chamber is computed using the relationship as given by Garlick and Barnes (1981):

$$V_T = V_U + V_F + V_L \quad \text{...(1)}$$

Where : V_T = total volume of mixing chamber,
V_U = volume of upper cylinder,
V_L = volume of lower cylinder,
V_F = volume of frustum

(2) Capacity of the conveyor

A vertical acting auger conveyor (Fig.2) which operates inside a close fitted tube to effect blending of feed components was designed for the machine. The auger in is designed with helices of uniform diameter of 145 mm and a pitch of 100 mm.

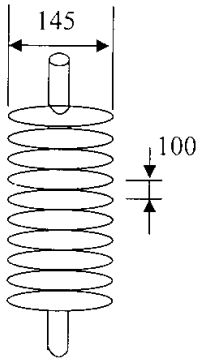

Fig. 2: Vertical acting auger conveyor

The capacity of the auger is computed using equation 2 given by Kubota (1995) as:

$$Q = 60\, n\, \phi p\, \gamma (D^2 - d^2)\, \frac{\pi}{4} \quad ...(2)$$

Where : Q = capacity of conveyor, t/h;
γ = bulk density of conveyed material, 800 kg/m3;
n = number of screw rotations, 800 rpm;
p = conveyor pitch, 0.1 m;
D = pitch diameter of conveyor, 0.145 m;
d = diameter of shaft, 0.02 m,
π = constant, 3.142,
ϕ = factor introduced for inclined conveyor, 0.33 (Lucia and Assennato, 1994).

(3) Power required by the conveyor

The power (L) required to operate the mixing auger was computed using equation 3 as expressed by Kubota (1995) viz:

$$L = 0.7355\, C\, l\, Q \quad ...(3)$$

Where : L = power required by the conveyor, kW;
C = coefficient, constant for conveyed material, 0.3;
l = length of conveyor, m;
Q = capacity of conveyor, t/h

(4) The drive

V-belt and pulley arrangements were adopted in this work to transmit power from the electric motor to the shaft of the mixing unit. The main reasons for adopting the v-belt drive are its flexibility, simplicity, and low maintenance costs. Additionally, the v-belt has the ability to absorb shocks thereby mitigating the effects of vibratory forces (Gary *et al.*, 1984).

(5) Pulley diameters

The diameter of the pulley for the mixing auger is calculated using equation 4 expressed by Champion and Arnold (1976) as:

$$D_2 = \frac{N_1 D_1}{N_2} \quad ...(4)$$

Where : N_1, N_2 = speeds of motor mixing auger respectively, rpm;
D_1, D_2 = diameters of motor pulley and mixing auger pulley respectively

(6) Belt speed

The belt speed for the mixer drive is calculated using equation 5 as expressed by Shigley and Mischike (2001).

$$v = \frac{\pi D_1 N_1}{60{,}000} \quad ...(5)$$

Where : v = belt speed, m/s;
D_1 = diameter of motor pulley, mm;
N_1 = speed of motor, rpm;
π = a constant

(7) Belt length

Equation 6 given below as expressed by Shigley and Mischike (2001) was used in determining the belt length for the mixing drive.

$$t = 2C + 1.57(d_1 + d_2) + \frac{(d_1 - d_2)^2}{4\,C} \quad ...(6)$$

Where : t = belt length, m;
C = center distance between pulleys, m;
d_1 = pitch diameter of driver pulley, m;
d_2 = pitch diameter of driven pulley, m

(8) Number of belts required

The number of belt required to transmit the designed power from electric motor to the shaft of the mixing auger is computed using equation 7 expressed by Khurmi and Gupta (2004) as:

$$N_B = \frac{L}{(T_1 - T_1)v} \quad ...(7)$$

Where : N_B = number of belts;
L = designed power, W;
T_1, T_2 = tensions on the tight side and slack side of the belts, N;
v = belt speed

(9) Determination of mixer shaft diameter

The equations for computing equivalent twisting moment (T_e) and that of a mixer shaft diameter (d) are given by Khurmi and Gupta (2004) as:

$$T_e = \sqrt{(MK_b)^2 + (TK_t)^2} \quad ...(8)$$

$$d^3 = \frac{16\,T_e}{\pi\,\tau} \quad ...(9)$$

Where : T_e = equivalent twisting moment, Nm;
M = maximum bending moment, Nm;
T = torsional moment, Nm;
K_b = fatigue factor due to bending, 2.0;
K_t = fatigue factor due to torsion, 1.5;
τ = maximum allowable shear stress, N/mm^2;
d = diameter of mixer shaft, m

Table 1: Technical Characteristics of the Mixing Machine

S/No.	Technical characteristics	Determined and selected values
1	Volume of mixing chamber (theoretical)	0.106 m^3
2	Capacity of conveyor	20.53 t/h
3	Power required to operate the mixer	2.26 kW, therefore an electric motor of 5 hp (3.729 kW) with a speed of 1450 rpm is selected
4	Diameter (D_2) of pulley for the mixing auger	D_2 = 145 mm
5	Belt speed	6.07 m/s
6	Belt length	1156 mm
7	Number of belts	1
8	Diameter (d) of the mixer shaft	19.3 mm, therefore a 20 mm diameter is selected

2.3 Description of the Machine

Fig.3 shows the orthographic view of the machine. The mixing section consists of two cylindrical bodies (upper and lower) of different diameters that are connected by a frustum. The upper cylinder is made with a diameter of 500 mm and height of 500 mm. The lower cylinder has a height of 70 mm and a diameter of 150 mm. The height of the frustum, which connects the two cylinders, is 100 mm. Both the cylinders and the frustum were constructed using a mild steel sheet metal of 1.5 mm thickness. An opening of 100 mm diameter was provided at the foot end of the frustum. This opening connects to the discharge channel. The mixing chamber is provided with a centrally based, vertical acting auger conveyor that operates inside a close fitting tube of 150 mm diameter and 500 mm length. The auger is constructed on a mild steel rod of 20 mm diameter shaft using a mild steel rod of 6 mm diameter. Its helices were made with a uniform diameter of 145 mm and pitch of 100 mm. The lower end of the auger carries a ring of 145 mm diameter. This ring bears three blades spaced 120^0 apart. Both the blades and the ring are constructed using a mild steel flat bar of 12.5 x 3 mm. The feed ingredients to be mixed are introduced into the mixing chamber via a trapezoidal hopper constructed also from a mild steel sheet metal of 1.0 mm thickness. The hopper is constructed with the following dimensions: major width, 300 mm; minor width, 150 mm; length, 300 mm and a height of 100 mm. The hopper is made to stand at an inclined angle of 60^0 with respect to the mixing chamber when fixed in place. All the parts that make up the machine are mounted on a rectangular frame robustly built with detachable stands. An angle iron of 50 mm x 50 mm x 5 mm is used in the construction of the frame, for its rated strength and stability in service.

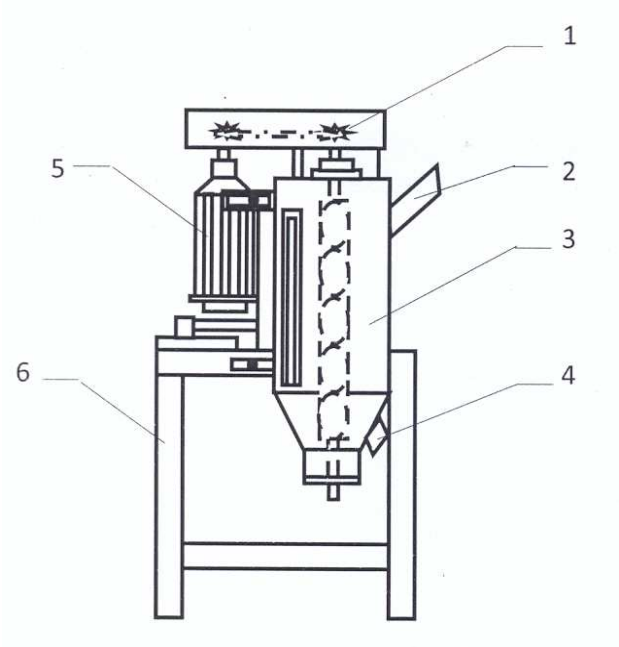

Fig.3: Orthographic View of the Mixing Machine

Legend : 1 = Drive for mixing mechanism;
2 = Mixing Chamber,
3 = Hopper,
4 = Feed Discharge Chute:
5 = Electric motor for mixer,
6 = Frame

The frame is constructed with the following dimensions: 1250 mm height, 1000 mm length and 600 mm width. A central electrical control point is provided for convenience and safety during operation. The control point consists of three socket outlets of 15A each. Three (3) connecting plugs one each from the two electric motors (i.e. mixer's and extruder's motors) and that of the heating element are attached to the sockets. A 2.5 mm PVC cable is used in connecting the three socket outlets and the connection is in parallel. A 4.0 mm PVC cable is used as the supply lead for the outlets.

2.4 Principle of Operation of the Machine

During operation with the switch of the mixer's electric motor set at the "ON" position, the feed ingredients are introduced into the mixer via a trapezoidal shaped hopper located at the upper part of the mixing compartment. Material introduction into the mixer is in order of quantity, with the bulkier among the components introduced into the machine first. With the material inside the mixing chamber, the rotating action of the centrally based vertical acting auger, lifts it up from the lower cylinder through the close fitting tube and drops it high up at the end of the tube. After thorough mixing is achieved as assessed through a look-in window located at the side of the mixing chamber, the flap of the discharge channel is open to allow the mixed components out of the mixer where the need for using the machine is only to blend feed constituents. Complete evacuation of the material is facilitated by the rotating action of the stirrer, which work close to the surface of the frustum section of the mixing chamber. At the end of evacuation operation, the motor switch is put off. The total cost of construction is **N47, 290.00 ≈ (US$300).**

2.5 Performance test

Preliminary testing of the mixer was targeted at evaluating its ability to blend feed components, duration of mixing and rate of discharge both through the discharge and the transfer channels. At the onset of the test, 150 kg of ground corn, 0.795 kg of cassava flour and 7.95 kg of shelled corn were divided into three equal measures of 50 kg for ground corn, 0.265 kg for cassava flour and 2.65 kg for shelled corn, and the mixer's performance test was conducted and replicated thrice according to the standard test procedure for farm batch feed mixers developed by ASAE, (R2006) and Ibrahim and Fasasi (2004). Four mixing durations of 5 min, 10 min, 15 min and 20 min where considered in the cause of conducting the tests. At the end of each test run, ten samples of 500 g were drawn from the mixed components and the coefficient of variation among blended samples and mixing levels, were computed using the expressions below as given by Ibrahim and Fasasi (2004):

$$CV = \frac{S}{x} \quad ...(10)$$

$$\%D_M = (1 - CV) \times 100 \quad ...(11)$$

$$S = \sqrt{\frac{\Sigma (X - x)^2}{(n - 1)}} \quad ...(12)$$

Where : CV = Coefficient of variability;
D_M = Percent mixing level;
S = Standard deviation;
X = Weight of shelled corn in the samples;
x = Mean value of shelled corn in the samples;
n = Number of samples

3 Results and Discussion

Table 2 gives the average weight of ungrounded corn recovered from each of the 10 samples drawn from the mass of mixed components after a mixing period of 5 min in respect of the three replicated tests.

Table 2: Mixing Machine's performance in 5 minutes mixing operation

Replicate	Mean weight of corn, (g)	Coefficient of variation, (%)	Degree of mixing, (%)
1	19.80	22.81	77.19
2	23.50	20.68	79.32
3	21.50	22.06	77.94
Total	64.80	65.55	234.45
Mean	**21.60**	**21.85**	**78.15**

The average weights of corn recovered from the three replicates are 19.80 g, 23.50 g and 21.50 g with corresponding coefficient of variability (CV) of 22.81%, 20.68% and 22.06%, respectively. The result showed that variation in composition of ingredients among samples tested ranges from 20.68% to 22.81% with an average CV of 21.85%, thus the degree of mixing achieved is 78.15%.

Table 3 presents the mixers performance in ten (10) minutes operation. The average weight of recovered ungrounded corn of 22.50 g, 22.80 g and 23.20 g with their corresponding computed coefficient of variation of 14.09%, 11.66% and 12.16% for the three replicates are obtained when the mixing duration was doubled from 5 min to 10 min.

Table 3: Mixing Machine's performance in 10 minutes mixing operation

Replicate	Mean weight of corn, (g)	Coefficient of variation, (%)	Degree of mixing, (%)
1	22.50	14.09	85.91
2	22.80	11.66	88.34
3	23.20	12.16	87.84
Total	68.50	37.91	262.09
Mean	**22.83**	**12.64**	**87.36**

The result shows a significant reduction in variation of feed components among samples by about 9.21% resulting from doubling mixing duration from 5 min to 10 min. This is in conformity with the findings of Brennan *et al.* (1998), who reported that in a mixing operation, non-uniformity among components in the mixture decreases with time of mixing until equilibrium mixing is attained. The average CV of 12.64% shows that the mixer's performance rose from 78.15% (Table 2) to 87.36% (Table 3) due to increased mixing time from 5 min to 10 min.

Table 3 gives the performance of the mixer during a mixing duration of 15 min. From the table, the average weight of shelled corn recovered from the three replicates were 24.9 g, 25.1 g and 24.8 g with respective computed coefficient of variations of 4.81%, 5.31% and 4.58%.

Table 4: Mixing Machine's performance in 15 minutes mixing operation

Replicate	Mean weight of corn, (g)	Coefficient of variation, (%)	Degree of mixing, (%)
1	24.90	4.81	95.19
2	25.10	5.13	94.87
3	24.80	4.58	95.42
Total	74.80	14.52	285.48
Mean	**24.93**	**4.84**	**95.16**

The average coefficient of variation is therefore 4.84%. This result shows a significant reduction in the coefficient of variations in feed components for the samples tested. The degree of mixing attained is as high as 95.16% (Table 4) which portrays an impressive improvement of about 7.8% reduction in non-uniformity of components among samples from what obtains when the mixing duration was 10 min.

The result further indicate an increase in the level of difficulty associated with intimate blending of feed components as the mixture approaches its equilibrium level (from 78.15% at 5 minutes increase by 9.21% at 10 minutes and by 7.8% at 15 minutes).

Table 5 gives the weight of ungrounded corn recovered from each of the ten samples with mean values of 24.90 g, 24.80 g and 24.40 g, respectively from the three replicates and corresponding coefficient of variations of 4.81%, 5.31% and 3.96%, respectively during 20 minutes mixing process. The average value of coefficient of variation for the three replicates being 4.69% indicating that, the mixer's performance pegged is at 95.31%.

Table 5: Mixing Machine's performance in 20 minutes mixing operation

Replicate	Mean weight of corn, (g)	Coefficient of variation, (%)	Degree of mixing, (%)
1	24.90	4.81	95.19
2	24.80	5.31	94.69
3	24.40	3.96	96.04
Total	74.10	14.08	285.92
Mean	**24.70**	**4.69**	**95.31**

Comparison of this result with what obtained during 15 minutes mixing operation shows a marginal difference of 0.15%. The result corroborates the findings of Brennan *et al*. (1998) that after equilibrium mixing is attained, further mixing will not produce a better result.
Table 6 shows the summary results of the mixer's performance. The average mixing level in respect of the four mixing durations considered stood at 89% attained in 12.5 min (the average of the four mixing durations of 5, 10, 15 and 20 min).

Table 6: Summary of results for the Mixing Machine's performance

Mixing duration, (min.)	Replicates/ Coeeficient of Variatio, (CV, %)			Average CV	Degree of mixing, (%)
	I	II	III		
5	22.81	20.68	22.06	21.85	78.15
10	14.09	11.66	12.16	12.64	87.36
15	4.81	5.13	4.58	4.84	95.16
20	4.81	5.31	3.96	4.96	95.31
Total	46.52	42.78	42.76	44.29	355.98
Mean	**11.63**	**10.70**	**10.69**	**11.07**	**89.00**

4 Conclusion and Recommendation

4.1 Conclusion

An animal feed mixing machine was successfully designed, developed and tested. A mixing performance of up to 95.31% was attained in 20 minutes of operation and evacuation of mixed materials from the mixer was observed to be almost complete and was accomplished in 9 minutes with the mixer at full capacity (60 kg of feed ingredients or two-third of the mixing chamber filled) while the average value of coefficient of variation for the three replicates was 4.69%. The salient implication of the result of this study is that the mixing machine developed from locally available materials is effective, simple, cheap, easy to maintain and yet sufficiently rugged.

4.2 Recommendation

The machine is recommended for use by small and medium stock raisers.

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Millennium Development Goals (MDGs) and Poverty Reduction in Nigeria

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Abstract *– The Millennium Development Goals (MDGs) are targeted at eradicating extreme hunger and poverty in the 189 member countries of the United Nations (UN). Nigeria as a member of the United Nation keyed into the implementation of the framework of the goals by formulating the National Economic Empowerment and Development Strategy (NEEDS), NEEDS as a policy is targeted at eradicating poverty and bringing about sustainable development. This is done through the establishment of Agencies like the National Poverty Eradication Programme (NAPEP). However, the scourge of poverty is till been felt by the majority of the citizens of the country who do not have access to primary health care, water and food. This paper analyses the effect of eradicating poverty in Nigeria via the instrumentality of the MDGs and concludes that government at various levels must come up with genuine poverty reduction programme if the challenges of poverty must be tackled. The study recommends that long-term strategic plans that address unemployment, taking into consideration the educational curriculum and the needs of the labour market as well as strengthening the human and financial capacity of poverty alleviation institutions in the country.*

Key Words – *Poverty reduction/ eradication, Sustainable development, Millennium development goals, Policy*

1 Introduction

The Millennium Development Goals (MDGs) have received unprecedented political commitment and have given rise to a strong consensus that poverty eradication should be the main aim of international development efforts. At the current rate of progress, however, the quantitative targets of only one of the eight goals will be met at the global level by 2015 (Adejo, 2006). It can therefore be claimed that September 2000 - marks a salient moment in international efforts to combat extreme poverty. As a result, Bello (2007) posited that it is increasingly being recognized by the United Nations, governments and concerned citizens alike, as the year when the world has an unprecedented opportunity to put in place the policies and resources needed to fight global poverty and achieve the Millennium Development Goals (MDGS).

Eradicating poverty is regarded as the most important goal of human development. Indeed, it is now widely believed that at its core, development must be about improvement of human well-being, removal of hunger, disease and promotion of productive employment for all (Edoh, 2003; Kankwanda, 2002; Mahammed, 2006) lend credence to the foregoing when they suggested that a nation's first goal must be to end poverty and satisfy the private needs for all its citizens in a way that will not jeopardize the opportunity for the future generations to attain the same objective.

In the words of Mahammed (2006) the MDGS goals, targets and indicators relating to poverty reduction and hunger, are quite relevant in the case of Nigeria. While poverty is accelerating at a terrific speed, progress towards minimizing the menace is at a slow pace. Implementation of the partnership goals has lagged, and significant progress is apparent only in debt reduction. Reforms to the global trading system, which are meant to foster the international integration of poor countries, have not advanced as the Doha Round has stalled.

Aid flows have begun to stagnate following an initial increase that began in 1997; one and only five countries (Denmark, Luxembourg, the Netherlands, Norway and Sweden) have reached the agreed target for development aid of 0.7 per cent of GNI (Central Bank of Nigeria, 2003). Despite the pledge made at the G-8 summit in Gleneagles in 2005 to double aid to Africa by 2010, disbursements to the region increased by only 2 per cent between 2005 and 2006 (Mahammed, 2006).

These failures of implementation are often attributed to weak commitment or ownership, especially on the part of developing country policymakers who give poverty reduction a lower priority than boosting growth or meeting ill-defined partnership targets for donor countries (Edoh, 2003). Specifically, the poverty situation was brought to the fore as Nigeria became committed to the United Nations Millennium Development Goals (MDG's) Declaration. The MDG's mandate countries to half the incidence of poverty in 2015.

The National Economic Empowerment Development strategy (NEEDs) that was introduced in 2004 therefore seeks to tackle poverty head on and provide a robust and efficient framework for addressing the lingering problems of the economy. As a member of the United Nations, Nigeria keyed into the MDGS and subsequently produced a policy document called the National Economic Empowerment and Development Strategy (NEEDS) to further see to the achievement of the millennium development goals. Specifically NEEDS has the following actionable goal:

- Wealth creation
- Employment generation
- Poverty reduction
- Value re-orientation

The NEEDS as a national policy was intended to meeting some of the goals of the MDGs, especially poverty reduction. In assessing the performance of MDGs and NEEDS in Nigeria, especially when it relates to 'poverty eradication' one can say without fear of contradiction that MDGs have performed below the expectations of Nigerians. It is at the backdrop of this realization that this paper is set to examine the MDGs and poverty eradication as it is geared towards bringing sustainable development in Nigeria. MDGs are aimed at reducing the number of people who lived on less than a dollar in year 2015 by pursuing the eight Goals. These goals are geared towards the reduction of poverty and encouragement of rapid progress in the improvement of the world.

The eight Millennium Development Goals and their targets are shown in table 1. As indicated in table 1, these goals are expected to be attained by the countries of the world in the year 2015. To simplify the implementation exercises for greater success to be recorded, 18 targets were set alongside the goals, for countries to be well-focused and time conscious in pursuing the goals. This will also enable them to measure the degree of progress made at any point in time. As earlier stated, eradicating

poverty is regarded as the most important goal of human development. The target is to help the proportion of people whose income is less than 1 US dollar a day, between 1990 and 2015. The proportion of people who suffer from hunger is also expected to be halved (Central Bank of Nigeria, 2003).

Also to halve the proportion of people whose income is less than and one dollar per day between 1990 and 2015.

Table 1: Synopsis of the Millennium Development Goals

S/N	Millennium Development	Targets		
1	To eradicate extreme poverty and hunger	Target 1	:	To halve between 1990 and 2015 the proportion of people whose incomes is less than $1 a day.
		Target 2	:	Proportion of people who suffer from hunger to be halved by 2015.
2	To achieve universal primary education	Target 3	:	To ensure that, by 2015, children everywhere, boys and girls alike will be able to complete a full course of primary school.
3	To promote gender equality and empower woman	Target 4	:	To eliminate gender disparity to primary and secondary education, preferably by 2005 and in all levels of education not later than 2015.
4	To reduce child mortality	Target 5	:	To reduce by two-thirds, between 1990 and 2015, the under five morality rate
5	To combat HIV/AIDS, malaria and other diseases	Target 7	:	To halt by 2015 and to begin the reverse the spread of HIV/AIDS, malaria and other disease.
6	To combat HIV/AIDS, malaria and other diseases	Target 7	:	To halt by 2015 and to begin the reverse the spread of HIV/AIDS, malaria and other diseases
7	To ensure environmental sustainability	Target 8	:	To integrate the principle of sustainable development into country policies and programmes and reverse loss of environmental resources.
		Target 9	:	To halve by 2015 the proportion of people without sustainable access to safe drinking water.
		Target 10	:	To achieve by 2020 a significant improvement in the lives of a least 100 million slum dwellers

S/N	Millennium Development	Targets
8	To develop a global partnership for development	Target 11-18 : Entail reduction and cancellation of bilateral debt among countries, avoid discriminatory trade and financial system among countries, address the special needs of landlocked countries, enhance the productivity of youth in developing countries, provides affordable essential drugs for developing countries and to make information and communication technologies available to developing countries.

Source: United Nations Development Report, 2011.

Let us take a glance at poverty profile for Nigeria as shown in table 2. The incidence of poverty increased during the period 1985-2006; however, there was a decline in poverty level between 1995-1999. The proportion of people living in poverty in 1985 was 28.1% which later rose to 46.3% in 1985; but decreased to 42.7% in 1999 before escalating to 65.6% in 2006. Nevertheless, the proportion of people living in poverty declined to 54.4% in 2011 (Bello, 2007).

This translated to 17.7 and 34.7 million poor people in 1985 and 1995 respectively. The number of people in Nigeria also increased from 39.2 million people in 1999 to 67.1 million people in 2006, and 68.7 million poor people in 2011. In spite of the observed drop in poverty in 1999 and 2011, the population in poverty was 4.5 million higher than the 1995 figure and 1.6 million higher than that of 2006 figure respectively (Federal Republic of Nigeria, 2010). The reduction in poverty level to 54.4% is traceable to reforms introduced to alleviate poverty since the declaration of the MDGS in September, 2000 (Kankwanda, 2002).

Table 2: Poverty Profile for Nigeria

	Poverty level (%)						
Year	National	Urban	Rural	Male headed households	Female headed household	Estimated Population (million)	Population in poverty (million)
1985	28.1	17.2	28.3	29.2	26.9	65	17.7
1995	46.3	37.8	51.4	47.3	38.6	75	34.7
1999	42.7	37.5	46.0	43.1	39.9	91.5	39.2
2006	65.5	58.2	69.8	66.4	58.5	102.3	67.1
2011	54.4	43.2	63.3	58.2	43.5	126.3	68.7

Source: Federal office of statistics 1999 and 2011.

2 MDGs and Poverty Eradication: The Nigerian Experience.

Just like other countries at the UN Millennium Summit that gave birth to the MDGs, Nigeria launched her own version of the MDGs poverty reduction or eradication programme. This and other programmes targeted at achieving MDGs are contained in the NEEDS document. In fact, NEEDS has 'poverty reduction' as its third actionable goal. To reduce poverty, NEEDS has set the following broad targets:

- Increase average per capita consumption by at least 2 per cent a year.
- Create about 7 million jobs by 2007.
- Increase immunization coverage to 60 per cent by 2007.
- Increase the percentage of the population with access to safe drinking water to at least 70 percent by 2007.
- Significantly increase school enrolment rates, especially for girls, and increase the adult literacy rate to at least 65 per cent by 2007.
- Significantly improve access to sanitation (NEEDS Document; 2004).

It is disheartening to discover that the Nigerian government did not meet these targets as contained in the policy document. Statistics reveal that Nigerians (especially the common man on the street) do not have access to safe drinking water, primary health care and the rate of unemployment is increasing on a daily basis. This paints an abnormal picture of the failure of NEEDS as a poverty reduction policy. In line with the policy thrust of NEEDS, the government set up the National Poverty Eradication Programme (NAPEP) to tackle the challenges of poverty. But since the establishment of NAPEP, it has nothing tangible to show for its existence. NAPEP, an agency established by government to tackle poverty through empowerment, rather than focus on its mandate is today enmeshed in controversy.

This led the Senate of the Federal Republic of Nigeria to move a motion to probe the activities of the agency since its creation (Central Bank of Nigeria, 2003). The general impression is that NAPEP has failed the country because the poverty rate is still high. It is gathered that the agency has received a total of 11.8 billion Naira but it has nothing to show for it (Edoh, 2003). The local governments in collaboration with their state governments are not helping matters neither. There are reported cases of misappropriation and diversion of budgetary allocations that are meant to efficiently tackle some of the challenges of poverty in the country.

The revelation from the Probe by the House Committee on Power and Steel into the National Integrated Power Project (NIPP) of the former President Obasanjo's administration buttresses the fact that intention on the pages of paper is not enough to tackle the scourge of poverty in this country. The probe revealed that over 10 billion US dollars was said to have been spent on the NIPP without any result to show for it (Kankwanda, 2002). By and large, the poverty reduction or alleviation programme of the government via the instrumentality of the MDGs and NEEDS has failed because of corruption and misappropriation of funds that are meant to carry out the programme. So MDGs have not successfully tackled the challenges of poverty in the country.

3 Eradication of Poverty within the MDGs Framework

A major strategy for the implementation of MGDs in Nigeria as earlier noted is the NEEDs. The targets are to half by 2015 the proportion of people whose income is less than one dollar a day. The second target is half by 2015, the proportion of people who suffer from hunger [8]. Findings in 2004 indicated that poverty was more acute in rural areas in Nigeria and that some geo-political zones were particularly harder hit than others by the phenomenon while unemployment kept souring with the worst affected age bracket being 13-25 years (Mahammed, 2006). According to Edoh (2003), Nigeria's democratic experience has neither served the purpose of political emancipation nor led to

economic betterment of the citizens. This is especially in the face of endemic poverty, hunger, unemployment and progressive disempowerment of a large chunk of the population. The prospect of escaping the life threatening situations and achieving sustainable growth and development is therefore linked to the MDGs.

Again its actualization in Nigeria is still challenged by poor leadership, insincerity in governance, policy inconsistency, lack of adequate data base, high levels of corruption, etc. Some growth indices are often paraded by the Nigerian government, but, there is mismatch or disconnect between it and existing realities as the country still exhibit large symptoms of underdevelopment as reflected in the socio-economic lives of Nigerians. According to Bello (2007), 70% of the over 140 million Nigerians currently live below the poverty line of one dollar per day. The rapid urbanization, put at over 5 percent per annum, exerts severe pressure on ailing infrastructure. Nigeria is further ranked as one of the twenty five poorest nations in the world. This further intensifies youth unemployment.

The Human Development Report 2007/2008 on Nigeria showed that the Human development Index for Nigeria is 0.470, which gives the country a rank of 158th out of 177 countries. Life expectancy was 46.5 percent, ranking Nigeria as 165th and adult literacy rate (% ages 15 and older) was 69.1, ranking Nigeria as 104th out of 17.7, the report also indicated the Human Poverty Index value of 37.3 percent for Nigeria, which ranked the country as 80th among 108 developing countries for which the index were calculated (Central Bank of Nigeria, 2003).

According to Mahammed (2006) about one million Nigerian children were given out for forced and exploitative labour, of which 18 percent work in dangerous environments after school hours. Ten million Nigerian children of school age were reported to be out of school as shown by statistics on school enrolment released by Federal Republic of Nigeria (2010). Eradicating poverty as step towards sustainable development in Nigeria via the MDGs framework continues to appear as a Herculean task.

4 Conclusion

Perhaps, no problem receives greater global attention today like poverty. In Nigeria poverty appears to be the greatest degrader of the Nigeria economy with serious economic and social consequences. Although several regimes had initiated several policy responses in the past to address the poverty scourge in Nigeria. These policies and efforts failed to yield the desired results of alleviating poverty because they were only declarative without concerted effort and lacked the required political will among several other reasons. Though the MDGs provide a platform for addressing the poverty issue once again, the situation from the Nigerian perspective indicates that there are still glaring constraints and challenges such as corruption, infrastructural inadequacies and others. Energy for instance that is required by industries which should be used to drive the economy is still unreliable, undependable, epileptic and in some cases non- existent, the inability of the government to address effectively the power sector problems certainly have negative consequential effect on the economy and on poverty reduction.

5 Recommendation

Therefore, for Nigeria to meet or advance greatly towards the MDGs in 2015, there is need to formulate and implement policies that will promote transparency and accountability, overcome institutional constraints, promote pro-poor growth, bring about structural change, enhance distributive equity, engender social and cultural re-orientation, promote human development and generate employment. Consequently, achieving the MDGs and hence unsustainable development through

poverty reduction would require the decisive commitment of all stakeholders involved –individuals, communities, governments, non-governmental organizations and relevant international agencies.

First, the government should recognize and encourage non-governmental organizations (NGOs) to be actively involved in a wide variety of activities to help provide development opportunities for grassroots communities considering the disproportionately high incidence of endemic poverty in the rural communities. Such encouragement of the NGOS should be closely accompanied by governments increased investment in human capital, a requirement necessary to equip the poor with education/training in order to enable them share in such grassroots opportunities.

Also, the federal state and local government must ensure commitment in the areas of fund allocation for provision of social services that are beneficial to the poor; fostering efficient macro-economic and sectoral policies and the provision of an enabling environment to facilitate private sector economic framework. Another strategy is for the government to realistically undertake a comprehensive study on the causes of poor implementation of development policies and strategies and develop a plan of action to address this critical and persistent problem.

There is also the need to develop long-term strategic plans that address unemployment, taking into consideration the educational curriculum and the needs of the labour market as well as strengthening the human and financial capacity of poverty alleviation institutions in the country. Finally, there is the need to fully integrate the MGDs in the national development strategy and enhance monitoring thereof. There should be periodic and consistent reporting of the MDGs

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The Impact of ICT-Driven Instructional Aids in Nigerian Secondary Schools

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Abstract *– The study investigates the impact of ICT-driven instructional aids in Nigerian secondary schools. Information communication technology (ICT) has no doubt changed the face of teaching and learning globally. The study observed that, though Nigeria is also making efforts to join the ICT fray, these efforts appear to be ineffective. Nigeria still experience a lag in its implementation due to general neglect and other factors, comprising corruption etc, and this continues to be the major challenge facing access to ICT-driven instructional aids facilities in most Nigerian secondary schools. The study concludes that despite the roles ICT-driven instructional aids can play in education, Nigerian schools are yet to extensively adopt them for teaching and learning. Efforts geared towards integration of ICT-driven instructional aids into the school system, have not had much impact. Problems such as lack of Teachers' Professional knowledge and technical know how and poor information infrastructure militate against these efforts. The study recommends that efforts should be made by government to post and provide teachers skilled in ICTs to each school to impact ICT skills to the students and also should stabilize electricity supply in Nigeria.*

Key Words – *Information communication technology, ICT-driven instructional aids, schools, education*

1 Introduction

Information communication technologies (ICTs) are information handling tools that are used to produce, store, and process, distribute and exchange information. These different tools are now able to work together, and combine to form networked world-which reaches into every corner of the globe (UNDP Evaluation Office, 2001). It is an increasingly powerful tool for participating in global markets, promoting political accountability; improving the delivery of basic services; and enhancing local development opportunities (UNDP, 2006). According to Ogunsola (2005) ICT "is an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think, the way we live and the environment in which we live". It can be used to access global knowledge and communication with other people (Ogunsola, 2005). Students who use ICTs gain deeper understanding of complex topics and concepts and are more likely to recall information and use it to solve problems outside the classroom (Apple Computer, 2002). In addition, through ICT, students extend and deepen their knowledge, investigation, and inquiry according to their

needs and interest when access to information is available on multiple levels (CEO Forum on Education and Technology, 2001).

Information communication technology (ICT) has no doubt changed the face of teaching and learning globally. And serious nations are taking the advantages inherent in ICT to impact on the educational sector. Though Nigeria is also making efforts to join the ICT fray, these efforts appear to be ineffective. Computer laboratories are largely non-existent in many public schools across the country. And where they exist, they are nothing to cheer. Due to this general neglect and other factors, comprising corruption, outdated curriculum, ill-motivated teachers, materialism and academic laziness on the part of Students and Teachers, the nation has been reaping mass failure in public examinations. Arising from this, stakeholders are calling on government to provide basic facilities including ICT-driven teaching aids for the nation's educational system (The Punch Newspaper 2012).

This paper therefore particularly dwells on the Impact of ICT-driven instructional aids in Nigerian Secondary Schools and the causes of low levels ICT-driven instructional aids use in Nigerian Secondary schools, as well as provides recommendations.

2 Types of ICT-Driven Instructional Aids

The ICT-Driven Instructional Aids mostly adopted by most of the Nigerian institutions those days are in form of prepared lectures on floppy diskettes, CD-ROMs that can be played as at when the need arises. This has limited advantage because of the number of students per computer system in which most of this facilities are not interactive enough as compare with when the lecture is been received in real time over the internet (Kamba, 2009) as the case are with most new generation well meaning institutions especially in the advance societies. Today, some basic ICT-Driven Instructional Aids (table 1) to echo in our minds when talk of ICT-Driven Instructional Aids would not be far from the following:

Table 1: List of some educational technology and ICT driven Instructional aids

Flexible	Laboratory	Fixed/mobile	Mobile
Television	Scientific Tools	Computers	Mobile Phones
Satellite Receivers	Technical Instruments	Storage Devices	Memory Reader
Radio	Medical Apparatus	Internet/ email/ social media	iPod
Recorders	Agricultural Implements	Smart Boards / Touch screens	iPads
Cameras Video/ Picture/ CCTV	Engineering Facilities	Plain Screens	Androids
Projectors/Beams	Art Costumes	Robots	Iphone
Video Games	Language Tools	Avatars	Calculators
Mp3-4 Players	Books and Other Devices	Cables	PDAs

3 How ICT-Driven Instructional Aids Can Improve Qualitative Education in Nigeria

Researchers have commented immensely in the use of ICT-driven instructional aids in any educational processes, that the use can not be over-emphasized. Abujaber (1987) added that, the importance of instructional materials for both teacher and students cannot be over emphasized. The use of ICT-driven instructional aids is essential to support teaching and learning because other phenomenals cannot be easily expressed without the support of graphics maps, video, pictures etc.

In concrete terms, ICT-driven instructional aids media has enhanced teaching and learning through its dynamic, interactive, and engaging content; it has provided real opportunities for individualized instruction. Information and communication technology (ICT) driven instructional aids has the potential to accelerate, enrich, and deepen skills; motivate and engage students in learning; help to relate school experiences to work practices; help to create economic viability for tomorrow's workers; contribute to radical changes in school; strengthen teaching, and provide opportunities for connection between the school and the world. Information communication technology (ICT) can make the school more efficient and productive, thereby engendering a variety of tools to enhance and facilitate teachers' professional activities (Yusuf, 2005).

Generally, the importance and the usefulness of ICT-driven instructional aids in teaching and learning are explained under the following headings:

a. Stimulation of students' interest

In teaching-learning process, there is the need to generate, arouse, motivate and maintain students' interest. If the learners' interest is build properly, learning can take place effectively. As ICT-driven instructional aids have the potentials if effectively used for regulating the pace of information flow among different class of learners under the same classroom. ICT-driven instructional aids addresses individual differences. Students are arouse with the nature and the beautiful appearance of the materials which will make them to Settle down and learn what the teacher had prepared to teach. Nnyejmesi (1981) sited by Anyawu (2003) agreed and based on investigations that pictures-stimulates and help further study, helps children to take active interest in the topic presented.

b. Concretize abstract issues or topics in Teaching and Learning Process

The use of ICT-driven instructional aids in teaching and learning process makes learning real, practical and more permanents to the learners. It makes conceptual abstraction more meaningful. Esu (2004) sates that; instructional materials are valuable assets in learning situations because they make lesions practical and realistic. They area the pivots on which the wheels of the teaching-learning process rotate. Since its concretize issues, it then facilitate revision (recall) activities and provider very unique opportunities for self and group evaluation for the teacher and the students alike. It captures the student intellect and eliminates boredom; make the work easier, neater, boosting for clarity and more appeal.

c. Creating of effective communication

ICT-driven instructional aids if properly used allow for a flow and transmission of ideal from the teacher to the students and likewise from the students to the teacher or from one group to other. The learners will be able to see, touch, spell what is been talked about by the teacher and be curious to ask questions that would be very helpful for effective evaluation (formative) of the teacher and instructions in subject matter.

d. Use for mass instruction and taking care of a wide audience

With the use of projected and electronic materials such as television, overhead transparencies and computer especially, instructions are packaged in a very broad manners and which take care of wide range of learner in a classroom with less stress and time. Many students will be able to learn faster as the package takes care of various learners' interest at the same time. Teacher can handle a very large class conveniently as the teacher is guiding and displaying the instructional materials on the wall with the use of projector.

e. Providing meaning and useful sources of information to teachers and learners

Teachers are up to date and able to provide for reliable and useful information for the learners with the use of ICT-driven instructional aids, it can effectively be used to ultimate, shorten information from various sources for the purpose of comparison and contrasting ideas. It helps in perception and retention of information or knowledge in learners.

f. It helps in developing a continuity of reasoning and coherence of thought

Disciplines that are integrated course of study which incorporate ideas from different disciplines, the use of ICT-driven instructional aids helps the learners on providing integrated experiences, which may vary from, disciplines which make the end product of education more productive. Since students are expose to the real nature of those concept or body of knowledge they tend to analyses and synthesis those body of knowledge for the proper application in their daily lives.

g. It save time and reduce verbalism or repletion of words

Emma & Ajayi (2006) asserts that "figurative speaking instructional materials enable the teacher to be in more than one place at a time and to address several issues at a time. For example, a video material could be on while the teacher moves around to explain to individuals students the subject contents in response to requests based on individual differences on problems. While the video material continues, providing details of the assignment the teacher also becomes part of the listening audience. It reduces verbalism or repetition of world by the teacher without knowing their meaning and also adds Varity in reinforcing verbal messages by providing a multi-media approach. Esu (2004) added that instructional materials are indispensable factor in a teaching learning process. This is because or clearly words or verbalization has been found to be inadequate for effective teaching. ICT-driven instructional aids, frankly speaking reduce the level at which the teacher should strives himself in the process of talking rather he guide the process of the instructions. And as a result save his time in process of teaching.

h. It is use to improve teaching methods

The teachers of social studies perfect not only their methods of teaching but also perfect contents and situations (activities) to be taught. With the use of instructional materials, the teacher is able to edit, try and retry, alter and delete his activities to fit the standard of the students and also to effectively address the curriculum objectives. Instructional materials if properly utilize helps in giving direct contact with the realities of the learners both social and physical environments.

i. To promote closer relations between the community and school

The purpose of using ICT-driven instructional aids is for the students to internalize the situational issues happening around his totality, the students will be able to identify crucial issues and address these issues if properly inculcated with the use of instructional materials.

Walsh (1967 in Chuba 2000) posited three importances of teaching aids in class, as; Easing off teachers' teaching task, Satisfying different children's learning patterns and In-building of special

child's or learner's appeal by teaching aid manufactures, which help to motivate or captivate interests of the learner.

Ikwumelu (1992 in Cluba 2000) outlined the following points as the reasons why teachers must apply teaching aids in classrooms: teaching aids helps to concretize abstract issues and topics; they motivate pupils' interests in topic being discuses, they develop continuity of reasoning and coherence of thought which augurs well with the inter-interdisciplinary nature of other subjects, Teaching aids save time and as things presented are almost self explanatory, energy is saved in too much talking and writing and They help to appeal to pupil interests and this is because, they tend to appeal to children's difficulties as well as take care of children's differences.

4 Guidelines and Requirement for the Use of ICT-Driven Instructional Aids

Use and utilization judges the value of ICT-driven instructional aids, process or personnel by the degree they singly or collectively satisfy the derived instructional needs. The foresight instructional behavior controls, to a large extent, the means for achieving them. Instructional materials are not ends in themselves but means of attaining specific instructional functions. Teachers ability to effectively utilize the available media and this optimize the attainments of instructional situation varies with their level of utilization.

However, once materials have been selected, careful preparation comes first by the user and other subsequent preparation. Anyanwu (2003) identify three ways by which the teacher should prepare for the use of ICT-driven instructional aids in classroom, these are as follows:

a. **By previewing-** before any ICT-driven instructional aids are brought to the class, the teacher has to have a first knowledge by using it her self before the class,
b. **first knowledge-** the teacher should have a full knowledge of the parts, names operational level of the intended ICT-driven instructional aids,
c. **Actual presentation-** this is the period the teacher operates and uses these materials in instructing the children.

The following however, are the basic guidelines and requirement for utilization and use of ICT-driven instructional aids:

a. **Specification of objectives:** clear objectives which are behaviorally stated are user ring guides in ICT-driven instructional aids using process they direct the sequence, methods, content and techniques of instructional in subject matter. They provide scientific basis of valid evaluation instruments construction and administration.
b. **Maximal fit with instructional tasks:** ICT-driven instructional aids must be appropriate to situation ally determined and individually responsive
c. **Preparation and preview:** for effectives and successful use of ICT-driven instructional aids for proper teaching-learning situation, the teacher must in advance prepare himself, the learners and the environment, the materials as a matter of must should be previewed by the teacher in order to follow its process of presentation sequentially.
d. **Multi-dimensional presentation:** proper and creative use of a variety of ICT-driven instructional aids at different level of lesson planning can be adequate in achieving various instructional objectives, reason because it will enrich variety of learners mind as they attain better goals more easily than with the use of a single medium
e. **Environmental situation:** the environmental variables such as physical cultural and social in which the ICT-driven instructional aids are utilized for learning have significant effect on their effectiveness. Sound-motion films for instance with their attention-complexly properties can be successfully presented in less quiet environment.

f. **Measure for outcomes:** ICT-driven instructional aids should be evaluated in terms of their suitability, practicability to the instructional objectives, appeal to the cost effectiveness, learner achievement level, consistency with content call for improvement in utilization techniques etc.

5 Problem Associated with the Use of ICT-Driven Instructional Aids

It has been identified that, using ICT-driven instructional aids to facilitate learning in subjects instructions is not always the issue but how to use it and it availability to use. Basing our discussion on foreign experience, ICT-driven instructional aids are available in large quantity " the increased quality and quantity of ICT-driven instructional aids, are producing a slit form the traditional audio visual aids approach to the more comprehensive and efficient learning resource concepts"

Unfortunately, In spite of the bright prospect of ICT-driven instructional aids, they are grossly lacking in Nigeria let alone its circulation to the secondary schools across the nation. A lot of problems are confronting the use of ICT-driven instructional aids in Nigerian secondary schools some of the revealing in the foregoing includes:

a. **Teachers' Professional knowledge and technical know how**
Since information communication and technology (ICT) is a fairly new area of importance in education especially in developing communities like Nigeria. It is a lightly technical field, and to understand how it can affect the teaching and learning situation, one first has to understand the operational functionality of the materials. As much as materials differ in terms of technical components, design and set-up, they also differ in terms of functionality. Same are multi-dimensional; capable of various functions such as giving logical out comes, manipulating information etc. Without the teacher who is knowledgeable enough, ICT-driven instructional aids cannot create change and progress. Teachers knowledge have a great impact on the effective application of ICT-driven instructional aids. This is because the teacher uses to understand the sequential presentation of the instructional gadgets so as to suit the interests of the learners and it appropriateness with the instructional tasks. For instance, a teacher who is not computer literate would find it difficult to apply its operation even when and where found necessary, or even if the teacher has a partial knowledge of the operational function of the materials. The materials might be wrongly used thereby creating a wrong impression for the audience or the students.

b. **Lack of computers:** Computers are still very expensive and despite spirited efforts by the government agencies, NGO, corporate organizations and individuals to donate computers to as many schools as possible, there still remain a big percentage of the schools unable to purchase computers for use by their pupils.

c. **Lack of electricity:** Many schools are still not yet connected to electricity; Nigeria being a developing country, the government has not been able to connect all parts of the country to the national electricity grid. Consequently those schools that fall under such areas are left handicapped and may not be able to offer computer studies.

d. **Computers are still expensive in Nigeria;** in a country with high rate of inflation, majority of the individuals and schools cannot afford to buy a computer and consider it as a luxury item, more expensive than a TV. While second hand computers cost as N45,000 naira and branded new computers being sold at between N98,000 and above.

e. **Broken down computers:** while a good number of schools have benefited from donated used computers, they have not been adequately equipped with the same on maintenance and repair, hence its very common to see a schools computer lab full of broken down computers, some

repairable and some not. This has actually been a major problem, and the government has now put strict measures on any person, NGO or corporate bodies willing to donate 2nd hand computers. (It is seen as a dumping ground); e-waste management.

f. **Burglary:** the fact that computers are still very expensive in Nigeria; this makes them a target for thieves who usually have ready markets to another party at a much less figure. This has made many schools to incur extra expenses trying to burglar proof the computer rooms. This extra expense makes some schools shy away from purchasing computers for their students.

g. **Lack of internet or slow connectivity:** most schools are not able to connect to the World Wide Web, due to the high costs involved in the connectivity. On average, it may cost approximately $150 per month to connect to about 15 computers on a bandwidth of 128/ 64 kbps. This is considered as very expensive for a very slow speed.

h. **Increased moral degradation:** internet pornography, cyber bullying and other anti-social behaviors is a worrying emerging problem.

i. **Environmental factors:** Part of the application of ICT-driven instructional aids process is the target population for whom the materials are to be used and the setting or vicinity where the learning should take place, the degree of satisfaction derived by children in respect to comfortability of environment of that learning situation is a great deal.

j. **Time constraints:** Time is also a serious problem or factor that impede the effective use of ICT-driven instructional aids because some time the time that is allotted for a subject on the timetable might not be enough for the teachers to present his contents alongside with effective use of the materials which will affect the wholesome delivery of the content.

k. **Poor maintenance culture :** Materials available for the teaching are poorly manhandled by both the teachers and school authority. Non available of resource room for the proper keep of both the locally manufactured and the commercially purchased ones thereby limiting it use as the time needed. Very many of the teachers use materials occasionally without the proper upkeep of the materials after used for the future reference.

6 Conclusion

ICT-driven instructional aids has every sign of long survival as long as such digital devices become more available. That means when the devices become more afforded, the connectivity bandwidths become widely use and less constraint; the multimedia applications will prosper. The survival of Nigerian secondary educational institutions in the 21st century will increasingly rely on various forms of electronic delivery system and communication facilities available in markets that are required to make education to be more flexible.

The adoption and use of ICT-driven instructional aids in schools have a positive impact on teaching and learning. Despite the roles ICT-driven instructional aids can play in education, schools in Nigeria have yet to extensively adopt them for teaching and learning. Efforts geared towards integration of ICT-driven instructional aids into the school system, have not had much impact. Problems such as poor policy and project implementation strategies and poor information infrastructure militate against these efforts. For ICT-driven instructional aids to succeed in Nigeria, there is the need to build on another important pillar i.e. the existence of befitting infrastructure and some degree of viable connectivity. A growing difference in market liberalization of the Internet-access supply is leading to another kind of “digital divide” on the global scale many countries have introduced or are introducing

telecommunications regulations that discourage the development of Internet-access service. Nigeria should take heed of that.

7 Recommendations

In order to ensure that ICT-driven instructional aids are widely adopted and used in Nigeria's school system, the following recommendations are made.

a. Government should provide institutions at all levels in the country with adequate information-technology facilities.
b. Government should ensure adequate electricity supply in schools.
c. Teachers should be more committed to teaching with the use of ICT-driven instructional aids given the importance of practical knowledge in it.
d. The institutions and teachers education should mount periodic training sessions for teachers on the use of ICT-driven instructional aids.
e. Schools should appeals to non-governmental organizations, private sectors, individuals and industries to assists in supplementing and substituting obsolete ICT-driven instructional aids like projected and other software packages.
f. Efforts should be made by government to post and provide teachers skilled in ICTs to each school to impact ICT skills to the students.

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Evaluation of Socio-Cultural Factors Influencing Consumer Buying Behaviour of Clothes in Borno State, Nigeria

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Abstract *–This study assesses cultural factors influencing consumer buying behaviour of clothes in Borno state, Nigeria. It was specifically carried out to examine consumer buying decision making process and assess cultural, economic as well as personal factors influencing clothes buying behavior. Data for the study were gathered through structured questionnaire administered by the researcher with the help of two research assistants, on a sample of 192 clothes buyers, out of which, 174 were duly filled and returned. The data obtained were analyzed using descriptive statistics, chi square, Analysis of variance and multi-stage regression. Findings revealed a highly significant influence of cultural factors (T=14.83, P<0.000) on consumer buying behaviour of which the relative regression coefficient influences equivalence of societal norms (24.6%) was the highest. The findings also indicated a highly significant influence of economic factors (T=11.89, P<0.000) factor on consumer buying behaviour with the highest relative regression coefficient influence equivalence exerted by income (20%). The study further revealed that age was the sole personal (endogenous) factor variable influencing buying behaviour with the highest relative regression coefficient influence equivalence of over 65%. The study concluded that culture, either acting independently or in conjunction with economic and personal factors significantly influences buying behaviour of clothes. It was recommended that marketing managers should take cognizance of the fact that socio-cultural factors are some of the fundamental determinants of a person's want and behavior and should therefore be considered when designing clothes for their markets*

Key Words – *Consumer behaviour, Culture, Socio-Cultural factors, Clothes, Borno State*

1 Introduction

Buying behaviour according to Dawson et al (2006), are set of attitudes that characterize the patterns of consumers' choices. Apart from the essential internal factors, which are recognized as influential to buying behaviour, there are a number of external situational contexts that affect consumer choices. Consumer behaviour is a combination of customers' buying consciousness and external incentives which are likely to result in behaviour remodeling. The society's culture such as norms, convention, customs religion, festivity, class, lifestyle and other subculture influence how individual consumers buy and use products, and help explain how groups of consumers behave.

Culture is that complex whole, which includes knowledge, belief, art, law, morals, customs and any other capabilities and habits acquired by humans as members of society. Culture influences the pattern

of living, consumption, and decision-making by individuals. Culture can be acquired from the family, from the region or from all that has been around us while we were growing up and learning the ways of the world (Kotler, 2000). Culture forms a boundary within which an individual thinks and acts. When one thinks and acts beyond these boundaries, he is adopting a cross-cultural behaviour and may be considered by his immediate society or group as deviant. Culture is an extremely critical and all pervasive influence in our life.

Given this broad and pervasive nature of culture, its study generally requires a detailed examination of the total society; it encompasses all aspects of a society such as its religion, knowledge, language, laws, customs, traditions, music, art, technology, work patterns, products, plus all other artifacts that gives a society its distinctiveness.

However, because the objective of this study is to understand the influence of culture on consumer buying behaviour, greater emphasize will be on the specific dimensions of culture that make it a powerful force in regulating consumer purchase behaviour. Culture in this narrow sense is defined by Schiffman and Kanuk (1997) as the sum total of learned beliefs, values, attitude and that serve to guide and direct the consumer behaviour of all members of a society. Thus, culture consists of traditional ideas and in particular the values, which are attached to these ideas. It includes knowledge, belief, art, morale, law, customs and all other habits acquired by man as a member of society. This view was also shared by Page (1995), who defined human culture as a group of complex belief and value system, and artifacts handed down through generations as determinants and influences upon human buying behaviour within a given society" He added that much of our behaviour is determined by our culture, but it may require contact with another culture, with different beliefs and value systems in order to understand the extent to which it influences us. An accepted concept about culture is that it includes a set of learned beliefs, values, attitudes, habits and forms of behaviour that are shared by a society and are transmitted from generation to generation within that society. The beliefs and values components of these definitions refer to the accumulated feelings and priorities that individuals have about things and possessions. More precisely, beliefs/or values are descriptive thoughts that an individual holds about something. They are standards, rules and/or principles that direct our specific behaviours, which include a person's particular knowledge and assessment of products and/or brands.

Cultural beliefs and values can therefore be said to be mental images that affect a wide range of specific attitudes, which in turn influence the way a person is likely to behave in a specific situation e.g. purchasing a new clothes; the evaluation, choosing among alternatives and finally paying for a particular type of clothes is largely a function of core cultural beliefs and values because Kotler, (2000) core beliefs and values in a society have high degree of persistence, they shape and colour more specific attitudes and behaviours found in everyday life. Cultural beliefs and values are passed on from parents to children and are reinforced by the major institutions of society, schools, business and government, the mass media, reference groups etc.

It is against this background that this study seeks to examine socio-cultural factors influencing consumer buying behaviour of clothes. The specific objectives are to examine how cultural, economic and personal factors influence clothes need recognition, information search, and evaluation, patronage and post-purchase behavior (buying stages)

2 Literature Review and Theoretical Framework

2.1 Consumer Buying Process

At any one time, we make decisions concerning every aspect of our lives; these decisions are generally made without stopping to think about how we make them and what is involved in the particular

decision-making process itself. Behind the visible act of making a purchase is a decision process divided into three major components: input, process and output. (Schiffman and Kanuk, 1997)

The input component comprises the external stimuli that serve as sources of information about a particular product and influence a consumer's product-related values, attitudes, and behaviour which include the marketing four Ps and the socio cultural influences, which when internalized, affect the consumer's purchase decision. At the heart of these socio-cultural inputs, which are the focus of this study, is culture. The influence of culture although less tangible are important input factors that internalized and affect how consumers evaluate and ultimately adopt (or reject) products. Kotler (2000) added that the unwritten codes of conduct communicated by culture subtly indicate which consumption behaviour should be considered right or wrong at a particular point in time. Thus, its influences on consumer purchase behaviour can never be over-emphasized.

The process component, which is concerned with how consumers make decisions considering the psychological field, is subdivided into five stages; Need Recognition, pre-purchase/information search, evaluation, purchase and post purchase behaviour. Need recognition is likely to occur when a consumer is faced with a problem. The problem/need recognition can be viewed as either simple or complex. The simple problem refers to needs that occur frequently and that can be dealt with almost automatically, such as becoming thirsty and purchasing a sachet of pure water where as the complex problem recognition is characterized as a state in which a problem develops overtime as the actual state and desired state gradually move apart. Pre-purchase search come to play when a consumer perceive a need that might be satisfied by the purchase and consumption of a product. The consumer's past experience might provide adequate information on which to base the choice. Where the consumer has had no prior experience a more extensive search has to be made, which would extend to the consumers psychological field and external sources where cultural beliefs and values play key role. This is followed by evaluation, purchase, and post purchase activities. The process above is designed to tie together many ideas of consumer buying decision making and consumption Behaviour shared by most marketing authors

2.2 Cultural Factors and Consumer Buying Behaviour

Every group or society has a culture, and cultural influences on buying behavior may vary greatly from place to place. Failure to adjust to these differences can result in ineffective marketing or embarrassing mistakes. International and National marketers must understand the culture in each of their markets and adapt their marketing strategies accordingly. Marketers are always trying to find cultural shifts in order to discover new products that might be wanted. For example, the cultural shift toward greater concern about health and fitness has created a huge industry for exercise equipment and clothing, low-fat and more natural foods, and health and fitness services. The shift toward informality has resulted in more demand for casual clothing and simpler home furnishings. The increased desire for leisure time has resulted in more demand for convenience products and services, such as microwave ovens and fast food.

Culture can be acquired from the family, from the region or from all that has been around us while we were growing up and learning the ways of the world. Culture forms a boundary within which an individual thinks and acts. When one thinks and acts beyond these boundaries, he is adopting a cross-cultural behaviour and there are cross-cultural influences as well. The nature of cultural influences is such that we are seldom aware of them. One feels, behaves, and thinks like the other members of the same culture. It is all pervasive and is present everywhere. Norms are the boundaries that culture sets on the behaviour. Norms are derived from cultural values, which are widely held beliefs that specify what is desirable and what is not. Most individuals obey norms because it is natural to obey them. Culture outlines many business norms, family norms, behaviour norms, etc. How we greet people,

how close one should stand to others while conducting business, the dress we wear and any other patterns of behaviour. Generally, how we perceive things, how we think, how we believe, are determined by our cultural environment and by the different people with whom we interrelate.

In an attempt to explain how a societal culture influences consumers' buying behaviour Hofstede (1980) came up with a useful cultural dimension. He saw culture as the interactive aggregate of common characteristics that influence a group's response to its environment. His cultural dimensions according to (Nokata and Silva Kumar, 2000) serve as the most influential culture theory among social science research. (Sondergaard, 2001) added that these cultural framework has received strong empirical support Hofstede (1980) separated cultures on the basis of the following dimensions: Masculinity-feminity, Power distance, uncertainty avoidance and Individualism-collectivism. By Individualism-collectivism, He refers to the basic level of behaviour regulation, whether by individuals or groups. People high on individualism view self and immediate family as relatively more important than the collective. He defines collectivism as a social pattern that consists of individuals who see themselves as an integral part of one or more collectives or in-groups, such as family and co-workers or settlement. People who are more collectivist are often motivated by norms and duties imposed by the in-group, they give priority to the goals of the in-group and try to emphasize connectedness with the in-group. These social patterns are expected to influence buying behaviour through their affect on a person's self-identify, responsiveness to normative influences, and the need (or lack of need) to suppress internal beliefs in order to act appropriately.

The ability to focus on group preferences and group harmony in collectivist cultures leads to an ability to repress internal (personal) attributes in certain settings. Accordingly, people in collectivist cultures often shift their behaviour depending on the context of what is "right" Among collectivist a person is generally seen as more mature when he/she puts personal feelings aside and acts in a socially appropriate manner rather than in a way consistent with personal attitudes and beliefs This pattern is likely to affect the buying behaviour of clothes. (Triandis, 1995). In individualist cultures, for instance, people would often ignore the potential negative consequences of their buying and consumption behaviour, preferring to focus on the positive consequences of their actions and on their own feelings and goals. This may not be true for people from collectivist cultures, which are more likely to focus on the potential negative consequences of their behaviour and the effect of their actions on in-group members.

Empirical research on the influence of culture on consumer buying behaviour, conducted by Kacea and Lee (2002) revealed that there is a powerful and consistent influence of culture at both ethnicity level and the individual level. The study added that among many aspects of consumer buying behaviour which cultural factors moderate include self-identity, normative influences, the suppression of emotion, and the post pavement of instant gratification. The study was based on individualism collectivism as cultural dimension. Highly individualist countries such as U.S.A. and Australia and highly collectivist countries such as Malaysia and Hong Kong were examined. It was concluded that although collectivists posses the buying tendencies in equal measure with the individualists, they suppress the negative tendencies and act in manner that is consistent with cultural norms, beliefs and values, in this case reducing their purchases for self fulfillment, which has been characterized as highly individualistic behaviour.

Other specific cultural-dimensions that make culture a powerful force in determining consumer buying behaviour according to Hofstede (1980) are the masculinity/ feminity, power distance, uncertainty avoidance and long term orientation dimensions. Power distance represents the extent to which formal authority is adhered to and the degree to which the lesser powerful accept the prevailing standard in the society. High power distance cultures have members who are much more comfortable with those at the top and often being influenced to behave in certain conforming manners. Uncertainty avoidance refers to how much people in a given society feel threatened by ambiguity, and orientation low on

uncertainty avoidance prefer situations that are free and not bound by rules and regulations governing their behaviours short term orientation involves the tendency toward consumption and maintaining materialistic status Feminity versus masculinity deals with different cultural beliefs held by male and female in a particular society (Pavlov and Chai, 2002).

2.2.1 Norms and Custom as Components of Culture

Social norms are rules or expectations through which a society guides the behavior of its members and often reflect social values. Social norms are mechanisms of social control which promote conformity. They can be both proscriptive, regulating what we should not do and prescriptive, establishing an expectation of what we should do. Particularly buying and consuming. Norms may be formalized in law or other types of institutionalized regulatory strictures, or they may be informal behavioral regularities or customs. Societal norms regulates the kind of cloth we buy and not adhering to it, even those which are informal, and often result in significant consequences, because an underlying social value or moral standard is violated. Individuals develop the capacity to evaluate their behavior by experiencing the consequences of having acted in ways that violate social norms of the society in which they live (Dandaneau 2008)

2.2.2 Religion: A Key Component of Culture

The significance of religious value systems has long been recognized in sociology and psychology but is not yet fully acknowledged in consumer research. Studies in the marketing literature suggest that religion is a key element of culture, influencing both behaviour and purchasing decisions (Essoo And Dibb, 2004).

Religion is an abstract concept that challenges scholars in defining the term (Guthrie, 1996). Nonetheless, many scholars would agree that a religion represents a unified systems of beliefs and practices relative to sacred things, religiosity is viewed as the degree to which beliefs in specific religious values and ideals are held and practiced by an individual, which according to Delener (1990), affect buying consumption pattern in so many ways

Understanding the influence of religion on consumer behaviour is complicated. Earlier religious psychology studies tended to focus on one's commitment to his or her religion as the main indicator for a religion's influence. Almost all factors related to religion are aggregated to form a religious commitment concept, thus complicating efforts to unravel the components of religion's influences (Himmelfarb, 1975). These scholars however concluded that influence of religion on clothes buying behaviour is found to be mediated through several factors including an individual's religious affiliation, commitment to religious beliefs and practices, the extent of consumers religious knowledge, views and perceptions on societal issues, and the motivation in following their religion Religious affiliation and commitment. These factors are mostly used in marketing to explain religion influences in the marketplace.

2.3.3 Other Sub-cultural Influences

Subcultures are distinctive groups of people in a society whose life patterns differ in part from the dominant cultural patterns of an overall culture. Although most sub cultural groups do share cultural meanings with the greater society, sub cultural meanings are unique and distinctive. Members of sub cultural groups can share emotional reactions, values, beliefs, and goals, and they can have similar customs, traditions, attachment to objects, languages, lifestyles, and rituals. Often sub cultural

characteristics represent artifacts of a group's adaptation to their historical social experience within the larger society. Sub cultural groupings can be based on multiple combinations of localized and specific group memberships and/or broad demographic categorical distinctions, such as gender, race, and country of origin, religion, age, geographic region, and community.

2.3 Economic Factors and Buying Behaviour

Consumer economic situation has great influence on his/her buying behavior. The smaller the consumer's family size or dependents, the higher the income and savings of such consumer, this will in turn influence the consumer to favour more expensive products. On the other hand, a person with low income and savings will purchase inexpensive products (Shah, 2010). (Myers, Stanton, and Haug, 1971) also provided support for the predictive power of economic factors such as income, family size and consumer budget over other social factors in explaining expenditure patterns for low-priced goods. They concluded that economic factors are a major determinant of buying behaviour and can be used to predict the type of clothes consumer is likely to buy. Keiser and Kuehl (1972) also shows the influence of economic factors on buyer behaviour, when it comes to brand identification. There study revealed that adolescents with high earnings and in the upper class were able to identify more brands than other adolescents. A very comprehensive and valuable research was conducted by Schaninger (1981) in the analysis of both usage/non-usage criteria as well as frequency of use data for a large variety of products, where it was concluded that economic factors are the most important factors in explaining the consumption of low social value products and services that are not related to class symbols, he opined that it is irrational and wrong to deny the influence that income has over buying behavior, both on type and prices of clothes purchased

2.4 Personal Factors and Buying Behaviour

Etzioni, (1988) believes that all human life is experienced at two levels: The Internal and the Collective. The internalized level of experience includes biological, psychological, and social factors that are more or less complex and are unique to the individual. This experience includes the formation of personal values which are the ideals or standards that guide human preferences and decisions. In collective terms, social values surround the person and represent the standards and principles of what in the greater society is generally considered "good" and "desirable." Personal values can, and often do, conflict with social values and norms. Interaction with parents and significant others within the social environment results in personality development, the acceptance (or rejection) of social norms, and the formation of personal values. Personal values in turn shape our beliefs, attitudes and ultimately our buying behaviors, which usually bear some basic similarity to those around us and reflect the collective cultural and other social influences to which we are exposed. Some of these personal or internalized variables that uniquely influence our clothes buying behaviour include; education, lifestyle, intuition, ostentations etc.

2.5 Theoretical Framework

The consumer is governed by social and cultural norms which the society has and in which he is living. Man is primarily seen as a social animal conforming to the general forms and norms of the culture surrounding him and to the more specific standards of the sub-culture to which his life is bound. Thus, man's attitudes and behaviour are influenced by several levels of society's culture, sub-culture, and other factors like social classes, reference groups and family. The challenge to marketer is to determine which of these social levels are most important in influencing the demand for his product. This framework was derived from the field of social psychology is found suitable to guide this study

because it explains the rational behind consumers and their buying behaviour. More so, it help marketers to understand why consumers act as they do, which goes beyond a basic measure of what consumers expects to do; rather, the underlying or salient beliefs that produce the behaviour. It is on this basis that this study seeks to examine whether cultural factors are some of the major underlying forces behind the way people behave in clothes/dress buying situations

3 Methodology

The area of study is Borno State. The State was created in 1976 out of the defunct North-Eastern State, although Yobe State was later (1991) curved out of Borno State, and the largest in the Federation in terms of land mass, covering a total of 69,436 Sqkm (BOSEEDS, 2005). Borno state lies between latitudes 100N and 130N and longitudes 11.40E and 14.40E. The state shares international borders with Cameroun to the East, Niger to the North, and Republic of Chad to the North-East. The state is a multi-ethnic one with about thirty different languages.

Structured questionnaire comprising of check list and four-point likert scale was employed to elicit responses on factors influencing consumer buying behavior. The population for the study comprised inhabitants of three local government areas, one from each of the three senatorial districts of Borno state, selected using purposive sampling technique. The researcher utilized both primary and secondary sources of data. Data obtained were subjected to descriptive statistics, chi square, and multiple regression analysis using a statistical package; Stata version 8

4 Results and Discussion

The present study investigated socio-cultural factors influencing consumer buying behaviour of clothes: Analysis using descriptive statistics and chi square revealed that consumers' clothes need recognition were mostly influenced by income and the society (opinion leaders, gate keepers, friends, family,) served as the main awareness window through which information and knowledge about clothes are obtained. This may partly be due to the fact that the audiences targeted for this study were mostly resident in villages and hardly have access to such other media (prints, broadcast, and bill boards), and the trust they have built over time with these people. This result agrees with Kotler, (2000), that people rely heavily on opinion leaders and gate keepers in the society for information on new product innovation even after exposure to advertisement.

The study further revealed that quality was the main clothes evaluation (choice) criteria and most consumers patronized native clothes. This may also be due to need to drive the maximum value for their limited resources, which is also in line with theoretical economics as reported by Schiffman and Kanuk (1997) that consumers, especially low income earners are always economical in their purchase decision and always consider functional (quality) aspect of a product in order to make a purchase that is not just satisfactory but a perfect one (maximum value for money)

The influence of gender and marital status was invariably not significant on consumer buying process. Gender insignificantly influences clothe buying behaviour. This may be due to the fact that buyers of clothe pass through the same process of buying decision making irrespective of gender. This agrees with Goldsmith (2002) who found consistency for both men and women while examining personal characteristics of frequent clothing buyers. Occupation of respondents had bi-variate significant influence on clothes need recognition process and patronage as well.

Table 1: Tobit regression analysis showing the relative influences of cultural, economic and personal variables on consumer buying behavior of clothes

Variable	Coeff.	%	Std error	T	P>[t]	95% Conf.	Interval	Log Likelihood
Exogenous (Cultural)								96.998
Constant	3.616879		.2438289	14.83	0.000	3.135452	4.098306	
Class	-.0012541	0.3	.0406257	-0.03	0.975	-.0814674	.0789591	
Fashion	-.0650657	17.6	.035239	-1.85	0.067	-.1346312	.0044997	
Norms	-.0908846	24.6	.0402518	2.26	0.25	.0114095	.1703596	
Style	-.0674981	18.3	-.0424942	-1.59	0.114	-.1514006	.0164045	
Religion	-.0532275	14.4	.0420609	-1.27	0.207	-.1362744	.0298195	
Festivity	.0415083	11.2	.036931	1.12	0.263	-.0314099	.1144265	
Custom	-.052352	14.2	.0336371	-1.64	0.102	-.1216498	.0111793	
Conventional	-.0285839	7.7	.0380063	-0.75	0.453	-.1036254	.0464575	
Dress code	-.0521895	14.1	.0550935	-0.95	0.345	-.1609687	.0565897	
Instrumental (Economic)								102.4995
Constant	2.964843		.2493376	11.89	0.000	2.472604	3.457081	
Income	-.0395744	23.9	.0460472	0.41	0.231	-.1046264	.0254776	
Budget	.0053954	3.3	.042789	0.13	0.900	-.0790779	.0898688	
Family size	-.0339803	20.6	.0366098	-0.93	0.355	-.1062547	.0382942	
Supply	.018221	11.0	.0357046	0.51	0.610	.0522664	.0887085	
Basic needs	.0491556	29.8	.0534706	0.92	0.351	-.0564052	.1547164	
Wardrobe	.0189177	11.7	.0329513	-1.20	0.682	-.0719879	.1098234	
Endogenous (Personal)								95.9474
Constant	3.418618		.2121059	16.12	0.00	2.9999	3.837336	
Age	.419948	65.9	.0345129	-1.22	0.225	-.1101269	.0261372	
Education	-.0776068	12.2	.0395276	-1.96	0.051	-.1556383	.0004246	
Life style	-.017758	2.8	.0408304	-0.43	0.664	-.0983613	.0628454	
Intuition	-.0633371	9.9	.034956	-1.81	0.072	.1323437	.0056695	
Ostentatious	.05830	9.2	.0455577	1.28	0.202	-.0316267	.1482441	

Field survey, 2012

Tobit regression analysis was also employed to show the relative influences of cultural, economic and personal variables on consumer buying behavior of clothes in the state. (See appendix). The results indicates a highly significant influences of cultural ($T=14.83$, $p<0.000$), economic ($T=11.89$, $p<0.000$), and personal ($T=16.12$, $p<0.000$) factors on clothes buying decision process. Societal norms (24.6%) had the highest relative regression coefficient influence equivalence among cultural variables. This can be explained by the fact that the study investigated consumers who are largely collectivist in nature and are bound to be highly culture conscious; such people would expectedly exhibit behaviours

(dressing mode) acceptable by the larger society for fear of being labeled deviants in the society. They belong to what Smka (2004) called Meso-culture; groups, communities sharing common buying behaviour within a macro-culture. This finding agrees with Hofstede (1980), whose study showed that people who are more collectivist are often motivated by norms and duties imposed by the in-group, they give priority to the goals of the in-group and try to emphasize connectedness with the in-group, they suppress internal beliefs in order to act appropriately. It also concurs with Dandaneau (2008), whose study revealed that societal norms are the major cultural factor that regulates the kind of clothes we buy and not adhering to it, often result in significant consequences, because an underlying social value or moral standard is violated.

Basic needs and income (29.8%, and 23.9%) were found to have the most influences on consumer buying decision process among economic factors because they topped the relative regression coefficient and percentage influence equivalences across the stages in the buying decision process; this may probably be due to the fact that consumers studied are low income earners who may want to prioritize their spending to satisfy basic needs. This result concurs with a study conducted by Myers, et al. (1971) who found income to be a major factor determining consumer's propensity to spend and the lower it is the higher the need to carefully share it among basic needs.

Age was found to have overwhelming influences on buying decision process as revealed by high relative regression coefficient influences equivalence (65.9%) across the buying decision stages among personal factors. This may probably be due to our tendencies to learn and adapt to ways of the society as we pass through our lifecycle stages, and particularly because of physical development, which affect the kind clothes we buy. This finding agrees with Rocha et al (2005) and Dilworth-Anderson and Boswell, (2007) who all experienced different requirements for clothing and fashion products based upon age or stages in the lifecycle and sizes, followed by education (12.2%). This could be attributed to the fact that highly educated people are generally seen as problem solvers and are likely to seek for information. This corroborate with series of empirical studies which revealed that persons with high education have greater contact with mass media (Katz, Lazarsfeld 1955) and that these persons read more advertisements than others.

5 Conclusion and Recommendations

Socio-cultural factors made up of cultural, economic, and instrumental variables are key factors affecting consumer buying behaviour, it is therefore concluded that socio-cultural factors, either acting independently or in conjunction with other personal or demographic factors have significant influences at each stage (need recognition, information search, and evaluation, patronage, and post purchase behaviour) of the consumer clothes buying decision making process.

Based on the findings of the study, the following recommendations were made:

a. It is recommended that in designing marketing strategy for clothes, managers should take ognizance of the fact that the society's culture is one of the most fundamental determinants of a person's want and behavior
b. As part of their efforts to convince customers to purchase the kinds of clothes they sell, marketers are recommended to use Socio-cultural representations, especially in promotional appeals. The objective is to connect to consumers using socio-cultural references that are easily understood and often embraced by the consumers. This would make the consumer feels more comfortable with or can relate better to the product since it corresponds with their cultural values.
c. In order to maximize relevance and effectiveness, business and marketing programs of any type, but particularly those that relate directly to the clothes buying behaviour of

consumers, must take into account the social, and economic positions of the people they intend to serve in order to enhance target marketing

d. Markers in the clothing business are recommended to continuously scan their socio-cultural environment and assess its influence on consumers' behaviours both at the personal and societal levels with a view to enhancing their capacity to recognize, resist as necessary, and make intentional decisions that will both be beneficial to them and their customers
e. It is also recommended for marketing managers to adopt market segmentation strategy and segment their clothes markets on the bases of demographic variables such as age,income, and gender since they were all found to have great degree of influences on clothes buying decisions
f. Finally, marketing managers are recommended to stimulate opinion leadership in some key members of the society by encouraging favourable word-of-mouth about their products since clothes consumers are found to heavily rely on them for information. And also ensure that their products are adequately labeled with important features and attributes to satisfy the educated ones who are found to be problem solvers and would deliberately seek for information in that direction

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A Component Analysis of Assisted Reading with a Third Grade Student with a Reading Deficit in a Psychiatric Hospital Setting

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Abstract *– The purpose of the research was to carry out a component analysis of assisted reading. A third grade student with a reading deficit who was attending an impatient psychiatric classroom setting was the participant. Data were collected from the student's oral reading. The measures gathered were percent correct, errors per minute, and the percent of comprehension questions correctly answered from the passages from the classroom reading text. The component analysis of assisted reading was evaluated in an ABCBDBEB single case design. The results indicated improvements in number of words read correctly, decreases as well as in comprehension when the total components of assisted reading were employed. Errors were low but increased when the various components of assisted reading were removed. The results of the component analysis, indicated that for this child, the auditory and repeated readings components were essential for comprehension as well as improvements in correct oral reading and reductions in errors. When the researchers removed the visual module, the results in comprehension were only slightly affected. The strengths and weaknesses in the present analysis are listed. The practicality of the procedures for use in the classroom and areas of future research are discussed.*

Key Words – *Assisted Reading, Component Analysis, reading Comprehension, reading fluency, reading errors*

1 Introduction

Reading skills have social significance, as well as personal value, because reading is an integral part of communication and learning (Chambers, Dunn, & Rabren, 2004). In an ever-increasing world of

technology, reading is a necessary requirement for acquiring and maintaining employable skills. Several authors have commented on the importance teaching reading with evidence-based procedures in today's schools (Carnine, Silbert, Kameenui, & Tarver, 2004; Chambers et al., 2004). Reading failure has been described as being the most serious educational problems by The National Advisory Committee on Dyslexia and Related Disorders (Lerner & Kline, 2006) and U.S. federal government (National Reading Panel 2000; National Research Council 1998). Reading problems in students with and without disabilities have aroused considerable interest among professionals who are concerned with early identification of the problem and effective remediation (Carnine et al., 2004; Mercer & Pullen, 2008).

Accurate word identification is an obvious skill that is necessary for successful reading. However, some research has indicated that accurate word identification is not sufficient for reading comprehension (Cunningham, 1979; Laberge & Samuels, 1974). To facilitate reading comprehension, it is important for students to demonstrate automaticity of decoding, which results in fluent reading. Cunningham (1979) suggested that assisted reading is one technique that can effectively improve reading fluency.

Heckelman (1969) first demonstrated the effectiveness of assisted reading using what he termed the "neurological impress method." Using this method, the student sits side by side with his or her teacher while decoding reading passages. The teacher's finger passes under the words as he or she reads the words directly into the ear of the student. The student is required to follow the teacher's finger and read along with the teacher. Although Lorenz (1979) suggested that this procedure might hold promise for students with learning disabilities, he cautioned that the impress method would most likely be less effective with children who have auditory learning disabilities because of the method's dependence on the auditory modality.

Hollingsworth (1970, 1978) felt that the neurological impress method was too time-consuming for teachers because it required one-on-one teacher attention. Therefore, he adapted the procedure using tape recorders and headsets. Using Hollingsworth's (1970, 1978) method, students are required to listen to a pre-recorded passage and to read aloud into their own microphones. Using individual headsets, the student listens to his or her own voice along with the pre-recorded voice.

Chomsky (1976) also reported success in improving reading skills in young children who did not learn reading skills with traditional methods of instruction. In this study, the students listened to a pre-recorded passage multiple times, while following along either silently or orally. This procedure was repeated until the students could orally read the passage fluently without audio support. The children not only became fluent with the selected passage, but they required fewer listenings for fluency with each successive passage.

Holmes and McLaughlin (1987) employed assisted reading techniques with three fourth-grade students who were having reading difficulty. In this study, the teacher recorded passages from the children's basal readers on audiocassettes. The students listened to the tapes and followed along silently. The procedure was repeated for three days, after which the students read the same passage for 1 minute. This resulted in a decrease in student errors and increased correct rates in all three students.

Van Wagenen, Williams, and McLaughlin (1994) replicated the results of Holmes and McLaughlin (1987) with three Spanish-speaking students who were learning English as a second language (ESL). The assisted reading procedure used in this study resulted in improved reading rates and decreased error rates for all three children. In addition, the use of assisted reading resulted in improved comprehension skills. Another analysis of assisted reading by Gilbert, Williams, and McLaughlin, (1996) found an increase in the frequency of words read by three elementary students with learning disabilities. Alber-Morgan, Ramp, Anderson, and Martin (2007) employed repeated reading (assisted

reading) and performance feedback to improve the fluency and comprehension with four students with behavior disorders in a special day school. They found increased fluency with three of the four students and improved literal and inferential comprehension with assisted reading and performance feedback. Thus, these studies demonstrated that assisted reading programs can be used successfully with non-English speaking students as well as with students who are English speaking.

Carbo (1978) also utilized teacher-made audiotapes to increase reading fluency for students with learning disabilities. However, in this study the audiotapes were developed from teacher made passages, rather than from commercially prepared textbooks, in order to modify the length and difficulty of the passages according to the reading skills of the student. Thus, this study demonstrated that assisted-reading techniques can be useful with students who have learning disabilities. However, because this study used specially-designed teacher made materials, it is unclear whether these procedures would have been equally effective using the students' regular basal readers. It is possible that the improvement in reading fluency was due to the fact that adapted materials were used with the students, rather than the use of assisted-reading techniques.

Sherman, McLaughlin, Derby, and Johnson (2009) employed an assisted reading program using a computer-based program with a single middle school student with learning disabilities. The outcomes evaluated with an ABABA design indicated that decreases in time to read passages, improvements in comprehension, with a reduction in errors.

The purpose of this study was to identify the critical components of an assisted reading package for a third-grade student with reading deficits. First, the passages from stories in the participant's classroom text were identified for intervention. Next, an assisted reading package, which consisted of the identified material was read to the student by one of the researchers who read the passage the first time through and then reading aloud with the researcher while following along with his/her finger. The students then read the passage aloud once, and three more times silently. Finally, the student was required to read the passage aloud in to an audio recorder for later analysis. In the present study, we used a component analysis procedure (Wacker, Steege, Northrup et al., 1990) to systematically test the significance of each component of the assisted reading method. The results of the component analysis on both reading fluency and comprehension were analyzed.

2 Method

2.1 Participant and Setting

The participant was an elementary school student who was an inpatient at a psychiatric center for children and adolescents, located in a major medical center in the Pacific Northwest. The subject was 9-years-old and had attended third grade in his local school district. Based the participant's test scores from the *Woodcock Johnson Psycho-educational Battery* (Woodcock & Johnson, 1977) he was performing at a half year below grade level in reading. From the WISC-R, the participant was of average intellectual ability of 100 when it was administered two months prior to data collection.

The setting for the study was a psychiatric unit that provided a classroom setting for inpatients during their stay at the center. The length of stays ranged from 30 to 45 calendar days. There were an average of 6 to 8 students in the classroom at one time. The students receive individual instruction in basic academic skills, such as, reading, spelling, math, and handwriting. The classroom was staffed by two certified teachers and from one to two practicum students from a local university.

The passages employed were approximately 4 minutes long and chosen from the subject's daily third grade classroom reader. The number of words per passage ranged from 398 to 470 words. The

comprehension questions were taken from the text and were listed at the end of each story. The number of questions varied according to the particular passage. A Fry readability of the reading materials was found to be at the third grade second month level.

2.2 Dependent Measures and Measurement Procedures

The target behaviors were the percentage of words read correctly per session, error per minute, and comprehension. A correct word was defined as, a word read without any mispronunciations of the whole word or word parts. The percentage of words read correctly per session was measured by dividing the total number of correctly read words by the total number of correct and error words.
Errors were measured by counting the number of errors which included: (1) insertion of extra words, (2) omissions of words or word parts, (3) mispronunciations of whole words or word parts, (4) word or sound reversals, and (S) substitutions of words or word parts. Mispronunciations attributed to speech impediment, repetitions, and self-corrections were not counted as errors. The number of errors was divided by time to determine the number of errors per minute.

Comprehension was evaluated as the percent correct on the comprehension questions at the end of each passage. There was an average of eight comprehension questions asked over each passage. These were written to assess the student's retention of the material read. These questions varied from straight recall, sequence, or vocabulary items.

Data were collected via the student's audio recording of the passage. Each session lasted approximately four minutes. Each individual researcher calculated the correct reading rate, error rate, and reading comprehension for each session.

2.3 Experimental Design and Conditions

The component analysis was implemented within a reversal design ABCBDBEB (Barlow, Nock, & Hersen, 2008; Kazdin, 1982). This design was employed to evaluate the effects of the removing each of these three components of assisted reading (e. g. auditory, repeats, and the visual model). Each of the components was evaluated separately by systematically removing them one at a time, and analyzing their effects independently. A description of the various phases follows.

Baseline (BL). The reading material was taken from the student's classroom reader, entitled *Stories for Children*. Baseline instruction consisted of the reading instruction typically used in the classroom to teach reading skills. This included the researchers introducing and discussing new vocabulary words within the assigned section and having the student practice reading the designated passage silently. The student then read the passage into the cassette recorder. After reading the assigned passage, the student completed the comprehension questions that accompanied each passage. No feedback was given to the student on his overall performance.

Assisted reading (AR). During this phase, the complete assisted reading package was implemented. First, the student listened while one of the researchers read the passage aloud. This step formed the auditory component of the package. Then the researcher read the passage again, while the student followed along with his/her finger. This step formed the visual component of the package. Next, the student independently read the passage to the researcher and then read the passage silently three times. These steps formed the repeated reading component of the package. The student then read the passage aloud into a cassette recorder and then completed the comprehension questions. Each session lasted approximately 40 minutes. This condition was in effect four different times over the duration of the

experiment and it always followed either baseline or an assisted reading condition where a component had been removed. It was employed for a total of 12 sessions.

Assisted reading minus auditory (AR-A). During this phase, the auditory component of the assisted reading package was removed. This entailed the omittance of modeling the assigned passage for the student. Therefore, the student was asked to independently read the passage both silently and aloud. This was in effect for three sessions.

Assisted reading minus repeats (AR-R). During this phase, the researchers omitted the repeated reading component of the assisted reading package. This entailed the omittance of the subject being able to reread the passage silently three times before reading aloud for the second time. This was in effect for three sessions.

Assisted reading minus visual (AR-V). During this phase the researchers omitted the visual module component of the assisted reading package. This entailed the omittance of the subject being able to see and follow along with the passage while the researchers read aloud. This was in effect for three sessions.

2.4 Interobserver Agreement and Reliability of Measurement

Interobserver checks were made three times during baseline and five times during each component of assisted reading. For words read correctly, and errors, an agreement was scored if both observers recorded the word as either correct or incorrect. A disagreement was scored if one observer recorded a word as incorrect and the other scored the same word as correct, or vice versa. For comprehension questions, both observers had to score the answer in the same manner. Any disagreement was scored as an error. Interobserver agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Interobserver agreement for words read correctly was 96% (range 88 to100%). Interobserver agreement for error rate was 96% (range 88% to 100%). Interobserver agreement for the percent correct for comprehension questions was 100%. Data as to the implementation of the various experimental manipulations were taken from the audio-tapes and from the research verification form (McLaughlin, B. Williams, R. Williams, Peck, Derby, Bjordahl, & Weber, 1999) completed by the classroom teachers. Reliability as to the fidelity of the independent variables was 100%.

3 Results

3.1 Percent of Words Read Correctly

As can be seen in Figure 1 in the upper panel, the percent of words read correctly by our participant varied in baseline condition and was quite high (M = 94%; range 91% to 96%). During the assisted reading intervention, the percent of words read correctly increased (M = 96%; range 95% to 97%). For the withholding of the auditory component, the percentage of words read correctly decreased (M = 93%; range 92% to 94%). With the reintroduction of assisted reading, performance increased, (M = 97.3%; range 97% to 98%) With the withholding of the repeats component the words correct declined slightly (M = 92.3%; range 92% to 94%). The replication of assisted reading improved his percent correct (M= 97.6%; range 97 to 98%). Finally, with the absence of the visual module the words read correctly replicated the results found in baseline (M = 94%; range 94% to 95%). The final assisted reading condition resulted in an increase in percent of words correct (M = 97%; range 96% to 98%).

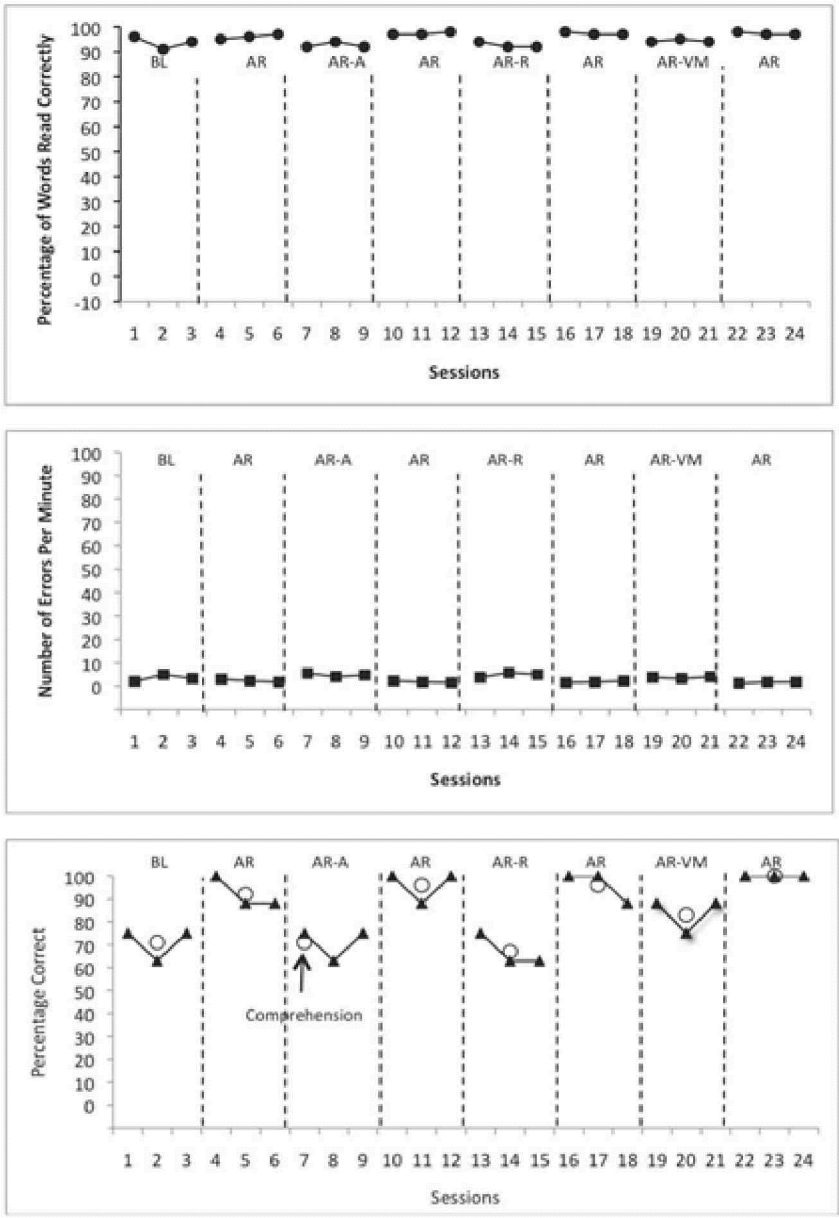

Figure 1: The percent of words read correctly (upper panel), errors per minute (middle panel), and comprehension (lower panel) during the various experimental conditions BL = baseline; AR = assisted reading; AR-A = Assisted reading minus auditory; AR = assisted reading; AR-R = Assisted reading minus repeats, AR = assisted reading; AR-VM= Assisted Reading minus visual; and AR = assisted reading. Open circles represent condition means for comprehension.

3.2 Errors Per Minute

For baseline, the participant's error rate per minute averaged 3.33 words (range = 2 to 5 errors). During the assisted reading intervention, error rate decreased (*M* = 2.31; range 1.75 to 3.0). With the absence of the auditory component, his average errors increased during assisted reading (*M* = 4.75; range 4 to 5.5 errors). A replication of the entire assisted reading package produced a decrease in

errors (*M* = 1.83; range 1.50 to 2.25 errors). When repeats were removed, (AR-R), his average errors increased (*M* = 4.83; range 3.75 to 5.75 errors per minute). A reintroduction of assisted reading generated a decrease in errors (*M* = 1.83; range 1.5 to 2.25 words per minute). The absence of a visual module increased the number of errors per minute (*M* = 3.67; range 3.25 to 4.0 errors). The final implementation of the complete assisted reading program decreased the number of errors per minute (*M* = 1.52; range 1.25 to 1.75 words).

3.3 Comprehension

The percentage of correct for comprehension questions for our participant during baseline was 71% with a range 63% to 75%. With the implementation of the assisted reading package, the percent of comprehension questions answered correctly increased (*M* = 92%; range 88% to 100%). When the auditory modeling component of assisted reading was removed, the percent of correct comprehension questions correctly answered decreased (*M* = 71%; range 63% to 75%). The replication of the total assisted reading package produced an increase in comprehension (*M* = 96% range 88% to 100%). With the absence of the repeats, the comprehension scored decreased (*M* = 67%; range 63% to 75%). A reintroduction of the assisted reading package yielded an increase in comprehension (*M* = 96%; range 88% to 100%). When the visual module of assisted reading was removed, comprehension averaged 84% with a range of 75% to 88%. The final implementation of the total assisted reading program, produced an improvement in comprehension to 100%.

4 Discussion

This case study indicated that the assisted reading intervention was very effective in increasing reading fluency and accuracy for a student who had a reading deficit. The results of the component analysis utilized with the assisted reading program, indicated that the repeated reading element along with the auditory feedback are the most beneficial. With the implementation of the assisted reading there was an increase in the percentage of words read correctly per session. The absence of both the repeats and auditory component slightly reduced the words read correctly. The withholding of the visual module corresponded with the baseline data. These outcomes were replicated four different times. In evaluating the percent of comprehension questions that were answered correctly, it was concluded that the absence of the auditory and repeats components resulted in a decrease in comprehension accuracy. However, the absence of the visual module appeared to have a small effect on comprehension performance for our participant. The number of errors or corrects were somewhat affected by the absence of any one component. The assisted reading program, as a whole, appears to be most beneficial for the related subject. During the assisted reading intervention the subject's errors decreased and his percentage of accuracy in words read correctly was the highest.

An additional manner to evaluate the various components of assisted reading would have been to employ an alternating treatments design (Barlow et al., 2008; Kazdin, 1982). In this way, the various components could be evaluated each session. In the present case report, we had three sessions for each of our comparisons. The return to the total package of assisted reading took place four times for a total of 12 sessions. It is possible that have more opportunity to experience the complete assisted reading package, improved the participant’s scores on all three measures. The use of an alternating treatments design allows one to make brief one-session comparisons and order effects are kept to a minimum (Barlow et al., 2008).

There were several limitations in the present case report. First, at various times during research the subject complained of blurry vision and sleepiness during both morning and afternoon sessions. The participant wears glasses, but may need a new prescription. His level and type of medication may have

been a factor for both of the above symptoms. Second, future studies should concentrate on the effects of a component analysis of the assisted reading package with more participants. Since, our study was limited to just one child, the results maybe somewhat unclear and biased based on the students mood, vision, and medication level. With such an analysis, that the results and trend should be more decisive. The reading passages that our participant read each day were varied. This was done to prevent our student from memorizing reading materials. An informal reading inventory of the text, indicated increases in difficulty as the student progressed through the material. However, this is what we typically find in reading materials employed in the schools.

The assisted reading method used in this study was economical as well as effective. It replicated much of the previous research with assisted reading (Alber-Morgan et al., 2007; Gilbert et al., 1996; Sherman et al., 2009; Van Holmes & McLaughlin, 1987; Van Wagenen et al., 1987) and its many variations (Blum & Koskinen, 1991; Carbo, 1970; Cunningham, 1978, 1979, Heckelman, 1979; Lorenz, 1979; Samuels, 1979). In the present analysis, we could employ assisted reading in a unique classroom setting in a hospital. Teachers at the study site appeared to be interested and enthusiastic about utilizing this program. The assisted reading program is a very useful individualized method of teaching reading. Therefore, the program could be beneficial for both teachers and students at the classroom located on the psychiatric unit for children and adolescents where much of instruction is individualized. Also, as noted in previous research, assisted reading can be employed in more traditional special education classroom settings.

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Normal Paraffin Production Process of Kerosene in Oil Refinery Company

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Abstract *– The took of unit 100 s separating needed cuts for continuing the process & producing LAB of Oil cuts "C10 _ C13" which is required. These are separated by two distillation towers. In the first tower called (STRIPPER COLUMN T_101) that consist of so trays, lighter cuts of C10 that are called LIGHT END. Are separated and the product of the lower level of tis tower goes to the 2nd tower called (Return Column T_102). This one consist of 60 Trays. In the bottom of tower products that are heavier than C13 and called heavy end are separated, & the products of the tower, as main products of unit 100 go to the unit 200 for hydrotreating. The purpose of using two tower is that in lower temperatures lighter materials get separated and in higher temperatures higher materials get separated.*

Key Words – *Separating, Light End, Temperatures, Distillation Towers*

1 Introduction

As it had been referred to, this part consists of units 100,200,300. That unit 100 to 300 is related to the main procedure of LAB production process.

1.1 The Unit 100

The took of unit 100 s separating needed cuts for continuing the process & producing LAB of Oil cuts "C_{10} _ C_{13}" which is required. These are separated by two distillation towers. In the first tower called (STRIPPER COLUMN T_101) that consist of so trays, lighter cuts of C_{10} that are called LIGHT END.Are separated and the product of the lower level of tis tower goes to the 2^{nd} tower called. This one consist of 60 Trays. In the bottom of tower products that are heavier than C_{13} and called heavy end are separated, & the products of the tower, as main products of unit 100 go to the unit 200 for hydrotreating. The purpose of using two tower is that in lower temperatures lighter materials get separated & in higher temperatures higher materials get separated.

The Procedure of Process in Unit 100 (Pre-Fractionation): As it can be seen in PFD related to the unit 100, kerosene that comes from Isfahan refinery is gathered in tank TK-101. Then by using the pump P-106 goes inside the container V-101.Fr the sake of preventing decrease of pressure, that is because of sediments in the equipment, the fl-101 filler is before v-101 container, and also in order to refine the feed of sediments and oscillating particles. v-101 works as a surge drum, and its duty is preventing from surging liquid flow, in order to quit the flow monotonously. quitting liquid of v-101 container is done by pump p-101,They pass liquid with 7-bar pressure and a temperature about 30°c of E-101 & E-102 convertor in order to pre-warm it, and then the liquid would go to T-101 tower for

separation with a temperature about 210°c. This tower would act as a STRIPER and consist of so trays.

Light End cuttings(cuttings lower than C_{10}) go out of the tower from its top, and in order to cool down pass of Fan FA-103 and go through surge drum V-102. The pump P-102 quits the liquid of this container. The output of this pump deuides into two branches. One branch as a reflux goes to the tower again for better separation. The other branch as the product of Light End directed to the tank TK-102, and collected there, than goes back to the refinery.But the products of the bottom of tower are divided into two branches. One goes to E-103 (of thermo syphone kind), and after heating by HOT OIL goes back to the tower again. The other branch as the feed of T-102 tower goes to the tower by p-103 pump. This tower also has 60 trays. The product of the bottom of tower is Heavy End (cuttings more than C_{14}) that goes to the container's by pump P-105. This tower has two reboilers that heats by hot oil. The product of the top of tower consist of C_{10}_C_{13} cuttings as its main product, and after cooling by fan FA-102 goes to surge drum container V-103. We have a Reflux line of there that goes twards the tower by pump P-104, and another line that goes through this unit as the feed of unit 200 (containing C_{10}_C_{13}).

1.2 Unit 200

This unit is called hydrotreating, and its duty is removing pollutants such as sulfur, oxygen, nitrogen, and metals. As you can see in the box diagram, this unit consists of two parts: (1) reaction part, and (2) separation part

In reaction part by injecting hydrogen, some pollutants react with hydrogen & release H_2S, H_2O, NH_2. All of these reaction would happen in two reactors called PLUG that are paralell to each other and it another reactors. Other kinds of reactions that generally happen in these reactors is reacting hydrogen with linear Olefin. The next part is separation. The materials after passing two separators would go to another tower called Striper Column. There the separation of additional materials with saturated Olefins takes place completely. Saturated Olefins are now Paraffin. The additional materials sent to the furnace 600as fuel.

1.3 Unit 300 Mulks

This unit is the most complex unit. The main task of this unit is separating normal paraffin of unnormal ones. Because of being near to boiling spot, we cannot use distillation for separation so we use Extraction method by molecular sift.

Mulks Process: UOP company uses a mulks process, which is a useful method for separating normal paraffin of hydrocarbons' feed. This process is done by absorbent material. Input feed to this unit is similar to kerosene. In this process the movement of fluid on a fixed bed is assimilitated to a fluid movement that moves in the opposite side of the absorbent flow. In this process we use a solid absorbent, liquid repellant , and flow devider called POTARY VALUE. Solid absorbent are molecular sifts which can absorb normal paraffin. Unnormal & branched material don't absorb. With this physical difference in absorbance, the absorbant material can separated the materials. The repellant is a mixture of some liquid that have different boil spots with the feed. The repellant can be replaced with normal paraffin in molecular sift space. It can also separated unnormal material of molecular sift bed. The repellant is a mixture of normal panthane & isooctane. These two have a tower boil spot than the feed & can easily get separated of the feed. The input feed to this unit is a mixture of different paraffin. The output of unit consist of EXTRACT which is a mixture of normal paraffin and repellant and PARAFFINATE, that is a mixture of unnormal material & repellant. For separating the repellant form

the output, both of the flows of outputs goes to tower, in order to separate their repellant with high purity is sent to the pacole unit.

2 General Description of Operation

2.1 Feed Flow

The feed of unit 300 is provided by pump P-202A/B from the bottom of tower T-201 (STRIPPER COLUMN). The output flow of this pump goes to feed surge V-301 after heat exchange in E-207A/B and giving its heat to the tower t-201 with the temperature 177°C by a 4 inch pipe. The temperature of feed is controlled and regulated by TR-2064. The feed flow V-301 by pump P-202A/B, after passing from filter FL-301A/B goes to ROTARY VALVE under control of the flow. The existence of filter is to prevent damage to Turbine Meter & RV. The feed enter in absorbent chamber flow between | & ||A areas.

2.2 Adsorbent Chamber Flow

This part includes two tower, each has 12 beds, that in whole becomes 24 beds. At any time 4 flows enter the tower & 3 flows come out of it. Input flows (current): feed, absorbent, zone flush, line flush in. Output flows: Extract, flush out, Raffinate. A round flow (pump around stream), flows from pump (pumparound pumps- 302A/B) to the top of V-302B, and again to the p-302A/B. The pumparound flow controls the flow of each area. Absorbent chambers are devided into seven areas that are always in flow:

District I: This district consists beds which placed between Feed input region & Raffinate output region. In this district the normal paraffin's in the feed are absorbed of paraffin comes down in liquid phase, and the normal condensation of paraffin in molecular sieur goes up.

District II A: This district contains beds between Line Flush-1N & Zone Flush. In this abnormal paraffin's repel, so tis district is called washing or purification district.

District II: This district contains beds between Line flush-in & zone flush-in this unnormal paraffin's repell , so this district is called washing or purification district .

District III: This district contains bed s between line flush out & Extract .in this distract normal paraffin's that absorbed the absorbent would repell by desorbent.So this district is called desorbent district .

District IIIA: This district contains beds between Line flush out & Desorbent.

District IV: This district contains beds between Raffinate & Desorbent. This district called Holding district that separates Disorption & Absorption districts.

Because these districts are determined according to the entrance and exiting area of the tower, and each active line would go to the lower line by a turning tap, so these districts always do more towards the bottom of the tower, and after passing through the lowest part of one tower go to the toppest part of the other tower. The output flow goes to the top of another tower from the bottom of each tower by pumparound. The amount of flow in movement would be regulated by FRC in each district. Because the amount in each district is different and changes, so it's necessary to change the flow amount of pumparound in each district. This would be done by R.V/ control system. Except Raffinate flow all the

input and output flows to the chambers are under control, and there is FRC on all of them. Raffinate flow controls the chamber pressure and fixes the pressure of chamber No.2. The other 6 flows must be controlled in details. For some flows that have many changes in their containing parts like feed and desorbent, the input flow to the R.V. can be controlled by orifice.

Extract: The main products of extract are recycle normal paraffin's, Desorbent, Zone flush and Flush out. The extract flow after passing through R.V. filter, and flow control tap and extract mixing drum would go inside V-305. The extract flow that comes out of V-305 in mixed with line Flush out that comes out of R.V. and sent to T-303 (E.C.). In E.C. lighter disorbent goes out from the upside and sent to DSD. Pure normal paraffin's go out from the bottom and sent to next containers or unit. A side flow also goes out from Tray No. 15, that sent to T-302 (stripper column). This flow is full of Isooctane (iC8)

Raffinate: The raffinate flow is composed of abnormal paraffin's, desorbent and ZONE Flush. This flow gets out somewhere between I and IV. After being discharged from the turning tap, Raffinate flow goes to V-303 (Raffinate Mixing drum) and from there to T-301 (Raffinate column). Abnormal paraffin's are discharged from beneath the chamber and after letting off its heat in E-301 and E-304 and e-305 water cooler is sent to TK-304. The desorbent gets out at the top of RC chamber and after condensation in air fan, will have part of itself gotten back to the chamber as a reflux. Its other part is sent to V-307 (desorbent surg drum). Moreover a side flow is discharged from the RC whose part is sent to T-302 by P304 and whose other part is released back to the chamber.

Desorbent and Zone Flush: A mixture of n-C5 and ic8, resulting from top steams of EC and RC is sent to V-307 and as mentioned above, the side flow of the two chambers whose EC and RC is full of ic8, is sent to T-302. The aim of T-302 chamber is to provide a high-purity ic8 for head flush, line flush in dome sealant and zone flush. V-307 is a tank for saving the desorbent. If an extra compensatory flow from ic8 and nc5 is needed, the compensation will be possible by sending it to the Raffinate chamber. The desorbent is made up of normal pentane and is-o-otane, with the volume percentage of 40% and 60% by dividing nc5 into ic8 which is calculated from the top of EC and RC chambers, under control. The normal pentane and the is-o-octane are separated from each other. Nc5 is discharged from the top and pushed into T-301. IC8 is discharged from the top of T-302 with high purity. After passing E-302 (Flush Heater), Ic8 which is fed by Hot Oil, enters the FL-302 filter and is, then, divided into 4 branches:

a. Head flush
b. Line flush in
c. Zone flush
d. R.V dome sealant

After passing an orifice controlling the flow's quantity, Zone flush and Line Flush flow enter RV. The presence of nc5 in these flows causes a decrease in the retrieval of the product because nc5 enters the II district with these flows and leads the normal paraffin's to repel irrationally. The temperature of flush flows is controlled by a temperature controller which adapts the quantity of with Heater Flush. If the existence of C_g+ in the Extract is caused by the secondary flow of the Raffinate chamber, it causes the contamination of the Extract. If its existence is the result of the secondary flow of the extract chamber, it leads to a decrease in capacity. We can use TRC to prevent C_g+ to accumulate. A two-part repellent of IC5 and NC5 is used in most Molex units but some units use three-part repellents. This repellent is composed of NC8, IC8 and parasilline (PX). In these units the principles are the same. The Desorbent enters the district III with 40% and 60% of IC_8 and NC_5. The product under the Desorbent Stripper has 70-80% volume percentage and 20-30% px volume percentage.

Line Flush: Because every pipeline of every Bed line carries Extract Zone, Flush and Feed continuously, the pipeline should be washed in order to decrease and sucking out the components of

Feed before the Zone Flush is injected and discharged with the Extract. So, the pipeline is flushed as soon as the Feed enters. For this reason Flush in comes after feeding. Flush in pipeline is composed of ic8. Because the volume in the pipe is still Extract after its discharge from the pipe, if when injecting the Desorbent into the chamber, because it bets back somewhere between III and IV, some of nnormal paraffin's are discharged along with Raffinate flow. Consequently, the retrieval may reduce. So we can prevent the reduction of retrieval with the Flush out. However the flush out flow enters the EC chamber after flushing the Extract pipeline. In both enough liquid is used for cleaning the pipeline. The quantity of Line Flush flow which is controlled by the turbine has been calculated according to the control of the longest pipeline which should be washed with two times of its own volume.

Head Flushes: Flush Head exists at the top of and beneath every chamber. These flows are provided by a secondary flow which is taken from FI-302 output. The Head flush dilutes the circulating liquid slightly and is discharged along with the Raffinate flow. The lowest measure of the flush substance which can prevent the pollution, determines the intensity of the Head flush flow. V-301 within the swing of food stuck in the bottom of the tower before mentioned Mulks feed unit T-201 will be provided, V-301 has two aims:

a. In normal situations, it provides a good capacity of feed, a stable quantity of feed for absorbent chambers.
b. In Start up and off-spec periods, the output flow from beneath Extract chambers is turned back to this container.

A liquid-level measurer is considered which continually shows the liquid level in this container. This container has also a pressure-balancing pipeline which is secured to the RC. After passing the FI-30IA/B, the hydrocarbons in this container are transported directly to RV by P-301A/B. these pumps have also a minimum flow (SPILL BACK) which frequently discharges a flow into V-303 by FIC-3001.

The Extract Chamber (T-303): The aim of this chamber is to separate the Desorbent and the product of normal paraffin. The chamber has 40 trays and the feed on the 26^{th} tray enters the chamber. The extract discharged from RV enters V-305 (Extract Mixing Drum). The output discharged from V-305 and the Line Flush out discharged from RV mix with each other and then enters T-303 (E-C) through a 6-inch pipe. The product from beneath the chamber that is normal paraffin is sent to Pacolet unit by P-309 AIB under the control of LIC-3002 or to the TK-401 tank under the control of FRC-3046 after being cooled down in the E-307 water cooler. The minimum flow of the p-309 A/B pump is controlled by FIC-3025. The temperature and quantity of the output flow from beneath the T-303 chamber is determined by TI-3014 and AR-3001 is-o-paraffin analyzer. The required heat for the EC chamber's Reboiler which is of thermo siphon type is provided by the Hot Oil in it. The measure of FRC-3026 is under control. The product of the top of the chamber is the Desorbent. This product that is made up of NC5 and IC8 is discharged from the chamber with the temperature of 100^{o} C and after passing the FA-302 A/D air fan and condensation with 40^{o} C temperature enters V-306 (Extract column receiver). A butterfly valve and the related controller PRC-3039 on the output flow control the chamber's pressure from the top of it. A v-305 side-pass pipe connects the pass line to the pipeline at the top of the chamber. There is a PDIC on this pipeline. The pressure controller PDIC-3041 is very sensitive in comparis-on with incondensable gases. These gases not only reduce the condensers Efficiency, but they also Erratic control the pressure. The temperature coming from the condenser is slightly under the point in which the majority of the vapors will be condensed. If the liquid coming out of the condenser is hot, not all of the substances which enter the receiver will be condensed. Poor and unsuitable control over the temperature coming out of the condenser will cause poor control over the chamber pressure. With the aid of the manual controller of HC-3002 air fan venetian blinds, reaching a suitable condition for operation. The liquid in V-306 is divided into two components by P-307. One of them is returned as a reflux to EC. The measure of the reflux is controlled by FRC- 3028 which is (NAA MAFHOOM). The other component of the discharged flow from P-307 is sent to V-307 (Desorbent surge drum). The

quantity of this flow is controlled by FRC-3027 which is (NAA MAFHOOM). Moreover a secondary flow is discharged from on the chamber's 15th tray with 117^{o} C temperature. This flow goes into P-308 A/B through a 3-inch pipe and is sent to T-302 (DESORBENT STRIPPER) through a 2-inch pipe. It is full of is-o-octane (ic8). It is very to control the EC chamber carefully because any indisposition in this condition a reduction in normal paraffin's purity, a reduction in retrieval or losing the Desorbent. If the upper vapors of EC chamber are polluted with normal paraffin the product's retrieval will be reduced and if the Desorbent pollutes the lower part of the chamber and exists in this part's product, the purity of normal paraffin product will be reduced.

3 Conclusion

3.1 Raffinate Chamber (T-301)

The aim of this chamber is to separate the Desorbent from the abnormal parffins. In addition, this chamber is a source for T-302 chamber's feed. The T-301 (RC) has 40 trays and the feed enters on the 26th tray. The Raffinate flow emitted from RV enters V-303 and then is sent to T-301 while controlled by PRC-3027 which is itself under the order of V-302 B absorbent chamber's pressure. The chamber's lower part's product which has abnormal paraffin’s in it is sent to TK-304 tank with a temperature of 55^{o} C after losing its heat in E-301 and E-304 and E-305 water cooler. The altitude of the lower part of the chamber (LIC-3005) controls this flow. This chamber's heat is provided by the E-303 chamber's reboiler which is of thermo siphon type. In fact the heat is taken from the Hot Oil in circulation and its quantity is determined by the Hot Oil circulating flow and with the aid of FRC-3031. The upper part's product that is the Desorbent is emitted with 96^{o} C temperature and enters the V-304 (Raffinate Column Receiver) after passing the FA-301 A/D air fan and being condensed. The chamber's pressure is controlled by a butterfly valve and PRC-3051 which is upon the vapors flow emitted from the chamber: a side-pass pipeline bypasses the FA-301 A/D on which is the PDIC-3053. The flow emitted from V-304 is divided into two parts. One part is controlled as a reflux whose measure. The other part of the flow is sent from P-3031 to V-307. This flow's quantity is controlled by FRC-3031 which . The secondary flow is sent to T-302 by p-304 A/B. P-403 A/B returns a substantial part of the flow to lower part of the tray from upper part of which the secondary flow is taken (the 11th tray). This returned flow is controlled by FRC-3030 which is itself adapted by RFC-3029. This part is so important in controlling the chamber precisely. A slight impurity in abnormal paraffin in the Desorbent reduces the product's purity and losing the Desorbent in the chamber's lower part causes a need for new Desorbent.

3.2 Strippe Desorbent (T-302)

This chamber has 21 trays and the feed enters on its first tray. The aim of the chamber is to produce high-purity is-o-octane, Dome Sealant line, Zone flush, Head flush and Flush in. its feed is provided in two ways: (1) The secondary flow from RC and (2) The secondary flow from EC whose quantity is controlled by FRC-3034

There is also another input flow that the output from RV Dome Sealant which enters the lower part of the 21th tray. Ic8 is discharged from beneath the tower by P-305 A/B and with high purity and is divided into four branches after passing the E-302 (Flush Neater), taking the Hot oil's heat and passing the FI-302 filter. Ic8's temperature is controlled by the TRC-3036 which operates on TRC-3035 (located on the circulating hot oil flow). Spill back flow's minimum (of p-305 A/B) is controlled by FRC-3036. E-301 is in fact the T-302 chamber's reboiler which is of thermo siphon type. The chamber's heat is provided by the flow emitted from T-301 (RC) and its quantity is adapted by FRC-3037 and a y-shaped tap. As mentioned above, normal pentane and is-o-octane are separated in T-302,

NC8 is emitted from the chamber's upper part and discharged from T-301 directly into the lower part of the 10th tray through an 8-inch pipe.

3.3 Drum Desorbent (V-307)

V-307 is in fact the source of the Desorbent during the operation and provides the required capacity for the operation. V-307 is connected to the Extract column Receiver through a pipeline and therefore has the same pressure as V-306. The output of the container enters E-508's crust through p-310 A/B (Desorbent pump) after a heat exchange with the output of the Raffinate chamber's lower part in E-504 and taking heat. There, it exchanges heat with Hot oil and takes heat again. The quantity of output temperature from E-508 which is in fact the input Desorbent's temperature to the absorbent chambers is controlled by which operates on FRC-3041 (located on circulating hot oil path). Finally, the Desorbent enters the FL-303 filter and then the absorbent chambers. The P-310 A/B has a returned minimum flow (Spill Back) whose quantity is controlled by FRC-3039.

3.4 The Desorbent Drier (V-310)

The aim of V-310 is to discharge the little amount of water which is emitted from the absorbent chamber along with the Desorbent. V-301 is composed of a Fixed bed of the renewable substance-cooler. During the operation, the liquid hydrocarbons ascend through the bed of the upward move and the water along is absorbed by the substance drier. V-301's feed can be a secondary flow taken from DSD which is sent to V-310 by P-310 A/B or it can be a branch of liquid flows produced at the upper part of Raffinat and Exteate chambers which is periodically sent to this part and then to the DSD after water-taking. However, the flow sent from any of the sources mentioned enters V-310's lower part after passing thee-309 water cooler and being cooled, and is discharged from the top. The drier has been filled by a four-angstrom Molecular Sieve When the sieves were filled they have to be renewed. This is done by vaporized Process fluid in 280^{o} C temperature. Normally the drier works a period of 6 days and then a 24-hour period is needed for its renewal. The Desorbent Drier system is used as a dependent unit in Molex process. Its equipments are:

a. (V-310) DESORBENT DIER
b. (V-311) REGENARATION COALESER
c. (V-312) REGENARATION SURGE DRUM
d. (E-316) REGENARATION HEATER
e. (E-317) REGENARATION CONDENSOR
f. (P-315) REGENARATION CIRCULATION PUMP

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Quality Assessment of Shallow Groundwater in Some Selected Agrarian Communities in Patigi Local Government Area, Nigeria

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Abstract *– A study was conducted to determine the biological, chemical and physical drinking water quality from shallow wells in agrarian communities. An in-situ membrane filtration test kit was used to determine the microbiological quality of water and a photometer was used for the chemical analyses. Water samples were collected from protected shallow wells during wet and dry seasons of the year 2012 to determine the change in quality with different seasons. The results of the analysis show that Gapkan had the least value of pH of 6.7 while Lade had the highest value of 8.4. ANOVA ($P<0.05$) showed pH to be statistically higher during the wet season than in the dry season. The conductivity during the wet season was observed to range between 1210 µS/cm and 1678 µS/cm for Kpada and Gakpan communities respectively. Turbidity values during the wet season ranged between 4 and 7 NTU while dry season analysis ranged between 2 and 3 NTU. Sulphate concentration was the lowest at 431 mg/L in Fey and highest of 532 mg/L at Duro and Rifun Woro during the wet season. Chloride content within the wet season varied between 260 and 269 mg/L while that of the dry season varied between 124 and 130 mg/L. Highest and lowest concentrations of nitrate recorded during wet season was 0.42 and 0.23 mg/L for Kusogi and Fey respectively. The colour observed during the wet season ranged between 17 TCU and 19TCU while that of the dry season ranged between 10 and 13 TCU. Current status of the water in the study areas are fit as source of drinking water for the community, though plans should be put in place for mini treatment plants that can serve these communities to enhance good drinking water delivery..*

Key Words – *Agrochemicals, agriculture, groundwater, potable, wastewater, water, shallow well*

1 Introduction

Water is the essence of life and safe drinking water is a basic human right essential to all (Versari, et. al., 2002). It is essential for the wellbeing of mankind and for sustainable development. Though, necessary for human survival, many are denied access to sufficient potable drinking water supply and

sufficient water to maintain basic hygiene. The effects of drinking contaminated water results in thousands of deaths every day, mostly in children under five years in developing countries (WHO, 2004a). Thus, access to safe clean water and adequate sanitation is a fundamental right and a condition for basic health (Palamuleni, 2002). The use of shallow ground water sources for drinking and other domestic purposes is a common feature for many low income communities in developing countries.

Ground water which occurs beneath the earth surface is considered free from contamination, hence usable but anthropogenic as well as natural factors are affecting the quality as well as quantity of this valuable resource. It has been estimated that once pollution enters the subsurface environment, it may remain concealed for many years, becoming dispersed over wide areas of groundwater aquifer and rendering groundwater supplies unsuitable for consumption and other uses. Therefore, understanding the potential influences of human activity on ground water quality is important for protection and sustainable use of ground water resources (Jehangir, et. al., 2011). Shallow wells are normally located in the valleys where the groundwater table is relatively high (1-4m below ground level) and infiltration of rain and river water plays a main part in groundwater recharge (Pritchard et al., 2008).

Ground water contamination is the result of polluted water infiltrating through the soil and rock and eventually reaching the ground water. This process might take many years and might take place at varying distances from various wells where such contaminations are found. Once the ground water is contaminated, it is very difficult to remediate. No doubt that the new technologies will always reduce the pollution level (Geetha, et al., 2008). Human health, agricultural development and the ecosystems are all at risk unless water and land systems are effectively managed (Kehinde et. al., 2009).

Pollution of ground water refers to any deterioration in the quality of the water resulting from the activities of man. This definition also includes apparently natural processes like saltwater encroachment into freshwater- bearing aquifers in coastal areas resulting from the artificial lowering of ground-water heads. Most pollution of ground water results from the disposal of domestic, municipal and industrial wastes on the land surface, in shallow excavations including septic tanks, or through deep wells and mines; the use of fertilizers and other agricultural chemicals; leaks in sewers, storage tanks, and pipelines; and animal feedlots. The magnitude of a pollution problem depends on the size of the affected area, the amount of the pollutant involved, the solubility, toxicity, and density of the pollutant, the mineral composition and hydraulic characteristics of the soils and rocks through which the pollutant moves, and the effect or potential effect on ground-water use.

Due to the increase in population growth and elevated living standards and coupled with the ever increasing demands for clean water around the world, more water is required for growing environmental concerns such as aquatic life, wildlife refuges, scenic values, and riparian habitats (Li, et al., 2007). The upsurge in population and the establishment of industries involved in the manufacture of various agrochemicals, petrochemical and house-hold products have resulted to the increase in the production of hazardous substances including heavy metals in developing countries (Oguzie and Okhagbuzo, 2010). Application of various agrochemicals and fertilizers for improved and increased agricultural produce can release contaminants of various categories such as nitrate, bacteria, viruses, and hazardous household chemicals to the subsurface, posing potential threats to nearby wells and surface water. The impact of human activities in and around agricultural farmlands is felt on the physical and chemical properties of water on which the sustenance of the various forms of life is dependent upon.

Past and present pollution of land with heavy metals as a result of atmospheric deposition and the application of fertilizer have led to an increase in the levels of heavy metals in the soil of farmland and uncultivated land. These heavy metals of human origin, together with amounts that are naturally occurring in the soil, cause emissions into groundwater and surface water (Bonten and Groenenberg, 2008). Depending on the area under study, underground water quality in basins are based on various

factors such as, influx of industrial effluent, influx of water through rainfall, soil, agriculture pattern etc., so we can say that by these factors, the underground water quality can be varied qualitatively and quantitatively.

For most communities, the most secure source of safe drinking water is pipe-borne water from municipal water treatment plants. Often, most of water treatment facilities do not deliver or fail to meet the water requirements of the served community; due to corruption, lack of maintenance or increased population. The scarcity of piped water has made communities to find alternative sources of water: ground water sources being a ready source. Wells are a common ground water source readily explored to meet community water requirement or make up the short fall (Adekunle, 2009).

The lack of safe drinking water and adequate sanitation measures lead to a number of diseases such as cholera, dysentery, salmonellosis and typhoid, and every year millions of lives are claimed in developing countries. Diarrhea is the major cause for death of more than 2 million people per year world-wide, mostly children under the age of five. It is a symptom of infection or the result of a combination of a variety of enteric pathogens (Zamxaka et. al., 2004).

The use of physic-chemical properties of water to assess water quality gives a good impression of the status, productivity and sustainability of such water body (Mustapha, 2008). The evaluation of potable water supplies for coliform bacteria is important in determining the sanitary quality of drinking water (Zamxaka et. al., 2004).

The aim of this study is to evaluate the sources of potable water from the different locations in Patigi Local government area of Kwara State and to clarify the concerns about the quality and safety of water used as drinking water within the locality.

2 Methodology and Materials

2.1 Study site

Patigi is one of the sixteen local government areas of Kwara State, north central area of Nigeria. The surface mean annual temperature ranges from 24 to 41^0C and the mean annual precipitation of 86 – 1100 mm (IMS, 2011). The vast area has a population of 600,000 (NPC, 2009). The area is one of the largest fadama lowland areas of the State with river Niger as a major water source for irrigation and other farming activities. The most common sources of drinking water are mainly open wells, water vendors and boreholes which are mostly not functional. Due to the rural nature of the study area, pipe-borne water is not provided for in most of the communities except in Patigi Township which is not supplied for domestic use on regular bases. The quality of water supplied by water vendors cannot be guaranteed.

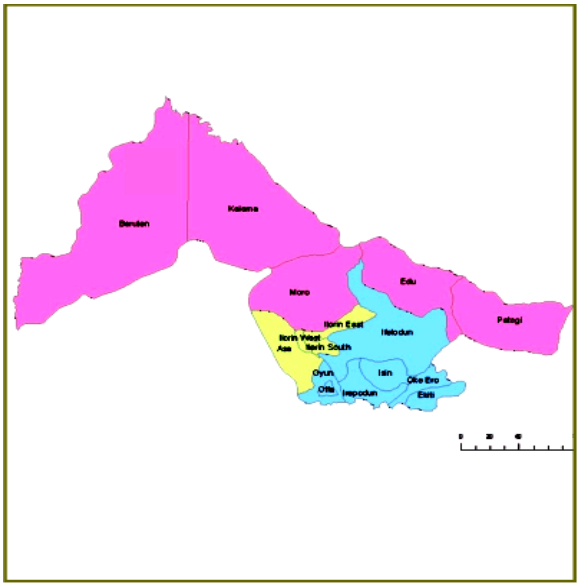

Figure 1: Map of Kwara State

Existing wells within some selected communities were high rates of agricultural activities are known to take place and farm locations were not far from the residential areas of the farmers were considered. The areas covered during the study period are presented in Table 1 below.

Table 1: Areas covered during the study period in Patigi Local Government Area of Kwara State.

S/no	Location	Sample Label	No of samples collected
1	Gakpan	G	4
2	Duro	D	4
3	Kapda	K	4
4	Kusogi	K_u	4
5	Sokingi	S	4
6	Patigi	P	4
7	Lade	L	4
8	Rifun Woro	R_w	4
9	Tankpafu	T	4
10	Fey	F	4

This area is characterized by extensive agricultural operations located in low-relief basins underlain by shallow, alluvial aquifers of River Niger. The most widespread and common type of crops grown in these areas are cereal crops. Farm operations in this region are family owned arable farms with an average land size of nearly 10 acres some of which are irrigated during the dry season.

2.2 Sample Collection and Analysis

Samples were collected in clean 1.5 liter plastic jars with screw caps and labeled with appropriate codes of the first letter of the name of the community and then a number ranging between 1and 4 depending on the total number of samples collected from the location. Some parameters such as pH,

electrical conductivity and Total dissolved solids, total hardness, calcium, magnesium, chloride, nitrate and sulfate were determined using standard methods for examination of water samples quality.

The in situ parameters, pH, electrical conductivity and total dissolved solids were measured using potable digital meter, EXTECH pH-100 and HM digital EC/TDS/Temperature COM-100. Total hardness, calcium and chloride were determined using titrimetric method. Nitrate and sulfate was determined using HACH DR/2000 direct reading spectrophotometer. Total solids and magnesium were determined by gravimetric and Atomic absorption spectrophotometer (AAS), respectively (Balogun et al., 2012). Water samples intended for chemical analyses were vacuum filtered through 0.45-lm nylon membranes. Samples intended for dissolved metal analyses were preserved with concentrated nitric acid, and all samples were kept on ice until they could be refrigerated. Field duplicates were collected on three occasions. Samples collected for isotopic analyses were filtered, frozen, and shipped overnight to the lab. Isotope analyses have been used in a number of previous studies as a tool for identifying nitrate sources (Wilcox et. al., 2005).

The samples were chemically analysed at the Water Laboratory of the Federal Ministry of Water Resources in Minna, Nigeria. The instrument performance check solutions and calibration blanks were analyzed for every 10 samples. Alkalinity was measured by titration with hydrochloric acid according to Standard Method 2560 (American Public Health Association, American Water Works Association, and Water Environment Federation 1995a).

3 Results and Discussion

Surveillance of water quality to ensure microbiological and chemical safety is a vital public health function most especially in our local and small communities as most of the agricultural products and local labour are from there. Four sets of results were collected each for the two identified season (wet and dry) in the year 2012. Almost all the water samples collected from shallow wells showed evidence of previous human impact on the basis of these constituents. Although most of the parameters tested had higher concentrations than average values of WHO (2004b) and NSDWQ (2007). The physco-chemical properties of water from the various wells used for domestic purposes in the various agrarian communities were analyzed during the dry and wet seasons of the year 2012. The results obtained are presented in Tables 2 and 3.

Table 2: Average Physico-chemical parameters determined during wet season for the year 2012

Parameters and units	Samples and location										Water Quality Standard	
	Gakpan	Duro	Kpada	Kusogi	Sokingi	Patigi	Lade	Rifun Woro	Tankpafu	Fey	WHO	NSWDQ
Temperature (^{0}C)	32	33	35	33	32	33	35	34	34	36	Ambient	Ambient
pH	6.7	7.3	7.4	7.8	7.9	8.1	8.4	8.3	8	7.6	8.5	6.5-8.5
Conductivity (µS/cm)	1678	1450	1230	1210	1658	1230	1562	1653	1548	1340	1000	1000
Turbidity (NTU)	4	6	6	7	5	6	5	6	5	6	5	5
Sulphate (mg/L)	550	532	561	556	531	532	533	532	527	531	500	400
Suspended solid (mg/L)	460	428	380	425	478	385	437	461	462	434	400	500
Chloride (mg/L)	260	269	263	267	269	269	260	264	267	268	250	NS
Ca^{2+} (mg/L)	268	297	247	268	284	258	259	258	258	258	250	NS
Chromium (mg/L)	0.057	0.065	0.06	0.055	0.054	0.051	0.054	0.053	0.045	0.055	NS	0.05
Magnesium (Mg^{2+}) (mg/L)	0.03	0.04	0.02	0.03	0.03	0.03	0.04	0.03	0.05	0.045	0.05	0.02
Sodium (mg/L)	230	240	198	256	275	301	300	253	213	238	NS	200
Potassium (mg/L)	312	301	298	320	301	256	300	306	375	406	200	NS
Zinc (mg/L)	2	2.4	2.6	2	1.5	2.9	3	2.7	3.6	3.5	5	3
Nitrate (mg/L)	0.3	0.35	0.38	0.42	0.29	0.27	0.24	0.26	0.28	0.23	0.2	0.2
Copper (ppm)	0.88	0.86	0.87	0.97	0.59	0.68	0.98	1	1.1	0.75	1.3	1
Iron (mg/L)	0.35	0.28	0.41	0.32	0.31	0.33	0.32	0.35	0.31	0.32	0.3	0.3
Cadmium(ppm)	0.0045	0.041	0.043	0.042	0.039	0.035	0.014	0.014	0.012	0.014	0.005	0.003
Lead (ppm)	0.019	0.019	0.018	0.012	0.018	0.01	0.014	0.015	0.014	0.012	NS	0.01
Colour (TCU)	19	18	19	19	17	18	18	19	19	17	15	
Odor	O	O	O	O	O	O	O	O	O	O	UO	UO
Hardness (as $CaCO_3$) (mg/L)	250	230	245	250	254	276	180	198	200	202	NS	150
E. Coli count (cfu/mL)	2	1.7	1.8	2	2	2.3	2.3	1.7	2	1.6	NO	10

Table 3: Average Physico-chemical parameters determined during dry season for the year 2012

Parameters and units	Samples and location										Water Quality Standard	
	Gakpan	Duro	Kpada	Kusogi	Sokingi	Patigi	Lade	Rifun Woro	Tankpafu	Fey	WHO	NSWDQ
Temperature (^{0}C)	47	47	46	46	47	47	46	47	46	46	Ambient	Ambient
pH	6.9	7.3	7.1	7.2	7.2	7.4	7.8	7.6	7.4	7.6	8.5	6.5-8.5
Conductivity (µS/cm)	1176	1098	1056	1210	1256	1076	1232	1256	1324	1231	1000	1000
Turbidity (NTU)	3	3	2	2	3	3	2	3	3	3	5	5
Sulphate (mg/L)	289	350	231	249	321	362	363	352	287	311	500	400
Suspended solid (mg/L)	248	312	256	312	267	298	372	312	321	344	400	500
Chloride (mg/L)	130	129	129	127	129	129	130	124	127	128	250	NS
Ca^{2+} (mg/L)	241	253	212	246	234	216	218	128	197	258	250	NS
Chromium (mg/L)	0.035	0.032	0.041	0.04	0.047	0.039	0.039	0.041	0.031	0.027	NS	0.05
Magnesium (Mg^{2+}) (mg/L)	0.021	0.032	0.017	0.024	0.024	0.021	0.032	0.021	0.041	0.037	0.05	0.02
Sodium (mg/L)	176	185	169	181	183	187	198	179	185	197	NS	200
Potassium (mg/L)	187	157	182	162	171	140	182	198	198	194	200	NS
Zinc (mg/L)	0.79	1.5	1.2	1.6	1.4	1.2	1.9	1.7	1.8	2.1	5	3
Nitrate (mg/L)	0.17	0.11	0.13	0.11	0.15	0.11	0.12	0.11	0.11	0.18	0.2	0.2
Copper (ppm)	0.82	0.81	0.75	0.87	0.61	0.61	0.97	0.77	0.95	0.68	1.3	1
Iron (mg/L)	0.25	0.18	0.21	0.32	0.21	0.33	0.3	0.25	0.28	0.27	0.3	0.3
Cadmium(ppm)	0.0025	0.0041	0.0043	0.0042	0.0039	0.0035	0.0032	0.0035	0.0024	0.0012	0.005	0.003
Lead (ppm)	0.009	0.009	0.008	0.012	0.008	0.01	0.014	0.015	0.014	0.012	NS	0.01
Colour (TCU)	12	12	10	13	12	13	13	12	12	10	15	
Odor	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO	UO
Hardness (as $CaCO_3$) (mg/L)	142	143	143	146	147	143	149	146	148	143	NS	150
E. Coli count (cfu/mL)	0	0	0	0	0	1.7	1.8	0	0	0	NS	NS

Where UO means unobjectionable, O means objectionable and NS means Not Specified

3.1 Temperature

The temperature wet season ranged between the lowest value of 32 °C which were obtained from Gakpan and Sokingi respectively while maximum temperature during the wet season was observed in Fey which could be attributed the nature of the soil within the area as the most common type of soil here is the red clay type. The highest of 46 and 47 ^{0}C of temperature was observed during the dry season for almost areas under consideration. Dry season temperature was significantly higher ($P<0.05$) than the wet season. It was observed that all the temperatures were within the ambient temperature range that which is recommended by both WHO (2004b) and NSDWQ (2007).

3.2 pH and Alkalinity

The acidity or basicity of domestic water is expressed as pH (< 7.0 acidic; > 7.0 basic). The normal pH range for domestic or drinking water is from 6.5 to 8.5 according to WHO (2004b) and NSDWQ (2007). The pH ranged between 6.7 and 8.4 during the wet season of the year 2012. Gapkan had the least value of pH of 6.7 while Lade had the highest value of 8.4. During the dry season, the pH values in Gakpan increased from 6.3 to 6.9 which also was the lowest pH value while others were observed to reduce in the pH values. The highest value of pH recorded during the dry season was 7.8 for Lade community. ANOVA ($P<0.05$) showed pH to be statistically higher during the wet season than in the dry season. The values generally were found to be within the recommended range for WHO and NSWDQ respectively for both seasons. Abnormally low pH's are not common in Nigeria, but where observed to occur it may cause accelerated corrosion of the various metal mediums which the water may be stored for future use. High pH's above 8.5 are often caused by high bicarbonate (HCO_3^-) and carbonate (CO_3^{2-}) concentrations, known as alkalinity. High carbonates cause calcium and magnesium ions to form insoluble minerals leaving sodium as the dominant ion in solution.

3.3 Conductivity

The variations in conductivity during the wet season was observed to range between 1210 µS/cm and 1678 µS/cm while during the dry season the average values of electrical conductivity ranged between 1056 and 1324 µS/cm for Kpada and Tankpafu agrarian community respectively. When the results were compared with the recommended values of WHO (2004b) and that of NSWDQ (2007), it was observed that all the values for both the wet and dry seasons were found to be higher than the recommended values of WHO and NSWDQ. This shows that most of the water considered for domestic purpose was discovered to have high salt content which supports the conduction of electricity in the various water samples tested. This may also be attributed to the high rate of chemical and fertilizer application to the various agricultural lands. Some of which are retained in the soil while others are dissolved into the various water bodies in the area and they in turn find there ways into the various wells. Thus, the high rate of electric conductivity.

3.4 Turbidity

Turbidity values during the wet season ranged between 4 and 7 NTU while that of the dry season ranged between 2 and 3 NTU. It was observed that wet season for the 2012 had a high rate of impurities flowing into the various open wells which were observed to be poorly lined with Kusogi having the highest value of 7 NTU and Gakpan having the lowest of 4 NTU. Clarity of water is said to be a major factor in consumer satisfaction. Thus, turbidity has been used over many years as an indicator of drinking water quality and as an indicator of the efficiency of drinking water coagulation and filtration processes. Thus the results obtained from the ten study wells during the wet season for

the year 2012 were found to be higher than the recommended values of WHO (2004b) and NSWDQ (2007) while the results obtained for the dry season were below the recommended values of the two regulatory bodies. In general this result corresponds with the works of Zamxaka et al., (2004). Turbidity has been described as a relatively crude method of detecting a wide variety of particles from a wide assortment of sources as it provides no information about the nature of the particles. Turbidity in water is caused by the presence of colloidal and suspended matter (such as clay, silt, finely divided organic and inorganic matter, plankton, and other microscopic organisms). The added presence of turbidity increases the apparent, but not the true colour of water.

3.5 Sulphate

The fluctuations in the average sulphate concentration in wells of selected agrarian community in Patigi Local Government area of Kwara State can be observed in the Tables 2 and 4. Sulphate concentration was the lowest at 431 mg/L in Fey and highest of 532 mg/L at Duro and Rifun Woro respectively during the wet season. It was further observed that the sulphate content of most of the wells studied were relatively lower values compared with the recommended standard of WHO (2004b) and NSWDQ (2007). The values observed during the dry season were observed o be below the recommended values of both WHO and NSWDQ. Kpada had the lowest sulphate value of 231 mg/L which goes to confirm that the community is not close to any water body which could transfer this chemical into the various wells within the community. The average highest value of 363 mg/L was obtained from the Lade community. Sulphate was significantly higher in the wet season, while the order of averagely higher concentration among the agrarian communities are Duro, Rifun Woro, Sokingi, Tankpafu, Kpada, Kusogi, Gapkan, Lade, Patigi and Fey.

Sulfate is a naturally occurring anion. High concentrations of sulfate in drinking water may cause transitory diarrhea (U.S. Environmental Protection Agency, 1990b). However, toxicity is rarely a problem, except at very high concentrations where high sulfate may interfere with uptake of other nutrients. Sulphate in irrigation water has fertility benefits, and irrigation water in Colorado often has enough sulphate for maximum production for most crops.

3.6 Suspended Solids

Sediment is usually measured as a concentration of Total Suspended Solid (TSS).The TSS concentration was found to be remarkably high in all the wells within the agrarian communities considered for this study. During the wet season, TSS ranged between 527 and 550 mg/L which can be attributed to the nature of soil within the areas. During the dry season, it was observed that TSS was generally low. The highest value of TSS during the dry season was 372 mg/L in Gapkan community while the lowest value was 248 mg/L in Gapkan. All the samples for the wet season were found to be off the range of the recommended values for WHO (2004b) and NSWDQ (2007) while those of the dry season were within. This finding followed a similar trend with the works of Adejuwon and Adeniyi (2011).

3.7 Chloride

In this study, chemical analysis revealed presence of high concentrations of chloride in water from the shallow wells during the wet season which is manifested through the saltiness of water from wells. Chlorides are present in all waters with sources ranging from sedimentary rocks (particularly the evaporates), Salt 'seeps', oil field drainage, domestic and industrial contaminants (Adejuwon and Adeniyi, 2011). According to Bello and Makinde (2009), the chosen locations are located within the

Nupe basin area which may likely account for the chloride content within the various wells under consideration. The chloride content within the wet season varied between 260 and 269 mg/L while that of the dry season varied between 124 and 130 mg/L. When these values were compared with those of the recommended values of WHO (2004b) though that of NSWDQ was not available, it was observed that the values obtained during the wet season were higher than that of WHO while during the dry season the values were relatively low. Chloride is one of the constituents found in human excreta. Like nitrate, the chloride in the samples could be possibly traced to fecal contamination of shallow wells. Chloride increases with fecal coliform which is significant to coliform count.

3.8 Nitrate

The highest mean concentration of nitrate recorded during the wet season was 0.42 mg/L which was obtained from Kusogi while the lowest average recorded value of 0.23 mg/L was obtained for Fey. Though, the amount of nitrates determined during wet season was relatively higher when compared with the recommended values of WHO (2004b) and NSWDQ (2007). This can be attributed to high rate of inorganic fertilizer and chemical application on the surrounding farmlands. On the overall, the nitrate content during the wet season was found to be higher when compared with the recommended values of WHO and NSWDQ.

A decrease as observed generally in the dry season with the lowest concentration of 0.17 mg/L recorded from Lade, where high rate cereal crop plantation is practiced. ANOVA at $P<0.05$ shows significant difference in the nitrate concentration during the seasons and within the various communities. Nitrate was higher in the rainy season and the order of magnitude in the concentration among the communities was Fey, Lade, Rifun Woro, Patigi, Tankpafu, Sokingi, Gakpan, Duro, Kpada and Kusogi.

Nitrate is one of the major anions in natural waters, but concentrations can be greatly elevated due to leaching of nitrogen from farm fertilizers. The mean concentration of nitrate nitrogen (NO -N, nitrate measured as nitrogen in testing) in a typical surface water supply would be around 0.2 to 2 mg/L; however, the individual wells considered in this study showed a significantly higher concentrations during the wet season with a slight reduction during the dry season.

3.9 Colour

The appearance of water can be a significant factor in consumer satisfaction. Low levels of colour and turbidity are also important for drinking water. The colour observed during the wet season ranged between 17 TCU and 19TCU while that of the dry season ranged between 10 and 13 TCU. The colour for wet season was observed to be higher than the recommended value of WHO (2004b) while NSWDQ regulatory body in Nigeria did not have a recommended value. Fey and Sokingi had the least colour value during the wet season while communities such as Gapkan, Kpada, Kusogi and Rifun Woro had 19 TCU colour rating all as against the recommended value of 15 TCU by WHO (2004). The sources of colour in water can include natural metallic ions (iron and manganese), humic and fulvic acids from humus and peat materials, plankton, dissolved plant components, iron and sulfur bacteria, and industrial wastes or the dissolved soil particles within the area as most of the soil in this area are either clay or loam soils. This is in conformity with the works of Adejuwon and Adeniyi (2011).

Pure drinking and domestic water is a colourless liquid. Therefore, colour in water is suggestive of the presence of foreign, water-soluble substances (organic and inorganic). Thus the coloured appearance of water obtained from the shallow wells during the wet season from the ten study areas suggest

contamination, which may have its origins in dissolved products of the decay of dead natural vegetation as rainwater infiltrates to the groundwater table or it may be due to surface runoffs making input into poorly covered or lined wells.

3.10 Hardness

Hardness is generally defined as the sum of the polyvalent cations present in water and expressed as an equivalent quantity of calcium carbonate ($CaCO_3$). The most common such cations are calcium and magnesium. This can also be defined to be a measure of the capacity of the water for precipitating soap. It is this aspect of hard water that is the most perceptible to consumers. From the various samples collected during the wet season, it was observed that it ranged between 180 and 276 mg/L for $CaCO_3$. These values were found to be higher than the recommended value of NSWDQ (2007) which is stated to be 150 mg/L $CaCO_3$ while the WHO (2004b) did not have any specified value. Wells in Patigi township recorded the highest value of water hardness value of 276 mg/L $CaCO_3$ while Lade had the least value of 180 mg/L $CaCO_3$. The other agrarian had varying values, though areas with such high value of hardness were observed to be highly involved in agricultural activities which imply that more chemical application in the area. Those having between 75 and 150 mg/L CaCO3 are said to be moderately hard. Those having from 150 to 300 mg/L $CaCO_3$ are hard, and waters having more than 300 mg/L $CaCO_3$ are classified as very hard. Calcium is of importance as a component of scale.

3.11 Cadmium

The various communities considered for this study are areas which are mostly without electricity power supply, thus much batteries are used to power most of their electrical appliances. At the expiration of these sources of power supply, they are discarded anywhere within their vicinity. Cadmium occurs as an impurity in zinc which is mostly used as roofing materials in all the communities. Due to reactions of rain water with these roof materials (iron zinc), some of the dissolved materials find their way into the surrounding open shallow wells thus increasing the presences of cadmium.

During the wet season, cadmium values ranged between 0.0045 and 0.043 ppm. The values in communities like Kpada, Kusogi, Sokingi and Patigi were found to be high; this can be linked to their proximity to a mining location in the area. When the values obtained were compared with the recommended values of WHO (2004b) and NSWDQ (2007), the obtained values were observed to be higher than the recommended ones. The dry season values ranged between 0.0012 and 0.0043 ppm. The observed values were found to be below the recommended values of WHO and NSWDQ. This reduction in values of the dry season shows that the high rate of runoff and infiltration activities occurring within the communities during the wet season the higher values of cadmium.

3.12 Chromium

Primary sources of chromium in water is usually from mining areas, wastes from electroplating operations which is not a practice in the all the communities considered for this study, and garbage or refuse dump sites which is very much common in all the study areas. The chromium values during the wet season ranges between 0.045 and 0.065 mg/L while that of the dry season ranged between 0.032 and 0.047 mg/L. It was observed that the values obtained during the wet season were slightly higher than the recommended value of NSWDQ (2007) though no recommended value for WHO (2004b) was observed. The obtained values during the dry season were observed to lower compared to the

value of NSWDQ (2007). This could be linked also to the rate of runoff and infiltration activities within the various communities.

Chromium in excess is toxic thus leading to liver and kidney damage, internal hemorrhage, and respiratory disorders, as well as causing cancer in humans and animals through inhalation exposure, but it has not been shown to be carcinogenic through ingestion exposure (U.S. Environmental Protection Agency, 1985a; U.S. Environmental Protection Agency, 1991e).

3.13 Copper

Copper is commonly found in drinking water (U.S. Environmental Protection Agency, 1985a) though it is a nutritional requirement. Lack of sufficient copper leads to anemia, skeletal defects, nervous system degeneration, and reproductive abnormalities. During the wet season the obtained values from the study areas ranges between 0.59 and 1.10 ppm while during the dry season it ranges between 0.61 and 0.97 ppm. These values were observed not to be higher than recommended values of 1.3 ppm for WHO (2004b) and 1.0 ppm for NSWDQ (2007). When the values were further compared against the seasons, it was observed that the values obtained during the wet season were higher than that of the dry season. Thus the values were not statistically significant.

3.14 Lead

Lead occurs in drinking water primarily from corrosion of lead pipe and solders and faucets constructed with leaded brass, especially in areas of soft or acidic water. The values obtained during the wet season ranged between 0.01 and 0.019 ppm while that of the dry season ranges between 0.008 and 0.015 ppm. When the values obtained for both seasons were compared with the standards of WHO (2004b) and NSWDQ (2007), it was observed that the values obtained during the wet season were higher while that of dry season was found to be below the recommended values which again could be linked to the effect of runoff and infiltration activities.

Health effects of lead are generally correlated with blood test levels. Infants and young children absorb ingested lead more readily than do older children and young adults. Lead exposure across a broad range of blood lead levels is associated with a continuum of pathophysiological effects, including interference with heme synthesis necessary for formation of red blood cells, anemia, kidney damage, impaired reproductive function, interference with vitamin D metabolism, impaired cognitive performance, delayed neurological and physical development, and elevations in blood pressure (U.S. Environmental Protection Agency, 1988b).

3.15 Iron

The values of iron concentration in all the shallow groundwater bodies considered for this study during the wet season ranged between 0.28 and 0.41 mg/L. Only the Duro community wells had low iron content which fell within the WHO and NSWDQ recommended values of 0.3 mg/L. During the dry season, the values of iron from the study area ranged between 0.18 and 0.33 mg/L. Patigi community was observed to have the highest value of 0.33 mg/L which could be attributed to the washing of some iron materials around the edges of the well which will find their ways into the same. All fell within the WHO and NAFADC permissible limit for samples analyzed during the dry season. The samples analyzed during the wet season was significantly higher ($p<0.05$) than that of the dry season but still within the permissible limit of 0.3 mg/L that is based on taste and appearance rather than detrimental health effect with an exception to that of Patigi. Iron is not considered hazardous to

health. In fact, instead it is an essential element for good health because it transports oxygen in the blood. Iron is considered a secondary or aesthetic contaminant (WHO, 2004b).

3.16 Zinc

Zinc commonly occurs in source waters and may leach into finished waters through corrosion of galvanized metal roofing sheets which mostly used in these communities. The zinc content during the wet season ranged between 3.5 and 5.4 mg/L while during the dry season it ranges between 0.79and 2.1 mg/L. Some of the obtained values for the wet season were found to be within the recommended values of WHO but above that of NSWDQ. The average value of the wells in Duro community had a high zinc content of 5.4 mg/L. The values obtained during the dry season were within the recommended ranged of value of both WHO and NSWDQ. Drinking water containing zinc typically contributes the basic requirement of 15 mg/L for male and 12 mg/L for female as recommended by WHO.

3.17 Sodium

The result shows that concentration of sodium (Na^+) was in the range of 198 mg/L at Kpada to 301 mg/L at Patigi during the wet season while during the dry season the concentration ranged between 169 mg/L at Kpada to 198 mg/L at Tankpafu. There is a significant relationship between the values of wet season and that of the dry season. Water containing sodium (Na^+) is in some cases absorbed by the soil. Such soils containing large proportion of sodium (Na^+) with carbonate and chloride or sulphate are termed as alkali or saline water, respectively. Sodium is a naturally occurring constituent of drinking water. Food is the major source of sodium. Of a suggested maximum daily intake of 2400 mg, drinking water, at a typical concentration of 20 mg/L, contributes less than 2 percent, assuming consumption of 2 L/day. Average adult intake is 10,000 mg/day.

3.18 Microbiological Water Quality

Microbiological water quality results show that the water is polluted with traces of E. coli during the wet season with the values ranging between 1.6 and 2.3 cfu/mL. Patigi and Lade had the highest value of 2.3 cfu/mL which may be because of the population in the two communities as it is the commercial nerve centers for the local government area. During the dry season, E. coli count in the communities considered were observed to be zero except for Patigi and Lade which had values of 1.7 and 1.8 cfu/mL respectively. This is in conformity with the works of Fasunwon et al., (2008); Oludare and Sikiru (2012); and Faparusi et al., (2011).

In terms of total coliform, the results show that approximately 100% of the shallow wells tested in the dry and wet season did meet the drinking water guidelines set by WHO and NSWDQ with maximum of 50 TC/100ml for untreated water. All the wells studied met the standard in at least three of the four samples. There was a noticeable increase in the number of coliform counts in the wet season compared to the dry season. This increase could be attributed to the fact that pollutants are easily transported to water points by rain water.

4 Conclusion

Underground water is believed to be the purest form of water because of the purification properties of the soil, however, source of contamination could be due to improper design and construction of wells,

shallowness, and proximity to toilet, refuse dump sites, and agricultural farm sites which serve as source of contamination. Thus, proper well location is essential, good sanitation of environment and control of human and agricultural activities that affect quality of drinking water. Water quality should be controlled in order to minimize acute problem of water related diseases. Domestic treatment of borehole water is also an essential means of improving water quality and regular cleaning of water reservoirs with appropriate cleaning reagents. Constant monitoring of water quality stands as a good mean of detecting earlier the deviation of drinking water from the standard.

It was observed that the wells were all located within the residential area of the various communities; traces of agricultural chemical contaminants were seen during the wet season which most were still within the WHO and NSWDQ limits while during the dry season the amount of these parameters reduced.

Thus, it is concluded that with the current status of the water in the various communities considered for this study is fit as a source of drinking water for the community, though plans should be put in place for mini treatment plants that can serve these communities to enhance good drinking water delivery.

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Assessment of Materialism and Reference Group Influence on Preference for Western Branded Fabrics in Maiduguri, Borno State, Nigeria

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Abstract – *This paper investigates how materialism and reference group influence may affect consumers' preference for western branded fabrics. Data for the study was collected through questionnaire administered on a sample of 26 respondents. The respondents were selected using convenient sampling through snowball from a population of male and female professional workers aged 18 and above. Data collected from the primary source (questionnaire) was analyzed using simple percentage. Findings revealed that materialism had no significant influence on their preferences for western branded fabrics. Reference groups, however, significantly influenced respondents' decision to purchase Western branded fabrics. It was concluded that although some of the behaviors of the sampled group were quite materialistic, they were not enhanced by associations with Western branded fabrics and their related cultural values. Based on the findings, it was recommended that marketers of western brands in Borno state, particularly in the state capital can do well if they adopt a strategy of deliberately targeting and nurturing of their consumers' reference groups, rather than attempt to position their products on the basis of inherent materialistic values.*

Key Words – *Materialism, Reference group influence, Western Branded Fabric, Consumer, Borno State, Nigeria*

1 Introduction

This paper examines whether Materialism Values or Reference Group influence consumers' preference for Western branded fabrics. The choice of Maiduguri, the Borno state capital as sample population for this research can partly be justified by the researcher's interest in the peoples' culture and views about the west, the city's long history and current economic status. During the past few years, Maiduguri has experienced rapid cultural and social change; it is being transformed from a traditional society to a modern one. Maiduguri's transformation and its implications on its culture and society can be understood through convergence theory, which controversially argues that developing societies will follow the path charted by western developed nations. Inkeles and Smith (1974) pursued the idea of convergence at the level of individual attitudes, values, and beliefs, arguing that the emergence of a modern psycho-social orientation accompanies national modernization. They identified 24 identifiers of individual modernization, including education, entrepreneurship and the encouragement of employment of women and some social activities. Maiduguri's rapid social change may have altered the society's social structure, which has induced substantial changes in their social practices and societal character, for example an increasing emphasis on the individual. Finally, Heelas et al. (1996) notes that modernization often leads to a crisis of identity where traditional values are forced to reinterpret themselves in response to modernizing forces. An individual may then consume those products that they feel are reflective of their perceived freedom and economic wealth that

modernization brings. Residences of Maiduguri, therefore, which are inclined towards a western orientation, might actively purchase Western branded clothes over, local ones.

Research into clothing consumption reflects its ability to demonstrate both brand and wealth values to other people, as a form of coded language that permits a message to be created and understood (Hollander, 1978; Holman, 1980; McCracken and Roth, 1989). Clothing, therefore, is primarily a means of communicating not only personal identity, but also social identity (Noesjirwan and Crawford, 1982). Clothing is then bought, which allows an individual to identify with a particular group's attempt to project a social image that is congruent with its values. It is this identification that may allow clothing consumption to reflect an individual's preference towards a Westernized self-image. It is against this background that this study examines the extent to which materialism values and reference groups affect fabric preference in Maiduguri, Borno State.

The study broadly aims to assess the influence of materialism values and reference group on the preference for western branded fabrics in Maiduguri, Borno State. Specifically, the study examines: (1) materialism values and its impact on preference for western branded fabrics, and (2) reference group influence on preference for western branded fabrics

2 Literature Review

The relationships between materialism and reference group influence and their affect on consumption can be understood from recognizing the cultural context that consumption occurs within. McCracken (1986) argues that cultural meanings within a consumer society, such as Maiduguri, move ceaselessly from the world to individual consumers, allowing consumers to use goods to constitute critical parts of the self and their world. Material goods, therefore, become important to individuals owing to their ability to carry and communicate cultural meanings (Belk, 1984; Foxall and Goldsmith, 1994). Consumers will then be expected to perpetuate a particular image consistent with their own self-image (Quester et al., 2000). For example, Wong and Ahuvia (1995) emphasize the importance of conspicuous consumption and products, within some cultures, which Maiduguri can be identified with, that bring public honor from both an individual and family perspective. Conspicuous consumption may also be related to the 'face' concept in these cultures. The notion of 'face', in relation to material values, stands for 'a reputation achieved through getting on in life, through success and ostentation' (Hu, 1944). Using expensive, high image, high status products, such as Western branded clothing, as symbols of status, may be important to people who want to maintain their 'face' in public. Consumers in Maiduguri may then purchase conspicuous Western branded fabrics to express or enhance their self-identity and demonstrate a sense of being Western orientated.

The need to actively use brands to construct and enhance a self-identity may be evidence of materialism. Richins (1994) describes materialism as "a value that represents the individual's perspective regarding the role possessions should play in his/her life". The consumer typically believes this role to be important for achieving personal happiness and social progress (Ward and Wackman, 1971). Micken and Roberts (1999) add that materialists have a preference for certainty, which finds reflection in concrete representations of the self, perpetuated through feedback from others. That is, people use products, such as fabrics - clothes to substantiate their self-identity and seek approval from others.

A typical consumer in Maiduguri purchasing a western branded piece of fabric may draw upon a variety of reference group influences. A reference group is a person or a group of people that significantly influences an individual's behavior. Brinberg and Plimpton (1986) argued that there are two reference group influences that are drawn upon: normative and informational. Drawing upon previous research they argue that informational reference groups facilitate the exchange of information

amongst reference group members. This information may include: product evaluations, preferences and opinions. Normative influence, drawing upon Deutsh and Gerald (1955), reflect an individual's awareness of the reference group's norms and accepted behaviors. Brinberg and Plimpton (1986) note that normative influence has included value-expressive and utilitarian influences, most notably separated into distinct reference groups by Park and Lessig (1977). However, Brinberg and Plimpton's (1986) research concludes that, unlike Park and Lessig (1977) findings, reference groups only draw upon two influences: normative and informational. We would then expect that irrespective of gender, clothes consumers in Maiduguri purchasing western branded clothing would draw upon these reference group influences.

As the characteristics of clothes may affect reference group influence, the question arises whether western branded clothing is still considered as a luxury or whether this perception has changed. A luxury is defined as products that are not commonly owned or used and requires a level of expenditure inducing extensive cognitive processing (Bearden and Etzel, 1982; Brinberg and Plimpton, 1986). This cognitive processing may involve consideration concerning cost, practicality and sources of advice. In contrast, a necessity is defined as a product that is commonly owned or used and which does not involve extensive cognitive processing. Although Bearden and Etzel's (1982) categorize a woman's fabrics-dress for example as public necessity, purchasing Western branded fabrics in Maiduguri may or may not involve extensive cognitive processing depending on the price in relation to local branded ones. Consequently, some western branded fabrics with potential ability to demonstrate social or wealth status, combined with a higher costs, suggests that they can be regarded as a public luxury in some societies.

3 Methodology

The area of study is Maiduguri. It is the capital and the largest city of Borno State in the North-Eastern Nigeria. The city sits along the seasonal Ngadda River, which disappears in to the Firgi swamps in the areas around Lake Chad. Maiduguri was founded in 1907 as a military out post by the British and has ground rapidly with a population of about 1Million (census, 2007). The region was home of the Kanem Borno empire for centuries. Maiduguri actually consists of two cities. Yerwa to the west and old Maidwuri to the east. Their residences are mostly Muslims including Kanuri, Shuwa, Bura and Fulani ethnic groups. There is also a considerable Christian population.

This study utilized both primary and secondary sources of data. Participants were chosen on the basis of fabrics purchasing behaviors. Fabrics occupy a sizeable proportion of monthly expenditure for men and women working in service and professional and administrative areas. It was, therefore, inferred that male and female professional workers represented a suitable population group to sample from. The respondents were recruited using convenience sampling through snowball sampling. Few respondents made up of professional female and male workers aged eighteen or above, living in Maiduguri, Borno State were self-identified. These respondents were then asked to identify their colleagues or friends who were qualified as respondents, and then a copy of the questionnaire was forwarded to them. This was complimented by a screening process that was strongly emphasized and implemented based on the required sample characteristics. Completed questionnaires were obtained from 26 respondents.

The Survey Instrument*:* was a questionnaire comprised of three sets of scales measuring consumer Materialism principles, Reference Group Influence, and Western Orientation towards the consumption of fabrics. The questionnaire used a 4-point Likert scale coded from Agree strongly (4) to disagree strongly (1).

4 Results and Analysis

4.1 Result

4.1.1 Materialism Value Scale

In the Table 1, the researcher sought to know the orientation of respondents towards materialism by asking them to indicate the extent of agreement or disagreement with the statements in table 1 below. The statements measure respondents' materialism principles

Table 1: Materialism Value Scale

S/N	Statements	AS		A		D		DS	
		f	%	f	%	f	%	f	%
1	I like people who own classy homes, cars and fabrics	4	15	10	38	8	31	4	15
2	My belongings say a lot about how well I'm doing in life	3	12	5	19	14	54	4	15
3	I like to own things that impress people	4	15	2	8	6	23	14	54
4	I endeavor to keep my life easy, as far as fabrics and other possessions are concerned	15	58	8	31	2	8	1	4
5	Buying things gives me a lot of joy	3	12	15	58	4	15	4	15
6	I like a lot of luxury in my life	5	19	3	12	7	27	11	42
7	I would be better of, if I possess things I don't have	1	4	12	46	7	27	6	23
8	I'd be happier if I can afford to buy extra things	18	69	4	15	3	12	1	4
9	It bothers me every now and then that I can't afford to acquire all the things I'd like	0	0	2	8	6	23	18	69

Source: Field Survey, 2011

Results in table 1 above showed that out of the total number of 26 respondents sampled, 10 representing 38% agreed that they like people who own expensive homes, cars, and fabrics and/or clothes, even as 8 respondents representing 31% disagreed. While 5 respondents representing 19% agreed that their belongings say a lot about them, 14 respondents representing 54% disagreed. While 54% and 23% disagreed strongly and disagreed respectively that they like to own things that impress people, only 15% and 8% agreed and agreed strongly, respectively. Although 46% of the respondents agreed that their lives would be better if they things they do not have, 89% agreed and agreed strongly that they like to keep their lives simple as far as clothes and other possessions are concerned. While 58% of the respondents agreed that buying things gives them a lot of pleasure, they disagreed strongly (69%) that it often bothers them that they cannot afford to buy all the things they like.

4.1.2 Reference Group Influence

Table 1 below shows the extent to which respondents agreed or disagreed with items measuring influences of reference group on their fabrics buying behavior

Table 2: Reference Group Influence

S/N	Statements	AS		A		D		DS	
		f	%	f	%	f	%	f	%
1	I look for information of branded fabrics from those who work with the products as a profession	16	62	8	31	2	8	0	0
2	I buy particular brands of fabrics because the people whom I consider having good taste of fabrics use them	2	8	3	12	17	65	4	15
3	I buy a particular brand of fabric because my friends or those with whom I have a social relations with, like it	7	27	13	50	4	15	2	8
4	I purchase a particular brand of fabric because my office mates or superiors like it and they expect me to buy it	6	23	14	54	3	12	3	12

Source: Field Survey, 2011

In table 2 above, results revealed that 62% of the respondents agreed that they search for information about branded fabrics from those who work with the products as a profession. While 65% of the respondents disagreed that they select a brand of fabric because the people they consider having good experience with fabrics those brands, 50% and 54% of the respondents respectively agreed that they buy particular brand of fabrics because their friends or those with whom they have social interactions like it and the fact that their office colleagues and/or superiors like it. This suggests that most of the respondents either strongly agreed or agreed that their choices for fabrics are highly influenced by reference groups.

4.1.3 Western Clothing

In the table below, the researcher sought to know the respondents' western orientation through their responses to statements regarding western fabrics.

Table 3: Western Clothing

S/N	Statements	AS		A		D		DS	
		f	%	f	%	f	%	f	%
1	I believe Western fabric is better than local ones	1	4	3	12	15	58	7	27
2	Western fabrics are more expensive than local ones as they are more tasteful	15	58	5	19	5	19	1	4
3	People who wear western fabrics are more fashionable and smarter than those who wear local ones	6	20	15	58	4	18	1	4

Source: Field Survey, 2011

According to the results in table 3 above, 58% and 27% of the total respondents, respectively disagreed and disagreed strongly that western branded fabrics are more superior to local ones. Similarly, 58% and 19% of the respondents respectively agreed strongly and agreed that western branded fabrics are more expensive than local ones. Similarly, most (58%) of the respondents agreed that people who wear western branded fabrics are more fashionable and smarter than those who wear local ones.

4.2 Findings and Discussion

The average responses in table 1 above suggest that the target audience of this research did not perceive Western branded fabrics from a materialistic perspective. Although this finding does not necessarily indicate that the respondents were not materialistic, it can be inferred that Western branded fabrics did not warrant greater materialistic personality than non-Western branded ones, which is in agreement with a finding on a similar topic put forward by Wong and Ahuvia (1995). This study however, revealed amazingly that Western branded fabrics are considered a high priced products and are therefore, considered as luxury; they require a great deal of expenditure, which calls for extensive information search and evaluation on carefully chosen criteria during the buying process as inferred from Bearden and Etzel, (1982). However, from the analysis of responses in table 2 above, it can be confirmed that the target audience's preference for Western branded fabrics were significantly influenced by their reference groups.

5 Conclusion

This study sought to know whether preference for western branded fabrics in Maiduguri is influenced by the buyer's reference group, materialism values or both. It is concluded based on the findings that although the target audience exhibited some materialistic behavior, there is no factual relationship between these materialistic behaviors with their preference for western branded fabrics. It is also a conclusion of this study that the materialistic behavior of the sample studied was not enhanced by links with western brands. However, reference group influence was found to have great effect on their choice of fabrics.

Based on the findings of this study it is recommended that rather than attempt to position their products on the basis of intrinsic materialistic principles, marketers of Western brands would be more

successful if they market their products in Maiduguri through premeditated encouragement of their consumers' reference groups.

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Causes of Increased Corrosion in Oil and Gas Pipelines in the Middle East

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Abstract – *Transfer tubes of petroleum are extensive network that responsible for petroleum and gas transference from petroleum field under the sea to platform and to stores in coast related centers. Occasionally, some part of this network damages, because of corrosion and result in stop production and also disorder in transfer and distribution. This matter, in addition to direct cost for corrosion and its resulting events, that is financial damage, lead to irreparable damages to environment too. So, it is important to know the factors of making corrosion and leakage in tubes. In this article, we analyzed the reason of corrosion and leakage of tube that use for transfer petroleum fro, a field to platform in bed in the Persian Gulf area. Then we offer some recommendations and solutions for decrease and prevent from further events in this connection*

Key Words – *Petroleum, Corrosion, Environment, Persian Gulf Area*

1 Introduction

External observations: The length of separated tube from tube line in sea bed was almost 24m. As you consider, there is a deep localized corrosion groove in the floor of tube. The width of this groove was almost 1 cm and in some part, this groove was covered by thick layer of sediment that separated by blade of manual cutter from the surface easily. The cooler of this sediment in part of corrosion at the groove (that consisted 20% of whole area of tube) is orange and dark yellow. Morphology of observable corrosion in this area includes pitting, mesa attack and flow induced localized corrosion. It is necessary to say that, there isn't notable corrosion in external surface of tube and evidences show that corrosion and leakage related to internal surface of tube.

Fig.1: Crevice Corrosion in a Flange

Fig.2: Fretting on Steel Backing

Fig.3: Galvanic Corrosion

Analysis of corrosion at the internal surface of tube by XRD and XRF methods: In order to recognition and analysis of corrosion, we take some part of sediment in the place of corrosion on the floor of tube and test by XRF elemental analysis and XRD structural analysis. Its results have delivered in table 1.

Table 1: Results of XRF elemental analysis and XRD structural (Analysis of corrosion at the internal surface of tube)

Analysis method	The results of elemental and structural analysis according to intensity
XRF	Fe – Ca – S – Sr – MO – Cl – Ba – Ni – Mn – Cu
XRD	$FeCO_3$ – $BaCO_3$ – FeO(OH)

Metallographic of Corrosion Section. In order to study the study the morphology of corrosion in the floor of tube, some sample of this area prepare and perform metalograohy studies by optical microscope. It is necessary to say that localized corrosion section in the floor of tube, which is the same as morphology of corrosion in flow induced localized corrosion type, is in the form of channel with U section that will offer pictures from different area in the following study. You can consider that morphology of corrosion in this section is similar to general corrosion. Of course, in some part of this

rim, you can see corrosion pit with wide shallow pit morphology. At the floor of this channel with U section, you can see some similarities with rim, although the corrosion pit in the floor is more than one in rim of channel.

Fig.4: Galvanic Corrosion

Fig.5: Galvanic Corrosion

Fig.6: Internal Pipe Corrosion

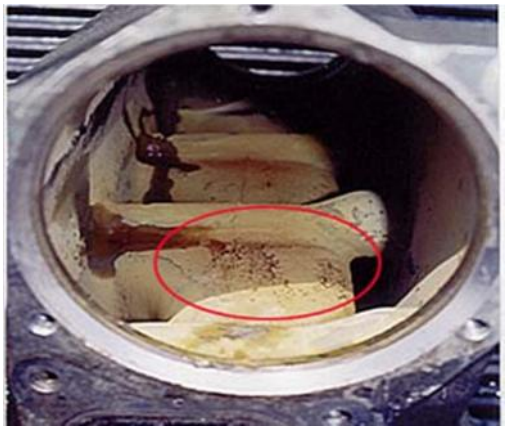

Fig.7: Galvanic Corrosion

3 Conclusion

According to results of experiments and studies, the reason of corrosion and leakage from mentioned tube is corrosion by carbon dioxide (sweet corrosion). Corrosion production of $FeCO_3$ is the salient features of this corrosion that shows in the results of XRD analysis (table 1). In this kind, the factor of carbon dioxide in chemical compound of petroleum production, dissolve in twin water and turn into H_2CO_3, so provide the condition for corrosion by acidification.

In this condition, a layer of corrosion production from $FeCO_3$ make in metal surface, that may be unstable and don't have enough adhesiveness to surface. Discontinuous production of this layer on this surface lead to localized corrosion by mentioned morphologies. In this studding sample, because of separation of water phase from floor of tube, corrosion is limited to the floor. Corrosion morphology include pitting, wide and sharp shallow pit with mesa attack, and corrosion in rim by a long and narrow channel (flow induced localized corrosion). There are many parameters affecting this kind of corrosion that refer to them as follow. We should control these factors and prevent from continuity of corrosion in this line and other transfer line of petroleum at the floor of sea in Persian Gulf or decrease if it is possible.

These parameters including [1-6]:
1. The content of soluble CO_2 and H_2S in petroleum production
2. Conditions of operational heat and pressure
3. The amount of water in relation to petroleum in transfer tube
4. Twin water PA in petroleum and kind and the amount of corrosive factors in this water
5. The resistance of tube alloy against this corrosion and life expectancy of this alloy
6. Kind and the amount of additive materials to this petroleum, such as corrosion inhibitors, buffering agent of PH.

In order to control and presentation from resulting damages of sweet corrosion offer these cases:
1. PH parameters and the amount of Fe in exit flowing of system should measure and control regularly unit distinguish corrosion changes in operational conditions;
2. The amount of corrosive factors such as CO_2, H_2S, Chloride, O_2 and so on should control and decrease in chemical comical compound of transfer petroleum by injection of inhibitors.
3. By installation of separator instruments of water, should decrease the amount of water phase in transferring flowing compound from tube.
4. Anti freezes of glycol and mental should use for prevent from freezing and hydrous solid gas.
5. Heat condition, operational pressure and flowing of system should monitor and control.

6. Pigging method should use for clean the internal surface of tube from corrosion. In addition, using intelligent pigging can aware from situation and profile of corrosion in external and internal surface of tube and make necessary decisions for selection the control method, or replace that part of tube with severe corrosion before leakage and disorder in production system.
7. Resistant steels against corrosion such as steels contain 13% chromium or duplex stainless steel should use for alloy production of tube.

The internal of mentioned tube line encounter to corrosion by carbon dioxide (sweet corrosion). Every three kind of morphology arise from this corrosion include pitting corrosion, mesa attack and flow induced localized corrosion, considered in corrosion area. Affecting parameters in this corrosion and prevention methods offer in discussion sector.

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Contemporization of Historic Monuments with Particular Reference to Contemporary Architecture and Design

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Abstract –*It is very important to understand the difference between quality of design and attraction of architectural works. Persian gardens with more than five thousand years background are of the most valuable cultural landscape of human being. The main question of the research is to find out differences between contemporary urban parks and Persian historic garden in attraction of addressees and quality of design. The result of paper emphasize that contemporization of valuable historic garden is necessary to meet attraction and efficiency regarding to contemporary architecture and contemporary urban parks.*

Key Words –*contemporization, contemporary urban parks, historic gardens, contemporary architecture*

1 Introduction

A 2006 academic review of the combined efforts of the World Heritage Committee, multiple specialists around the world, and nations to apply the concept of 'cultural landscapes', observed and concluded that:"Although the concept of landscape has been unhooked for some time from its original art associations ... there is still a dominant view of landscapes as an inscribed surface, akin to a map or a text, from which cultural meaning (Pannell, 2006). Looking from the theoretical point of view, the necessity of the protection and enhance of landscape visual quality is one of the environmental design fundamentals, which is essential while creating the ecologically stable, ergonomically comfortable, aesthetically attractive, and semantically meaningful landscape (Kamičaitytė-Virbašienė&Janušaitis, 2004).The idea that some places possess more pronounced character than others has been an underlying premise of many geomantic traditions in both eastern and western cultures since antiquity. More recently, humanistic geographers, environmental psychologists, and planners have revived this notion in concepts such as place, sense of place, place character, and genius loci (Altman & Low, 1992) (Seamon&Mugerauer, 1985). In addition it can be used to determine the relationship between perceived use and urban design characteristics. Many studies have been made to the physical characteristics of the communication and integration between the built environments and find a reaction of participants. Researches are related with the tourism development and Sustainable design as the recreational resource (Ansari, Mahdavinejad, &Abedi, 2012) (Mahdavinejad&Abedi, 2011). The results of public opinion analysis in 1972 showed that vicinity is beautiful when there is water (71%), forest (64%), expressive relief (27%), and structures (13%). According to the results of the research performed in 1986, the natural landscape visual type is beautiful considering its structure when there is 52% of water, 47% of relief, 32% of vegetation, 4% of architecture of buildings. A townscape is beautiful when the architecture of buildings consists 58%, vegetation – 50%, water – 13%, and relief – 10% (Kavaliauskas&Kurševičius, 1977). Although these studies analyze specific physical attributes, they do not include an in-depth analysis of the structure of observer emotional image reactions and how that relates to their overall evaluation (Llinares& Page, 2007).The

conception of the visual environment includes an object i.e. the material environment, and a subject, i.e. the society, according to which the environment is analyzed. Therefore, seeking to create landscape of a particular visual quality by means of environmental design, there is a need to know not only objective indicators of landscape visual quality but also the evaluation of these objective indicators by society – preferences of experts and laity (Kamičaitytė-Virbašienė&Janušaitis, 2004). This paper will present a number of principles that support contemporizing historic sites.

Regarding to the literature review of the research, the purpose of this study is three fold: (1) describe characteristics of historic gardens and urban parks, (2) examine how these characteristics might differ between historic gardens and urban parks, and (3) describe how different types of landscape changes are liked and perceived, so we tested three hypothesizes:

(H1): there is no difference in the perception of emotional concepts in the field of "pleasure" between urban park and garden audiences.
(H2): there is no difference in the perception of emotional concepts in the field of "excitation" between contemporary urban park and garden audiences.
(H3): there is no difference in the perception of emotional concepts in the field of "dominance" between contemporary urban park and garden audiences.

2 Theoretical background

2.1 Cultural Landscape

Cultural Landscapes have been defined by the World Heritage Committee as distinct geographical areas or properties uniquely "..represent the combined work of nature and of man..". The World Heritage Committee has identified and adopted three categories of cultural landscape, ranging from (I) those landscapes most deliberately 'shaped' by people, through (II) full range of 'combined' works, to (III) those least evidently 'shaped' by people (yet highly valued). The three categories extracted from the Committee's Operational Guidelines, are as follows: (I) "A landscape designed and created intentionally by man"; (II) An "organically evolved landscape" which may be a "relict (or fossil) landscape" or a "continuing landscape"; (III) An "associative cultural landscape" which may be valued because of the "religious, artistic or cultural associations of the natural element". Cultural landscape, cultivated terraces on lofty mountains, gardens, sacred places ..., testify to the creative genius, social development and the imaginative and spiritual vitality of humanity. To reveal and sustain the great diversity of the interactions between humans and their environment, to protect living traditional cultures and preserve the traces of those which have disappeared, these sites, called cultural landscapes, have been inscribed on the World Heritage List (Habib, 2012). The cultural landscape concept recognises that the present landscape is the product of long-term and complex (inter)relationships between people and the environment and emphasises the landscape-scale of history (Brown, 2007).

2.2 Importance of Meaning

The conception of the visual environment includes an object as the material environment, and the subject, according to which the environment is analyzed. The problems of the evaluation and creation of the visual environment cannot be solved considering only the environment without a subject –the society. The society is miscellaneous and there are a lot of attitudes to the landscape as a visual environment. Those attitudes differ according to the social position, education, profession, etc. These factors determine evaluation purposes and priorities (Kamičaitytė-Virbašienė&Janušaitis, 2004). The model explains landscape perception as a function of two latent variables: making sense (understanding) and involvement. Humans, for adaptive reasons, prefer environments that are easy to comprehend, or easy to make sense of, but that are also simultaneously challenging or involving. Furthermore, environments that are easy to understand possess coherence and legibility; whereas,

environments that are involving contain complexity/diversity and mystery (N.Singh, Donavan, Mishra, & Todd D., 2008).When we try to describe the meaning of a cultural symbol, we sometimes have difficulties to find the right words. The reason for this seems to be that cultural symbols often have very complex meanings (Schaefer &Rotte, 2010). Of several approaches to assessing landscape perception, one dominant approach (the cognitive paradigm) attempts to identify the meanings and values associated with landscapes with the objective of building predictive models of landscape preference (Zube, 1991).

3 Methodology

3.1 Semantic Differential

The technique of semantic differentials has been introduced by Osgood et al. (1957). It was designed to measure the connotative meaning of concepts, personalities, or symbols. In this method subjects are asked to rate a concept or term on a scale with the poles described by two contrary adjectives (e.g. 'healthy' and 'sick'). The results provide information about the connotations of the term by revealing its relationships to a number of adjectives in a semantic space (Osgood, Suci, &Tannenbaum, 1957); for a German sample: Hofsta¨tter, (1957). For example, the term 'safety' may be close to the adjectives 'peaceful' and 'cooperative', but far away from the adjective 'wild'. Based on a large collection of semantic differential scales, Osgood et al. (1957) performed factorial analyses and found three underlying determinants of semantic space that people use to assess concepts or phrases. Subsequent studies revealed that these three underlying dimensions are used by all subjects to evaluate concepts, values, or terms of their social environment, irrespective of language or culture. The first of these three factors are referred to 'evaluation' and loaded high on the adjective pair 'good–bad'. A second factor was related to 'strong–weak' adjectives. This factor was named 'potency'. Finally, the third factor described an 'active–passive' dimension and was labeled 'activity'. Experimental studies have showed three primary emotional responses: pleasure, excitation and dominance. Pleasure deal with like and dislike sense; Exciting related to environment interesting features and Dominance is related to the sense of personal freedom (Lang, 1987).Ten of the bipolar pairs emotions extracted from library sources were classified in three primary emotional responses on a 7-point scale (It shows in Table 1).

Table 1:Definitions of the landscape descriptor variables and their attributes

Variables	Semantic differential bipolar pairs (1-7)	Definitions
Pleasure	Pleasant - Unpleasant	Pleasure deal with like and dislike sense
	Friendly - Unfriendly	
	Happy - Unhappy	
Excitation	Fictional - Realistic	Exciting related to environment interesting features
	Beautiful-Ugly	
	Glorious- Trivial	
	Hectic - Peaceful	
Dominance	Safe - Unsafe	Dominance is related to the sense of personal freedom
	Closed - Open	
	Comfortable - Uncomfortable	

3.2 Environmental Setting and Procedure

The Kaplan's preference model views humans as information- seeking, information-using organisms. Because efficient gathering, processing, and storage of environmental information (in the form of cognitive maps) have survival and adaptive significance, humans have become extremely proficient at gathering and processing information from their environment. People react to visual environments, including landscapes, in two ways: as a visual array or two dimensional patterns, similar to a flat picture (e.g., the photograph of a given landscape), and as a three- dimensional pattern of the space that unfolds before them. That is, in perceiving a setting, scene, or landscape, apart from considering the immediate, two-dimensional qualities of the scene, people also imagine themselves in the scene and make projections about how they would function if they were to enter into the scene (Kaplan, 1992). Semantic Differential was developed by Charles Egerton Osgood and is designed to measure the connotative meaning of concepts. Firstly, after widely surveying a great amount of landscape resources, the method sets up landscape visual influence factors. Secondly, by showing photos, public feelings towards the visual elements can be measured and quantificational data considering public feelings can be produced. Lastly, it utilizes factor analysis to measure the quantificational data. Many surveys proved that using photographs as landscape evaluation intermediary is almost as same as site landscape evaluation (Weimin, 1996). Thetechnique of altering the sets of items from positive to negative, as previously done by (Yildirim, Akalin-Baskaya, &Hidayetog˘lu, 2007) (Akalin-Baskaya&Yildirim, 2007) (Kavaliauskas&Kurševičius, 1977) (Natori& Chenoweth, 2008) (Schaefer &Rotte, 2010) (Weimin, 1996).

In this study historic garden and urban park was represented by photographic prints. Photographs have been shown to serve as a good representation of real scenes. To reduce the seasonality bias, all Photographs were taken in early autumn approximately the same season in which the study was conducted. Photographs were chosen projection for the presentation media for logic reasons. The projection method has the advantage of enabling the survey of a large number of subjects, but we chose Photographs because we assumed it difficult to gather a large number of participants in one location. Slide projection would also limit the locations where the survey could be conducted, and pose difficulties in controlling for the brightness and contrast of showed Photographs.

4 Experiment

4.1 Participants and Samples

The participants in this study were selected randomly among the students who study in department of architecture at Sama Islamic Azad University in Saveh, Iran and who were selected from those who had not seen the materials prepared for the experiment. In total there were fifty students involved. In order to achieve a more robust statistical result, the distribution of class years and gender of the participants were equally apportioned: 50% of the participants were in their first year and 50% second; additionally, 50% of the participants were female and 50% were male. The ages of all the participants range from 19 to 26.

4.2 Questionnaire

The questionnaire form consisted of two parts: the first part asked for general information about the participants i.e. department, age, gender, degree, years of education etc.; the second part consisted of seven-point semantic differential scales about their perception of meaning and concept between historic garden and urban park. The participants had to evaluate each of the bipolar adjective pairs on a 1–7 semantic differential scale. A total of ten bipolar adjective pairs were evaluated by the participants after familiarizing themselves with the items, three of which dealt with pleasure, four of which with

Excitation, while the remaining items measured Dominance. Related bipolar adjective pairs were designated for each category; for pleasure: Pleasant – Unpleasant, Friendly – Unfriendly, Happy – Unhappy; for Excitation: Fictional - Realistic, Beautiful – Ugly, Glorious- trivial, Hectic – Peaceful; and for Dominance: Safe – Unsafe, Closed – Open, Comfortable – Uncomfortable.

4.3 Survey Administration

Participants were familiarized with the survey instrument using a sample Photographs at the beginning of the study. Participants were instructed to assume being present in the landscapes depicted by the Photographs not to evaluate the Photographs themselves and to describe their perceptions of those scenes on the Semantic Differential scales on the questionnaire. Having been familiarized with the survey instrument, the participants evaluated the photographs one at a time. The set of Photographs were sorted in a random order. Two identical sets of Photographs were prepared, so that up to two persons could simultaneously complete the survey with their own set. When there were more than two persons participating simultaneously, Photographs were passed around the participants until everyone had evaluated all the Photographs. Students were surveyed in groups in their classrooms during their normal class hours, and all completed the survey within 20 min.

5 Data Analysis

The dependent variables (Pleasure, Excitation and Dominance) were separately computed for each of the historic garden and urban park. There were a total of five Photographs for each site. Preparation for testing ten scales conducted with SPSS software. Cronbach's alpha to assess the validity and reliability of the items in each scale was used. If the coefficient alpha for the factor was less than 0.7, the hypothesis test was dropped. The survey is a valid and reliable measure of the construct because its validity and reliability coefficient confirmed by Cronbach alpha (0.7) and a pilot study with 32 respondents was undertaken to assess the validity and reliability of a questionnaire. Factor analysis of each scale was developed and Sample items for each scale in historic garden and urban park are showed that ten scale (Table2). The Cronbach alpha coefficient estimate of internal consistency for the scale, including the average scores for ten bipolar Semantic Differential scales grouped together in Table 2, was 0.91. The coefficient of all items was above 0.70, representing good reliability.

Table 2: Scale reliability of Semantic Differential used in the survey

Semantic differential bipolar pairs (1-7)	Factor loading	Scale reliability
Pleasant - unpleasant	0.86	
Friendly - unfriendly	0.94	
Happy – unhappy	0.93	
Fictional - realistic	0.92	
Beautiful-ugly	0.83	0.91
Glorious- trivial	0.88	
Hectic – peaceful	0.92	
Safe – unsafe	0.93	
Closed – open	0.88	
Comfortable - uncomfortable	0.82	

In this part, the statistical differences between meaning and implications for the dependent variables were analyzed. The results are given (in Table 3) as the mean, standard deviation and homogeneous group for three groups of scale items (Pleasure, Excitation and Dominance). The results (Table 3) indicate that perceptions of the meaning and implications for the dependent variables were statistically different and the ordering of meaning and concepts from the most positive to the most negative value is given as follows:

Table 3: The mean and standard deviation for ten bipolar Semantic Differential scales

Semantic differential bipolar pairs (1-7)	M	SD
Pleasant - unpleasant	5.02	1.53
Friendly - unfriendly	5.16	1.68
Happy – unhappy	4.94	1.97
Fictional - realistic	4.92	1.42
Beautiful-ugly	4.8	1.45
Glorious- trivial	5.1	1.72
Hectic – peaceful	4.64	1.21
Safe – unsafe	4.88	1.66
Closed – open	5	1.34
Comfortable - uncomfortable	5.06	1.36

The differences among the dependent variables including between historic garden and urban park were tested with one-way analysis of variance (ANOVA). According to these results, the differences among the dependent variables were found to be statistically significant for all Semantic differential bipolar pairs. The further steps of the analysis addressed the effect of the kind of landscape on the emotional responses of participants. For this purpose, in the first step of the analysis, mean values of the factors were compared across the experimental conditions. The comparison of the mean values of the observed variables between the different conditions of the experimental factor revealed significant differences as a result of the type of landscape. Subjects showed a clear preference for Initial emotional reactions representing historic site imagery, as compared to the visual representations of historic garden or urban park, with respect to attitude toward the initial emotional reactions and positive emotional responses evoked by the stimuli. Results of the descriptive analysis of the attitude toward the Initial emotional reactions scale and the semantic differential scales on emotional responses are shown in Table 4. One way ANOVA analyses were performed for initial emotional reactions and each of the emotional response measures. Differences in the preference scores are appreciable and overall significant ($p < 0.001$).

Table 4: NOVA results of the dependent variables in terms of Initial emotional reactions

Variables	Semantic differential bipolar pairs (1-7)		Sum of squares	df	Mean squares	F
Pleasure	Pleasant - unpleasant	Between groups	0.18	1	0.18	0.11
		Within groups	74.8	48	1.56	
		Total	74.98	49		
	Friendly - unfriendly	Between groups	0.32	1	0.32	0.19
		Within groups	82.4	48	1.72	
		Total	82.72	49		
	Happy - unhappy	Between groups	2.42	1	2.42	1.23
		Within groups	94.4	48	1.96	
		Total	96.82	49		
Excitation	Fictional - realistic	Between groups	8	1	8	6.22
		Within groups	61.68	48	1.28	
		Total	69.68	49		
	Beautiful-ugly	Between groups	2	1	2	1.45
		Within groups	66	48	1.37	
		Total	68	49		
	Glorious- trivial	Between groups	7.22	1	7.22	4.48
		Within groups	77.28	48	1.61	
		Total	84.5	49		
	Hectic – peaceful	Between groups	5.12	1	5.12	4.51
		Within groups	54.4	48	1.13	
		Total	59.52	49		
Dominance	Safe – unsafe	Between groups	9.68	1	9.68	6.48
		Within groups	71.6	48	1.49	
		Total	81.28	49		
	Closed – open	Between groups	2.88	1	2.88	2.19
		Within groups	63.12	48	1.31	
		Total	66	49		
	Comfortable - uncomfortable	Between groups	0.02	1	0.02	0.014
		Within groups	66.8	48	1.39	
		Total	66.82	49		

With regard to the emotional responses, the initial emotional responses showing the conqueror setting rated lowest on comfortable- uncomfortable a feeling of dominance and second lowest in pleasant – unpleasant a feeling of pleasure. Conversely, conqueror elicited safe – unsafe most feelings of dominance, while rating second fictional - realistic most on excitation. Strongest positive responses were evoked by the semantic differential depicting the historic garden.

For the analyses of inferred landscape, paired t-test was performed to test for significant difference in ratings (by the same observers) between two similar historic gardens and two similar urban parks ($p = 0.05$). The differences among ten factors in the study (for each observer type, two kinds of landscape) were tested. Analysis of the variables was conducted by using SPSS software. If the direction of the response categories does not make a difference, then the means for the ten factors should all be statistically equivalent. Differences were considered significant at $P<0.05$, indicating that the vectors of means for the two groups were equivalent.

7 Complementary Experiments

The historic gardens and contemporary urban parks need to have some attractions in order to become a tourist destination. An attraction is a resource controlled and managed for the enjoyment, amusement

and education of the visiting public. The Complementary studies showed that there are differences in perception of meaning between urban parks and historic gardens in attraction aspects (Table 5 and Fig.1).

Table 5: NOVA results of the dependent variables in term of attraction

Variables	Semantic differential bipolar pairs (1-7)		Sum of squares	df	Mean squares	F
attraction	Attractive - Unattractive	Between groups	7.55	1	7.55	4.39
		Within groups	82.67	48	1.72	
		Total	90.22	49		

There is need for improving attraction of historic sites. Some of these relate to excitation and dominance, others to attraction. With respect to the former, the contemporary urban parks, which is the most viewed most increase quality of design.

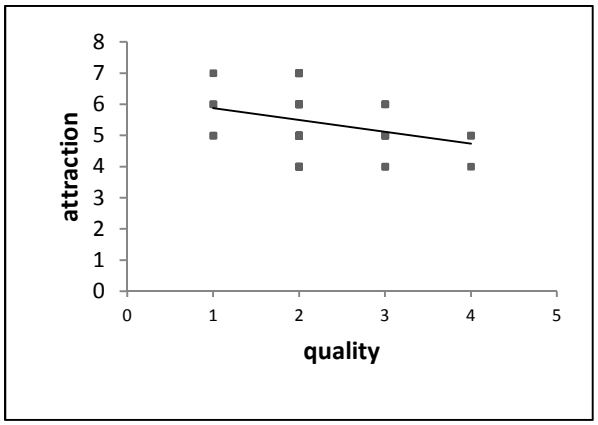

Fig.1: relation between attraction and quality in contemporary urban parks and historic gardens

8 Conclusion

The results show that there are differences in perception of meaning between contemporary urban parks and historic gardens. In addition some invaluable aspects of historic gardens are missing in contemporary urban parks. The research shows that the perception of emotional meaning and concepts of pleasure Variable, pleasance, friendliness and happiness, between historic garden and urban park visitors, there is no difference. Test results of one-way analysis of variance (ANOVA) showed that the differences observed is in arousal of interest in the Excitation variable of the environment that includes “Fictional – realistic”, “Glorious- trivial” and “Hectic – peaceful”, Thus, a set of environmental capabilities and potentials, make a unique position for human behavior in the environment. In other words, the difference in the emotional responses, the interaction between features of a historic garden or urban park, and the needs of its audience. Also in Dominance variable in scale of security among historic gardens and parks in urban contemporary audiences, major differences were observed.

Persian Gardens have a lot of apparent and latent values that many of these values are missing. This study has shown that most of these values are probably related to excitation variables of Persian Garden. In other words, fictional, majesty and excitement scales of Persian gardens are same missing values. The research shows that urban parks design are far from their original, so it is not the extension of the principles of Persian garden.

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A Brief Comparison of Rural Poverty and Urban Poverty at its Consequences for Students with Special Needs

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Abstract – *Poverty has significant effects on children, especially those with special needs. Poverty is a well-known and well-documented risk factor for being served under special education. There are many factors that work against a child living in poverty that can exacerbate or cause a disability. However, not well documented in the research literature are the differences in rural and urban poverty, whether there is a difference between these two different types of poverty and their differing effects on children with special needs. This article will provide a summary of the research regarding poverty as a risk factor for special education. A summary of rural poverty will follow, and finally a comparative brief examination of rural and urban special education was carried out*

Key Words – *At-risk, Education, Rural Poverty, Special Education, Urban Poverty*

1 Introduction

Income poverty is defined as not having enough money to provide basic food, shelter or clothing. The cumulative harmful effects of poverty include greater exposure to environmental toxins such as, alcohol, tobacco and lead, less nutrition, excessively crowded and noisy living arrangements, less parental involvement in school, less cognitive stimulation, residential instability, negative, harsh and unresponsive parenting, exposure to aggressive peers, family instability and divorce, lack of parental monitoring, lack of maternal emotional support and weaker social ties. (Bigelow, 2006).

The effects of poverty also include being more likely to be reported in poor health, be low birth weight, have lead poisoning, die in infancy, be sick, have short stay hospital visits, be diagnosed with developmental delay, be diagnosed with a learning disability, repeat grades, be expelled or suspended, be a high school drop out, have an emotional or behavioral problem but they are less likely to be treated for it, experience child abuse or neglect, experience violent crimes, live in a dangerous neighborhood, experience hunger, be jobless or not in school by age 24 and the girls are more likely to be un-wed teenaged mothers. Regardless of alcohol use, mothers living in poverty are far more likely to birth children with hyperactivity, malformation of some kind, mental retardation and failure to thrive. (Barkley, 2006; Bigelow, 2006). Learning disabilities, lower levels of intelligence, lower levels of achievement in math and reading, severe physical disabilities and grade repetition are common among children who had a low birth weight. Even a slight elevation in lead levels in the blood is associated with decreased intelligence. This lead is found primarily in deteriorating lead-based house paint, commonly found in low-income housing. (Brookes-Gunn & Duncan, 1997).

The negative cognitive effects of poverty occur early. Long-term poverty has a greater negative impact on children's cognitive ability than short-term poverty. The long-term cognitive effect (teen years) still lacks a solid research base to make any accurate conclusions. The most significant effects of poverty may be during the early childhood years (birth to 5). Children in persistent poverty (4 years or more) have more externalizing and internalizing behaviors than children in non-persistent poverty (1 out of 4 years) although persistent poverty is more likely to produce internalizers while non-persistent poverty is more likely to produce externalizers. These are not as significant as the effects on cognitive functioning. (Brookes-Gunn et al., 1997).

IQs of children living in poverty decreased as the number of risk factors increased. These risk factors include low maternal education, poor maternal mental health, high maternal anxiety, head of household unemployed or unskilled, father absent, being a member of a minority, high incidence of stressful events and more than four children in a household. "The list of adverse outcomes associated with poverty by age 5 include externalizing and internalizing behavior problems, academic incompetence, police contacts."(Bigelow, 2006) "Mild mental retardation is primarily environmentally generated." (Bigelow, 2006.) Poor parenting skills exacerbate this condition, especially if there is a dual disability. Impoverished parents are less likely to have the skills or resources to cope with their child's disability, creating an ongoing destructive cycle (Heward, 2013). The effects of poverty on impoverished children from a very early age include mild intellectual disabilities and impair brain growth and development. Poverty also puts extra stress upon the parent, especially when they have a child with special needs, reducing their effectiveness and causing greater negative impact on the child. (Barkley, 2006; Bigelow, 2006).

Early poverty creates lasting learning, behavioral and health problems. Children in these environments do not have access to adequate intellectual stimulation or healthcare. Children with mild mental retardation are more likely to have issues with their adaptive skills, especially social skills. These children are more likely to be rejected by their peers, due to socially inappropriate behavior. Abuse and neglect are also linked to ADHD in children, and the impoverished environment (i.e. lack of parental supports) serves to exacerbate ADHD symptoms. Neglected or maltreated children are at risk of a diagnosis of learning disability (Bigelow, 2006).

2 Rural Poverty

There is much research regarding the effects of poverty and the incidence of special needs. However, poverty is not isolated to only the urban areas. Rural poverty has many of the same negative outcomes as urban poverty, but it also has its unique challenges. In impoverished rural areas, there is less sophisticated medical care, the towns are spread out, further away from intervention services and often there is little to no public transportation. People living in these areas are less likely to have strong academic backgrounds- they may not have graduated from high school. According to the government definition, all areas that are not urban, suburban or metropolitan are by default classified as rural. Traditionally, rural areas were agricultural, but this is not always the case. The poverty rate for rural children is slightly elevated compared to that of urban children, and this number is even worse for rural minority children. Those employed in rural areas make about 4/5 of what those in the urban work force make (Butera, 2001).

It has been suggested that the prevalence of disability may be slightly higher in rural areas. Roughly 25% of the population of rural areas is thought to have a disability, which is about1.1 million children. Children with disabilities living in rural areas are isolated and have few role models or services available to them. There is little transportation for these children and they have very few peers of similar disability, age and economic status. The main social services for these youth are schools and hospitals, but more and more rural hospitals are closing down. Oftentimes these doctors don't have as

much training and are busy serving the rest of the community and cannot give as much attention to those with disabilities (Smith, Fasser, Wallace, Richards, & Potter 1992).

There are not enough trained personnel to educate rural students with special needs. There are an approximate total of 9.2 million rural learners in the United States. More students living in rural areas live in poverty, which puts them at a greater risk for a disability diagnosis. An area in West Virginia, prior to intervention, was providing inadequate early childhood intervention services. Only one or two children a year were being referred for services under Part C of IDEA (Tindal, 2003).

In one study looking at the instruction provided to three students with severe handicaps from three different districts in a poor rural setting, it was found that there was almost no instructional or peer time given to these students. The researchers hypothesize that this lack of instruction is due to a lack of teacher expertise, a lack of influence the families had over their child's school day and a dearth of good examples of service delivery. In each of these student's classrooms, one district had an emergency certified teacher, another district had a teacher that was not certified to teach students with severe disabilities and the final district had two teachers in two years, one that was not certified and the other who did not like that geographic area. It is hard to get certified teachers in impoverished rural areas, and there is a high turn over rate. It is much more difficult for poor families to get the resources they need to challenge the system and receive quality services. These school districts were also far removed from additional services, such as Universities, and did not have positive examples of high quality service. (Capper, 1990)

Often rural school districts have difficulty complying with legal special education mandates such as IDEA because they are underfunded. (Johnson, Elrod, Davis, & Smith 2000) In a study comparing a wealthy school district to a poor school district in a rural area of Mississippi, a $764 difference was found in the allocation of funds per students with special needs student between the wealthy district and the poor one. This difference is mainly due to local revenues. The wealthier school district had significantly higher local revenues than the poor district. The wealthy district received $500 (271%) more per student from local revenues. The wealthy district provided more placement options than the low wealth district and served a greater range of disabilities. The wealthier district hired higher qualified teachers and retained them longer than the poor school district, and the poor district had to resort to hiring teachers out of field (not certified in special education, emergency certification) while the wealthy school district did not. The largest differences between these two districts were in personnel, assessment and related services. One third of the teachers in the low wealth school district had emergency certificates, meaning they were far less qualified than certificated staff. The low wealth school district did not offer occupational or physical therapy and served half as many students as the high wealth district under speech services. These findings strongly suggest that the wealth of a school district is directly linked to the quality and quantity of services (Johnson et. al., 2000).

3 Urban Vs. Rural Poverty

A study conducted by Huang and Van Horn (1995) found there were differences between impoverished families living in rural areas as opposed to urban areas. Children age's three to five in rural areas were more likely to have a disability than the students living in an urban area. There are fewer special educators in rural areas than in urban areas (Smith et al., 1992). Rural parents relied much more heavily on information from doctors and teachers than did urban parents as found by the study conducted by Sontag and colleagues (1993) comparing parental concerns for young children in rural and urban counties in Arizona. Also, rural parents have far less information about their child's educational needs than do urban parents. Urban settings may have a greater array of special education services because they can interact with other social service agencies, such as Universities, to provide a better and more comprehensive service model. These positive examples lead to higher expectations as

to the quality of special education services. Rural school districts are often far removed from these kinds of settings and therefore have fewer positive examples, lending to a poorer quality service (Capper, 1990).

Rural special education teachers have to perform multiple roles in the community in a relatively small environment, whereas urban educators, though they may serve multiple roles in a community, are operating in a much bigger environment and will have an easier time keeping all of those roles separate. Rural special educators will also find much more resistance to change and remediation in their children in rural settings compared to urban communities due to pre-determinism, fatalism and religious reasons that are far more ingrained in rural cultures than urban ones (Mallory, 1995). There also seem to be significant differences in the education of the parents. The education of the parents in rural areas is lower than that of urban parents. For example, 18% percent of rural parents had a college education compared with 25% of urban parents living in poverty. High school graduation rates have indicated that only 13% of the urban parents did not graduate high school where as 19% of the rural parents living in poverty failed to graduate high school (Huang & Van Horn, 1995).

Children with disabilities in urban areas are far more likely than children living in poverty to have adults with disabilities as positive role models. Children with disabilities in urban areas have access to support models and groups that allow for a great number of personal growth opportunities. Rural areas lack transportation and do not have a large enough population to support such groups (Smith et al., 1992). One study compared the transition of special need high school graduates in rural and urban settings in Iowa. This study found, when looking at employment status, benefits, expenses and living arrangements, urban and rural youth performed about the same. At year one over all, the urban students had more health insurance than rural students, although the rural students had a higher employment rate. This held true for three years out of high school, and more rural students were employed full time, receiving vacation and pursuing post secondary education. For job status, more rural students were laborers for both one and three years out of high school, and by three years out of high school more rural students had higher status jobs. More urban students were service workers across both data collection times, and one year out of high school the urban students held higher status jobs. However, the overall level of successful adjustment for both groups was not high (Sitlington & Frank, 1994).

4 Conclusions and Recommendations

The research reviewed here suggests that there is a difference in rural poverty and urban poverty. Rural children living in poverty are more likely to have a disability than their urban counterparts. Rural areas also have fewer services and fewer role models for their students with disabilities than those children living in urban poverty. There is also less transportation in rural areas and services are far more spread out than those in urban settings. Impoverished rural school districts also have a more difficult time retaining highly qualified educators and complying with federal special education laws. These issues make it more difficult for parents to develop the necessary educational or social capital (Howard, McLaughlin, & Vacha, 1996; Vacha & McLaughlin, 1992) to assist their children. Although the research conducted by Sitlington and colleagues suggests that there may not be a large difference between the post-school outcomes of students with special needs in rural and urban areas, this paper calls for large-scale educational reform in the rural areas. These reforms could include incentive programs to bring highly qualified teachers and other professionals to these parts of the country with the greatest need. Such reforms could include an expansion existing programs eliminating student debt for a certain contractual period of time. Certain school districts in rural areas, such as Waterville, Washington, offer higher pay for their teachers than in the surrounding urban areas. However, not all rural school districts have the economic capital to make this possible. Second, teacher and parent training needed to assist children should be an important part of such efforts (Garber, 1988;

McLaughlin & Vacha, 1993; Vacha & McLaughlin, 1992). Third, the lessons learned from Project Follow Through (Engelmann, Becker, Carnine, & Gersten, 1988; Gersten, 1985) have clear lessons to assist children with behavioral and academic issues in both rural and urban settings. Fourth, the recent work with Success for All (Slavin, 2004, 2006a, 2006b) would be highly appropriate for rural and urban school districts to adopt and implement. In addition, some form of incentives should be considered for implementing educational

The more urgent need however, is what the research on poverty in general has found. For example, the outcomes of Bigelow et al. (2006), seems to suggest that intellectual disabilities (educational disabilities and mild mental retardation) are often a product of an impoverished environment. This has negative consequences for the interventions of these children in an academic environment. The cause of these children's problems lies in their environment, something that the teacher has no control over. This then calls for a broader intervention piece, or wrap around services, and it needs to happen when these children are very young. Nutritional services should be provided for these children to help remediate the negative effects of poor nutrition. Interventions should be conducted in the home involving the parent to create a richer learning environment for the child. However, the problem lies much deeper than that. Those interventions suggested above are only surface interventions. They will not eliminate of the real cause of their mild to moderate intellectual disability, which are the parents.

So much of these children's difficulties stem from prenatal issues or things that only the parents can provide. The teacher cannot fix low birth weight or provide better housing or neighborhoods for these children. Intervention and training need to be implemented with low-income adults before they start having children. These adults should be provided with a comprehensive pre-and postnatal parent training so they can create a better learning environment for their children. Something akin to the Milwaukee Project (Garber, 1988) appears warranted to address such issues. Also, providing job-training programs so these adults can make money and live in better neighborhoods should be a priority. Finally, implementing nutritional and rehabilitation programs so mothers will have a better chance of giving birth to healthy weight babies is important.

However, in our view this bespeaks of a deeper and much more serious educational issue. A proper general education is not being provided to the population of students that is at highest risk for living in these kinds of environments. These students are allowed to pass by reading at only a third grade level and they drop out early because there is such a huge emphasis now on college bound education and not on skilled trade training (NSTTAC, 2012). There needs to be a serious look at the kind of young adults that our public schools are producing. Not only does the present research call for social reform, it calls far more strongly for the type educational reform where the outcomes of poverty can be widely and clearly diminished. A very strong effort at all levels of government appears warranted. The federal government and state governments need to create these educational reform programs. It is up to the local governments to implement these programs, and create incentive programs of their own, such as debt forgiveness, to better the outcomes of their students.

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Analysis of Solution Corrosive a-MEDA on 316 and 304 Stainless Steel in Hydrogen Unit

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Abstract – *a-MDEA its corrosive properties with depends on operating conditions. In this article the concentrations of 10 to 3740 by weigh used on the corrosive solution 3, 4, 316 though analysis in different situations of temperature and turbulence. The results showed that changing the concentration of the corrosion rate in stainless steel horrentany major difference of it. With studies that are done about this topic, it is clear that minimum concentration a-MDEA Which required to obtain acceptable terms in the passive film, is equal to 31 wt%. By this concentration it might able to produce iron-oxide and therefore creating a bulge on the patio of increasing polarization crew is low.*

Key Words – *Polarizationcrew, Corrosive Solution, a-MDEA, Density*

1 Introduction

Parameters affecting the rate of corrosion in amine units in refineries amines using to clean small sour gas streams. In contrast at natural gas factories, amine units are the main process units. Amines typically used to remove CO_2, H_2S of Gas and So it is used to Sweeten it. One of the newest amines that introduced for this Purpose is a-MDEA. Remove of CO_2 by a-MDEA is a process of physical/ chemical absorption that in minor temperature high CO_2 act. As a physical absorptive while in minor Temperature of low $CO_2$is a chemical absorptive. CO_2 Gas that dissolved in the solution and rinse again with plain and it use again that cause low used energy. Also the amine cohesion is very low compared with other amines.

Removal of CO_2 with less spin speed need less compensate and less harmful to the environment main advantages of a-MDEA. Although corrosion can be changed for a short period, but a small amount of corrosion can lead to a quick solution contamination, Furling, unpredictable events and is probability of failure the factory, that eventually of failure the factory, that eventually cause switching valuable equipments of plant.

Variables and parameters that can influence the corrosion process are in the following:

- Type of used amine
- Load gas sour
- Power solution
- H_2S/ CO_2 ratio
- Feed contamination

- Pressure
- Temperature actions
- Organic acid concentration and composition
- Variable products and undefined from amine analyze
- Solid particle present in the solution
- Solution flow rate

The open circuit potential and with a scan of lmv/s by Ptansyrastat was performed. After drawing national curves that called "TOEFL CHARTS", the curves with Soft–CoreIII Software and according to extrapolation techniques were evaluated. It was done because of preparing information to evaluate the Corrosive rate.

2 316 Stainless Steel

2.1 Living Condition

Figures of 1 to 3 Showed drawing Polarization that was related to 316 Stainless Steel at 10, 15, 20, 27, 37 density with 50°C, 65°C, 80°C Temperatures. The carves which was related to different density in a-MDEA Solution at the same temperature matched. It was showed lack of concentration on the corrosion rate of stainless steel.

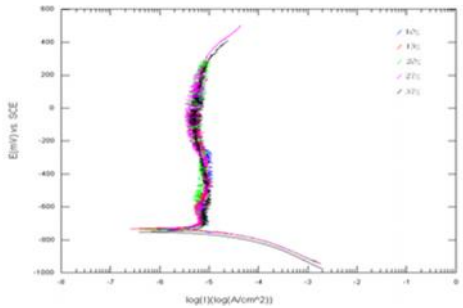

Fig.1: Polarization Drawing of TOEFL for 316 Stainless Steel with 50°C Temperature

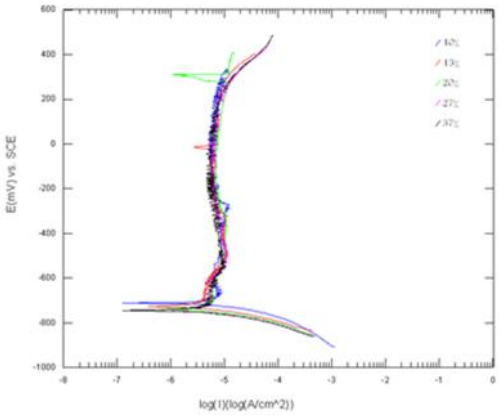

Fig.2: Polarization Drawing of TOEFL for 316 Stainless Steel in 65°C Temperature

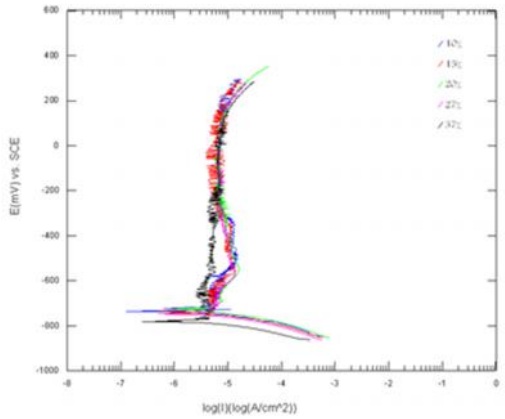

Fig.3: Polarization Drawing of TOEFL for 316 Stainless Steel in 80° C Temperature

Table 1: Showed Current Corrosion Values (icorr) and Corrosive Potential (Ecorr) that Are Relates to Mentioned Curves

E_{corr} (mV)	i_{corr} ($\mu A/cm^2$)	Concentration (wt %)	Temperature (°C)
-741/9	5/5	10	50
-733/7	5/5	15	50
-739/0	5/5	20	50
-735/3	5/6	27	50
-753/8	7/3	37	50
-713/5	6/3	10	65
-728/8	4/2	15	65
-743/0	6/8	20	65
-747/0	5/5	27	65
-747/5	5/3	37	65
-729/6	5/9	10	80
-739/1	7/1	15	80
-731/1	8/7	20	80
-748/1	7/3	27	80
-782/6	3/3	37	80

2.2 Turbulent Condition

Figure (4) to (6) of TOEFL polarization drawing are related to 304 Stainless Steel in mentioned density with order Temperatures of 50°C, 65°C, 80°C. Here also we have the same living condition that have little effect on Corrosive ratio with Steel.

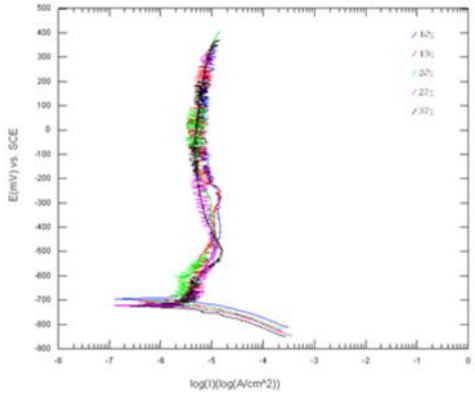

Figure 4: Toefl Polarization Drawing Relate to 316 Stainless Steel with -50° C

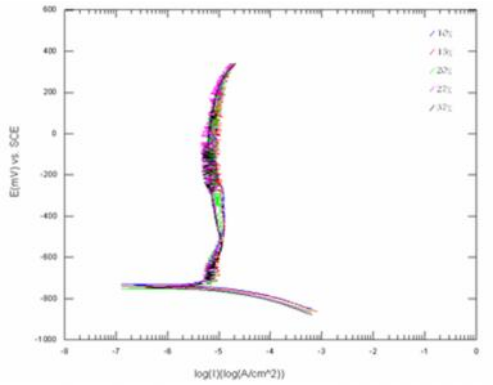

Figure 5:Toefl Polarization Drawing Related to 316 Stainless Steel with -65° C Temperature

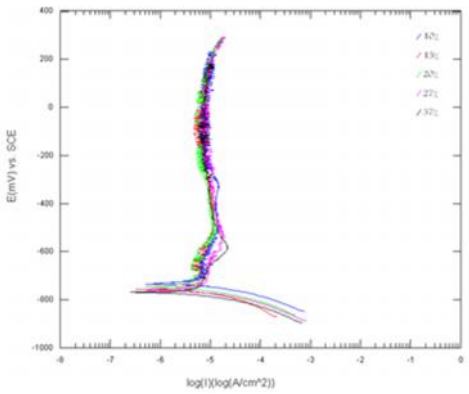

Figure 6: Toefl Polarization Drawing Related to Stainless Steel with -80° C in Turbulence Condition

Table (2) showed current Corrosive density (icorr) and Corrosive potential (Ecorr) which related to mentioned Curves mentioned values are near to obtained values are near to obtained value in living Condition.

Table 2: Density Value of Corrosive Flow (icorr) and Corrosive Potential (Ecorr) Related to-316 Stainless Steel in Turbulence Condition

Temperature (°C)	Concentration (wt %)	E_{corr} (mV)	i_{corr} ($\mu A/cm^2$)
50	10	3/7	-697/2
50	15	4/2	-709/0
50	20	3/0	-707/2
50	27	7/0	-720/9
50	37	3/9	-729/3
65	10	4/6	-734/8
65	15	8/5	-742/0
65	20	6/1	-752/4
65	27	6/8	-744/4
65	37	6/9	-749/0
80	10	5/0	-735/3
80	15	5/7	-757/8
80	20	3/9	-749/0
80	27	8/3	-771/4
80	37	6/1	-748/7

4 304 Stainless Steel

Figures of (7) to (9) Showed TOEFL polarization drawing that they are related to 304 Stainless Steels at 10,15,20,27,37 density withTemperatures orders of 50,65,80° C. As we can see these Figures, The cures likely in 316 Stainless Steel with anyTemperature are matched together. It is also Showed the effect of low Solution density of a-MDEA on 304 Stainless Steel.

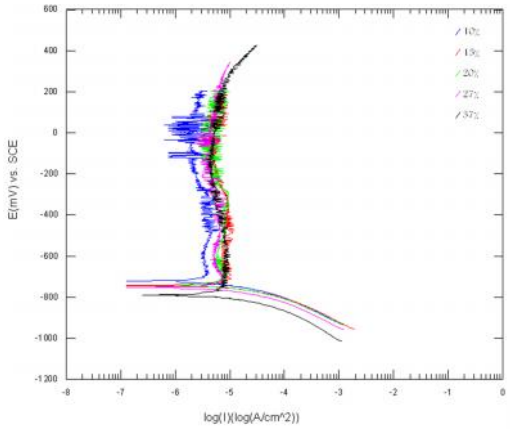

Fig.7: Polarization Drawing Relates to 304 Stainless Steel with 50° c Temperature

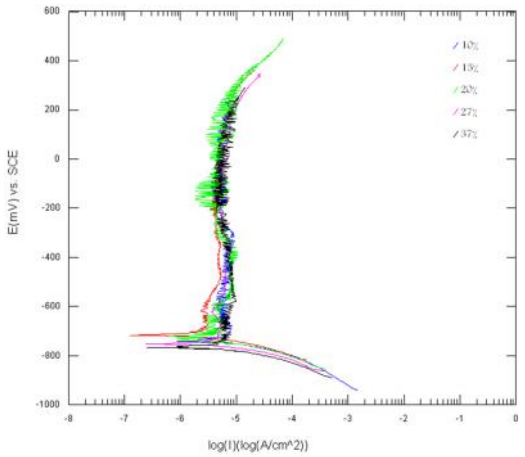

Fig.8: TOEFL Polarization Drawing Relates to 304 Stainless Steel with 65° c Temperature

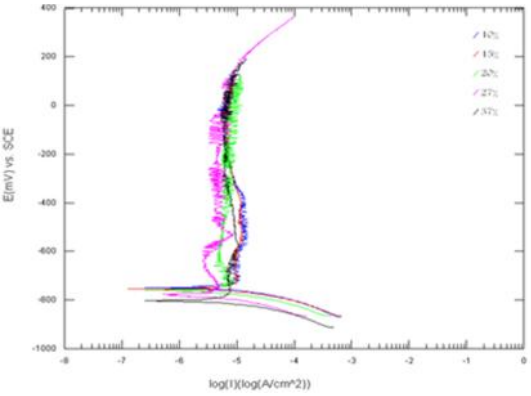

Fig. 9: TOEFL Polarization Drawing Relates to 304 Stainless Steel with 80°C Temperature

Table 3: Density Values of Corrosive Flows (icorr) and Corrosive Potential (Ecorr)

Temperature (°C)	Concentration (wt %)	E_{corr} (mV)	i_{corr} ($\mu A/cm^2$)
50	10	3/3	-724/9
50	15	6/1	-745/6
50	20	6/9	-742/0
50	27	5/2	-753/9
50	37	7/2	-791/4
65	10	6/9	-739/1
65	15	2/7	-718/4
65	20	4/2	-731/2
65	27	2/8	-756/3

Temperature (°C)	Concentration (wt %)	E_{corr} (mV)	i_{corr} ($\mu A/cm^2$)
65	37	5/6	-769/7
80	10	9/6	-751/3
80	15	9/7	-755/7
80	20	9/2	-765/0
80	27	4/5	-781/0
80	37	7/3	-804/5

In this current correction of flow density with 304 Stainless Steel was at different condition of density and temperature in range of 1-10 μ A/cm2. It is so near to density of 3/6 Stainless Steel.

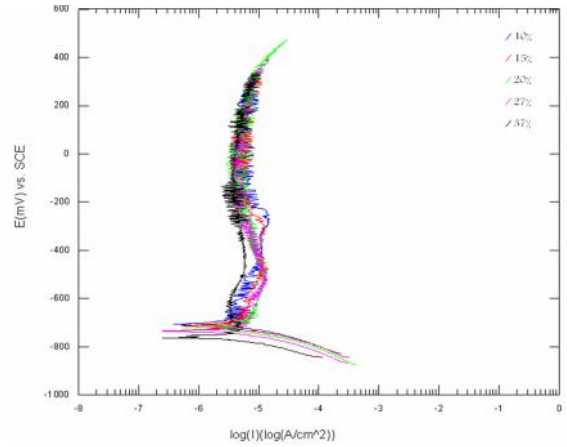

Fig.10: TOEFL Polarization Drawing Relates to 304 Stainless Steel in 50° C Turbulence Condition

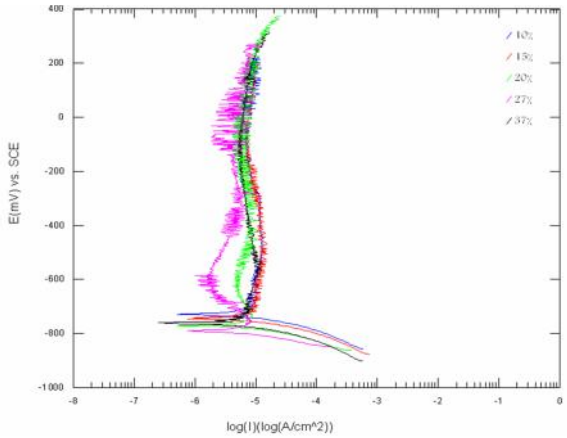

Fig.11: TOEFL Polarization Drawing Relates to 304 Stainless Steel in 65° C Turbulence Condition

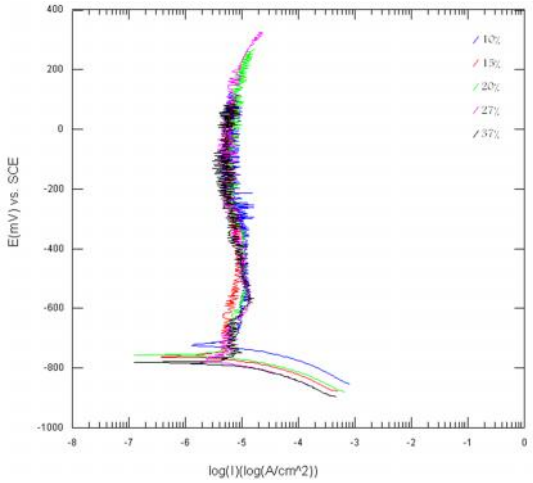

Fig.12: TOEFL polarization drawing relates to 304 Stainless Steel in 80° C Turbulence Condition

Figure (4) showed the corrosive flows (i corr) and corrosive potential (E corr) that are related to mentioned curves, as we see, density values of 304 stainless steel are near to gain values in static condition (Table 2), so we can concluded that turbulence have less effects on corrosive rate of 316 stainless steel with diffrent conditions of temperature and density.

Table 4: Density values of Corrosive Flows (icorr) and Corrosive Potential (Ecorr) Relates to 304 Stainless Steel with Turbulence Condition

Temperature (°C)	Concentration (wt %)	E_{corr} (mV)	i_{corr} ($\mu A/cm^2$)
50	10	4/5	-708/7
50	15	5/7	-716/5
50	20	6/6	-726/8
50	27	4/1	-736/6
50	37	5/1	-765/1
65	10	9/0	-730/3
65	15	11/0	-744/1
65	20	4/6	-771/8
65	27	9/2	-792/0
65	37	7/7	-761/3
80	10	9/4	-724/1
80	15	4/4	-763/6
80	20	6/0	-757/4
80	27	6/2	-783/0

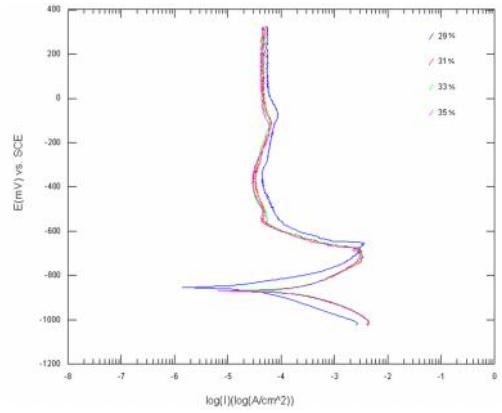

Fig.13: TOEFL Polarization Drawing Related to Simple Carbonic Steel with 80° C Temperature

5 Testing Methods

Corrosion tests on stainless steels 3, 4, 316 in the solution of a-MDEA at fire density 10, 15, 20, 27, 37 in three different Temperature 80 ± 2°C, 65 ± 2°C, 50 ± 2°C and these are act two static and dynamic conditions. The template of preparations in samples before doing the test. Was that first of all corrosive steel layers 304, 314 and simple Carbon with lcm2 area carved. So after they Connect together with wire, testing in the cell Standard the Corrosive is with Electrode and the temperature with CO_2 marked.

Then the layers laundered and faded by alcohol. Controlling the temperatures made with Ben Mari. Turbulences in phthisis also with entrance of bubbles of gas take into solutions. The length of plastic pipe is 5 cm.

With 5 lit/min from CO_2 gas, after duration of normal temperature between 10 minutes and also with pump of CO_2 gas was placed. Polarization potential of TOEFL Tests lower than 250 MV of open amount to about 1/2 V upper than.

Table (4) have showed corrosive values curves of density (i-corr) and corrosive potential (E-corr) that are relates to mentioned curves. As you seen density of 304 Stainless Steel are near to living condition values (Table 2). So we have concluded that turbulence have less effect on corrosive ratio of 316 stainless steel with different and temperature conditions.

Table (1) showed current corrosive values (i-corr) and corrosive potential (E-corr) relate to according to this table, it is clear that the 316 corrosion current 316 stainless steel density of steel was with about 5-7 μA/cm2of density and temperature Condition. So we can concluded that the effects of density and temperature ratio to 316 stainless steel with a-MDEA solution was so negligible though we see these cures we can see that 316 steel is able to keep patio film with 200 MV potential.

Figures of (4) to (6) turbulent conditions showed the polarization TOEFL drawing with mentioned order of temperature 50°C, 65°C, 80°C. Conditions are seem the same as living conditions that it was conclude of no effect of turbulence to corrosive rate of this steel with different density and temperature conditions.

6 Conclusion

1) Changes of a-MDEA density changes in the range of 10-37 wt %, temperature in solution have less effect on corrosive 316,304 stainless steels.
2) Optimal concentration of a-MDEA from economist sight are equal to 31 wt%.
3) Results of drawing on AC impedance show that, the dissolution process in stable passive film in potential dissolution (means making iron oxide) is under control of free ion.
4) Foaming of the solution and its failure to reduce the temperature and increase of density were reduced. Although the volume to the lowest level of fuming and failure and failure time are relates to 37 wt%. Densityfrom a-MDEA.
5) Changing in density Solution of a-MDEA with range of 10-37 wt%, changes in solution temperature with 50 - 80°c range and making the turbulence in solution have less effect on corrosive the stainless steel. The Corrosive density of a-MDEA in the 1-10 μ A/cm2range are exist.
6) Changes of a-MDEA density solution with 10-37 wt% range, change of temperature in a-MDEA Solution with 50 - 80°C and making the turbulence in a-MDEA solution is about 1-11 μ A/cm2.
7) Optimal concentration of a-MDEA by condition of patio film are according to polarization drawing that they are equal to 31 wt%.

Determine the optimal Concentration of a-MDEA density changes in the concentration range of 10-37 wt%. With considering to the above results, it was found that solution changes of a-MDEA in the range 10-37 wt %, Temperature solution changes, in the range of 50 to 80 °C and making turbulence in solution case less effect on corrosive rate of 304,316 stainless steels. Meanwhile about simple carbon steel, the ration is about 10 wt% but 37wt% density is so important because the patio layer have more protection, absence of tail in chart with 37wt% of density is so important, because patio layer provide better protection.

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Building and Experimentation of Diffusion Absorption Refrigeration Machines

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Abstract – *This paper presents an experimental investigation of a driven n-butane/ octane (C_4H_{10}/ C_8H_{18}) diffusion absorption cooling machine according to the cycle of Platen and Munters. For that purpose, we construct a prototype designed for air-conditioning applications. The cooling capacity of the constructed machine is 55 W. A clear description of the constructed prototype is given. These researchers have a final goal which is coupling these types of cooling machines with solar energy. In this paper, our major challenge is to design and choose the kind, the shape and dimensions of all components, which will afford a final and complete machine. In this experimental case, the value of COP reached was 0.3. Experimental results show that such refrigerator, simply fabricated, gives promising results and could be used for clean and safe use where there is a growing interest.*

Key Words – *absorption diffusion machines, solar cooling, COP, Platen-Munters*

1 Introduction

Due to the lack of natural sources of energy (oil, gas), it is necessary to concentrate on the exploitation of new renewable ones. In this context, our researchers are directed to work hardly to find an alternative choice of the cooling machines existing before. In the literature, we find that the diffusion absorption refrigeration machines represent a good choice to produce an important cooling capacity after a coupling to renewable energies especially solar sources, that's for its low functional temperatures [1]. In the 1920's, the Swedish engineers Von Platen and Munters invented the diffusion absorption machines [2]. This kind of cooling machines is classified that's the most suitable cooling cycle to solar applications. Experimental researches in this domain started in the eighties and gave rise to prototypes using many working fluid mixtures (ammonia/ water, lithium bromide/ water, light hydrocarbons). In fact, that system has the following advantages in comparison with others kind of cooling machines. A diffusion absorption refrigeration cycle holds on great efficiency in noiseless refrigeration applications. So, it is unique in that it runs without any mechanical work input and it's characterized by its reliability and portability. Also, it can use any low potential heat source and operate anywhere [3, 4, and 5].

The production of cold by our built prototype has been proven, but up to now only few tests have been done under actual conditions. So, this work proposes an absorption diffusion refrigerator using hydrocarbons as the functional fluid, which has been totally built, and is under experimental tests, in the National School of Engineering of Monastir with a final goal of coupling solar thermal energy as a driving heat source. In the laboratory, there are others who are working on numerical modelling to

validate the different results acquired by measurements. We want to gain knowledge of design, realization and experimental manipulations with this type of refrigeration machines.

2 Principle of a Platen–Munters diffusion absorption refrigerator

A simplified schematic diagram of the Platen–Munters diffusion absorption machine is illustrated in the Fig.1 giving its main components. It is composed of a condenser, an evaporator, an absorber, a solution heat exchanger, a rectifier, a reservoir of accumulation of the rich solution and a generator including a bubble pump and a boiler. All components are related with copper tubes. It uses the performances of the pair absorbent–refrigerant. The bubble pump is the motor of circulation, the cycle operate at a single pressure. It's a fluid pump operates on thermal energy to pump liquid from lower level to the higher level. The bubble pump operates on the same principle that lifts coffee to the top of a coffee percolator [6, 7, 8 and 9].

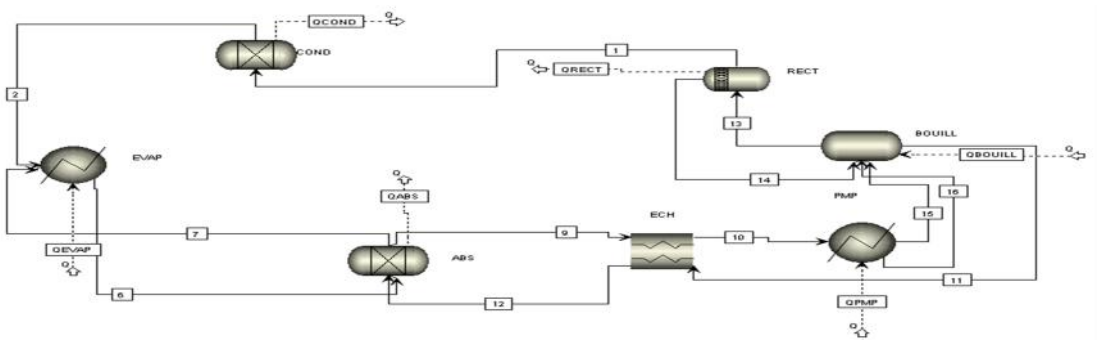


Fig.1: Diagram of a diffusion absorption machines

Fig.2 illustrates the n-butane-helium-octane cycle. The auxiliary gas provides pressure equalisation for the working fluid between the condenser and evaporator. Single pressure refrigeration cycles produce cooling by lowering the partial pressure of the refrigerant (butane) in the evaporator allowing it to evaporate and extract heat from the environment. The rich solution (mixture of n-butane and octane) is driven in the generator. By heat supply Q applied in the bottom of the tube of the bubble pump, it will cause the evaporation of some refrigerant (n-butane).

Due to the small diameter of the pump tube, the vaporised n-butane is used to lift slugs of poor mixture up the vertical tube and back into the absorber via the SHX. The produced vapour rises up toward the condenser through the rectifier, where the rest of absorbent is removed by a partial condensation. The formed liquid falls back into the boiler and return to the absorber. The purified refrigerant enters the condenser where the n-butane vapour is condensed at its saturation temperature according to the cycle's total pressure. At the evaporator entrance, the partial pressure of the liquid n-butane is reduced due to mixing with the helium gas returning from the absorber. This reduction in the partial pressure allows the n-butane to be evaporated at low temperature according to its partial pressure in the evaporator. At that organ, cold is produced. Then, the evaporated fluid leaves the evaporator to the absorber flowing upward it in counter current to the weak solution arriving from the absorber's top, where they will be mixed and accumulated in the reservoir. The residual helium–butane gas mixture rises up and returns to the evaporator. The rich solution flows down to the generator through the solution heat exchanger. And the cycle begins.

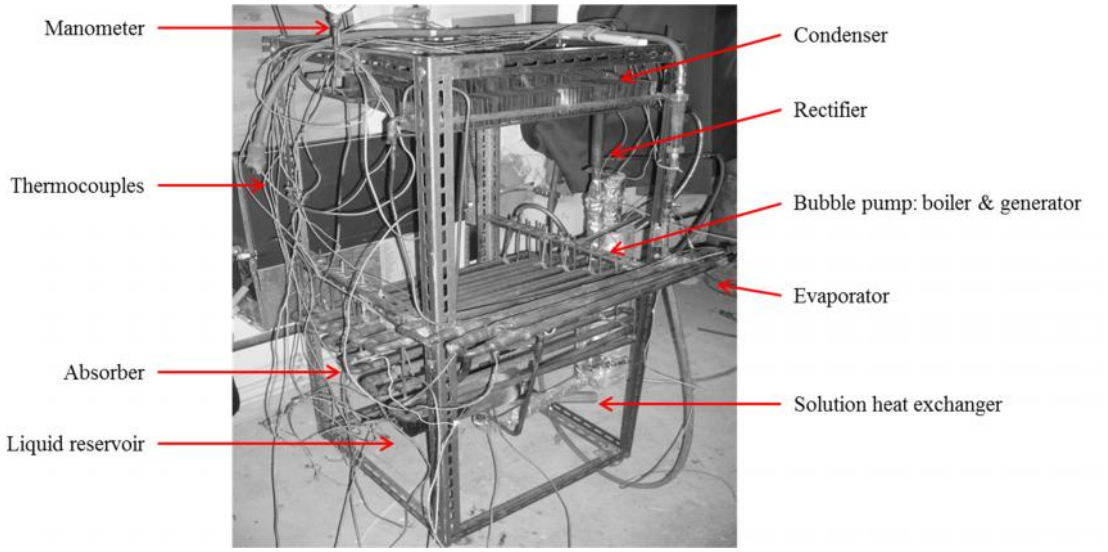


Fig.2.Experimental setup

3 Experimental set-up

3.1 Overall description

The diffusion-absorption machines with the cycle of Platen and Munters making an important challenge to make it work successfully, was built and tested. The actual experimental set-up with all components is shown in Fig.2. The prototype is constructed of the frigorific copper which is a suitable metal for the non-reactivity and absence of bad effects (corrosion) with light hydrocarbons at all temperatures and pressures. Before the built of this machine, we begin with the choice of the components, their design and their dimensions. Its total dimensions are about 1.2 m × 0.5m × 0.5m.

3.2 Detailed component description

The setup has following components:

3.2.1 Liquid reservoir

It has a cylinder shape (length: 30cm and diameter: 8cm). It is located in the output of the absorber and the entry of the SHX. During the charge of the prototype, we put the octane liquid in the reservoir, and then we add the refrigerant n-butane. The full volume of the mixture mustn't pass the 2/3 of the total volume of the reservoir to assure the circulation of the vapour (n-butane and helium).

3.2.2 Solution heat exchanger

It's constituted of two coaxial tubes. The rich solution passes through the interior tube to the bubble pump. Its temperature increases by exchange with the poor solution which flows through the outer tube of the SHX, it returned to the absorber from the bubble pump. Its length is about 48cm. The inner tube has a diameter about 10mm.

3.2.3 Bubble pump

It's the most important component in the machine which assures the circulation of fluids. The rich solution entered the bubble pump tube. An electrical heater was placed at the bottom of the pump tube. The value of electrical power is a variable parameter. The height of the bubble pump as measured from the bottom of the electrical heater was 0.60m. Heat losses were minimised by insulating the whole vertical pump tube. The fluid passes over many flow regimes until it becomes slugs which entrain the passage of the rest of liquid to the top of the bubble pump.

3.2.4 Liquid-vapour separator

It's constituted of a cylinder tube with a 24mm diameter. The separator is bigger than the diameter of the bubble pump tube which arrives until the 1/3 of the length of the separator. Its length is about 18cm. The vapour produced by the bubble pump entered the separator. And the vapour flows to the rectifier and the poor solution returned to the solution heat exchanger.

3.2.5 Rectifier

It's a new organ designed to ameliorate the performance of this type of refrigeration machines. It's composed from a cylinder (length: 20cmand diameter: 28mm) traversed by a spiral serpentine (diameter: 6mm) where cold water follows to purify the refrigerant vapour produced by the generator from the absorbent.

3.2.6 Condenser

It's an air cooled exchanger formed by tubes with fins spaced with an equidistant space. It's constituted of three ranges. The diameter of the tube is 10mm. In the first range, there are 47 fins, in the second, there are 49 fins and finally in the third, there are 58 fins. In that configuration, we respect a variable level of the three ranges to afford the circulation of the condensed refrigerant to the evaporator. The condenser is cooled to the temperature of condensation of refrigeration by a natural convection with the exterior environment.

3.2.7 Evaporator

The refrigerant liquid enters to the evaporator. It is characterised by the recuperation of cold. It is formed by two coaxial tubes which open at the end in a little chamber where the refrigerant and the auxiliary gas meet. And by the change of the partial pressure, the n-butane evaporated. The temperature of evaporation of the refrigerant is low than the ambient temperature.

3.2.8 Absorber

It is very important for the absorption of the refrigerant from the absorbent. In fact, if absorption is important, the transport of the refrigerant is more important, so the production of cold is more important. It has the shape of an inclined V constituted by a tube with an 18mm diameter. In the top of this component, the poor solution enters and meets the evaporated refrigerant and the mixture circulated to the reservoir. The most important characteristic of the absorber is the inclination of the tube of the absorber. It is chosen to minimize the speed of fluids so we can increase the time of stay of

absorbent and refrigerant in the absorber. So we must choose an optimum angle for a good work of the setup.

3.3 Testing procedure

After verifying the absence of holes with the technique of soapy water, we will aspirate gas with a rotary vacuum pump. Then, the set up is charged with the absorbent (octane) via the reservoir then we add the refrigerant (n-butane) and finally the auxiliary gas: helium until it reaches the pressure of condensation of the refrigerant at the ambient temperature: 4bar. The temperatures of all the machine components were taken by means of k-type thermocouples fixed in order to establish the distribution temperature in many points (input and output of every component of the setup) (Fig. 2). We use also a manometer fixed at the entry of the condenser to measure the total pressure in the machine. To determinate the value of the power of the evaporator, we pass it into another tube traversed by air produced by a compressor with a flowmeter fixed in its output to measure the debit of the air circulation. With these measurements, it was possible to determine the performance of the setup.

4 Data Reduction

The following parameters were selected to assess the cooling machine's performance. It is expressed by the following equation:

$$COP = \frac{Q_{Evap}}{P} \quad \ldots(1)$$

Where: COP = the performance coefficient;
Q_{evap} = the heat capacity of the evaporator;
P = the electrical power;

The cooling capacity is calculated from experimental measures of the rate of the circulation of air and temperatures of inlet and outlet of air. So, we can calculate the heat exchange between the refrigerant vapour into the evaporator and the air circulated around it causing the decrease of the internal energy of the refrigerant:

$$U_{Evap} = mC_p(T - T_{amb}) \quad \ldots(2)$$

Where: U_{evap} = the internal energy of the evaporator;
m = the total mass flow rate;
C_p = the specific heat of water at constant pressure;
T = the temperature;
T_{amb} = the ambient temperature;

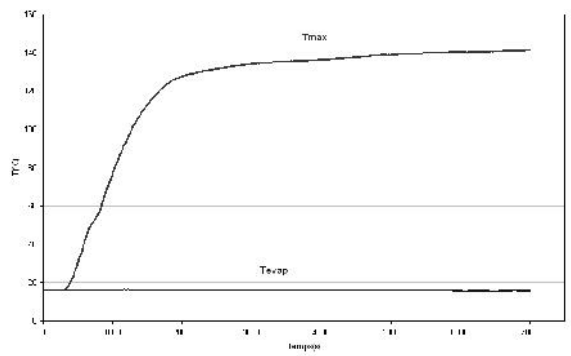
Then;

$$Q_{Evap} = \frac{dU_{Evap}}{dt} = mC_p \frac{dT}{dt} \quad \ldots(3)$$

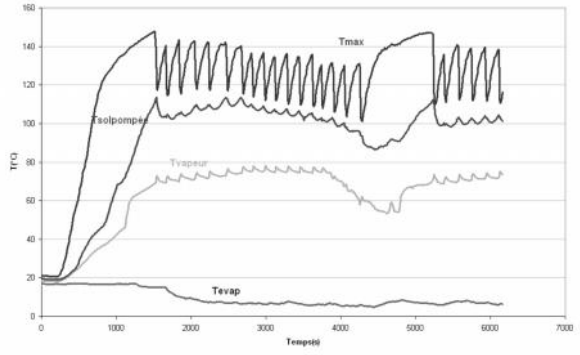
5 Results and Discussions

Many tests were conducted to obtain these ambitious results. The setup is tested for different heating power applied on the bubble pump and different amounts of the mixture of absorbent and refrigerant added on the reservoir. The heating of the bubble pump is done with electrical resistances. For every test, we change progressively the power with a voltmeter and current meter. The most important component which was indicated before is the bubble pump [7]. So we try to understand her function behaviour specially the oscillatory flow inside the bubble pump to afford the circulation of fluids inside the prototype. At low heating powers (below 112W), the solution oscillated slowly without arriving on the top.

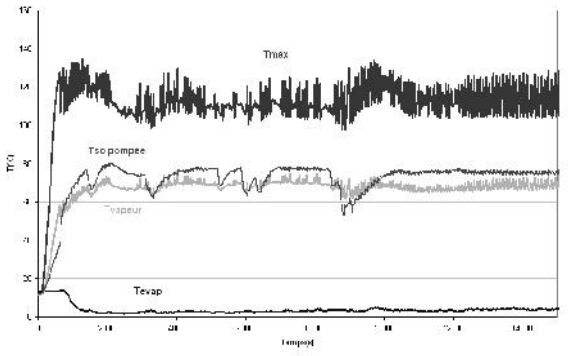
To affirm this result, we use a slight glass to verify the passage of liquid. That's related to the amount of vapour bubbles produced which was enabling to transport solution to the top. With the increasing oh the heating power, more and more refrigerant could be evaporated and the bubbles were more important. The frequency of oscillations increased with increase in heat input (fig.3). The pumping action was not continuous, but intermittent. The time interval between two successive pumping actions was not constant and increased with the increase of the heating power.



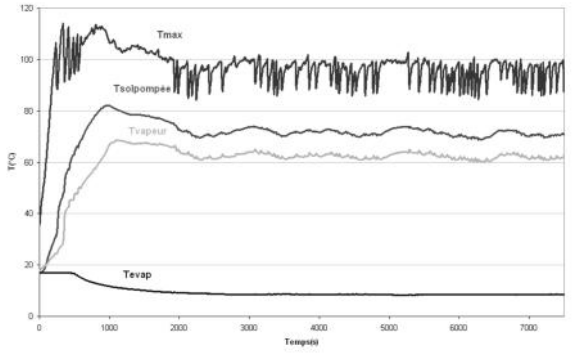
I1=0,51A; U1=220V; P1=112,2W



I2=0,81A; U2=220V; P2=178,2W



I3=1A; U3=220V; P3=220W



I4=1,23A; U4=220V; P4=270,6W

Fig.3: Time evolution of temperatures in the bubble pump, the SHX, the evaporator and rectifier for various heat inputs

For an ambient temperature approached to 19°C, we did these measurements. We note that the first power value (P_1=112.2 W) is insufficient to make the prototype works after a heating time exceeds one hour and half (see Fig.3). The variation of the temperature shows that no pumping actions appear in

the bubble pump. The temperature of the evaporator decreases slowly without any important effect. Its value remains around 15 ° C. For the second heating power value (P_2=178.2 W), temperatures oscillate slowly. The temperature of the bubble pump (T_{max}) increases until 147.67 ° C and then it starts to decrease to 115 ° C. The pumping actions continue by oscillating between two values near to those indicated. For a value of heating power about 220W, curves of pumped solution's temperature show the same phenomena of oscillations appearing in the bubble pump. The unique difference is the range of values measured which reached 80 ° C. To enhance the quality of production of cold, we must quantify the value of temperature reached at the evaporator. From experimental data, it decreases further down to 1.7°C (see Fig.3). After many measures, we observe that we obtained good results for the operation of the prototype. The maximum temperature increases up to a maximum value. Then it oscillates with a frequency of pumping more important. After an increase of the electrical power to 270.6 W, we note that pumping of the rich solution in the pump tube bubble continues with a lower frequency. But the temperature of the evaporator decreases to 10 ° C and continues steadily. So, we can deduce that any refrigerator has an optimum heating power which is related to the maximum temperature necessary to produce the refrigerant vapour for the transport of the absorbent. And these primordial results show that coupling with solar energy is adequate to this constructed prototype.

6 Conclusions

This work presents the design, construction and test run of a diffusion absorption refrigeration machine. The basic cycle operation of the setup is the Platen and Munters with some modifications to ameliorate the performance and recuperate the loss energy. The results show that the refrigerator gives well primordially performances. The unit can produces cold and the COP is about 0.3. The performance of the unit could be higher if the loss of energy is reduced, which is the next objective of this work. Even though, the working fluid chosen for this work is the couple n-butane/octane with inert gas helium, others couples of light hydrocarbons are tested successively. In that work, we focus principally our attention on comprehension, manufacturing and experimental working of these machines. Don't forget that our final objective is to couple them with a source of solar energy, but we need functional cooling machines to attempt this purpose.

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Investigation of Traffic air Pollution in Addis Ababa City around Selected Bus Stations Using Instrumental Neutron Activation Technique

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Abstract – *Instrumental Neutron Activation Analysis (INAA) using high resolution gamma-ray spectrometry was used to monitor traffic air pollution in Addis Ababa city (Ethiopia) around selected bus stations. Biomonitoring technique was applied for the research. The low neutron flux from our isotope source is compensated by taking relatively long irradiation time and large mass samples. Gamma photon mass absorption correction was made for the relative large mass sample. It was identified that more than 18 air pollutant elements are accumulated in the biomonitor samples. The research reveals that the studied area were highly polluted due to mainly traffic air pollution.*

Key Words – *Addis Ababa City, Air pollution, Biomonitoring, INAA and Traffic air pollution*

1 Introduction

1.1 Background

Different research works investigated that cement and metal industries, mines, fossil and fuel combustion road dust and traffic emissions are the most significant sources of environmental pollution (Cipurkovic, 2011). In many cities, children's asthma rates are measured above 90% and mental retardation is endemic. In such places, life expectancy may be half that of the richest nations. The levels of regulatory and management controls that protect people in modern industrial societies are not yet reflected in developing countries. Pollution is a serious problem on the poor and marginalized people in the developing world. It is a major factor impairing economic growth, and a significant strain on the lives of already impoverished people. Efforts are being made and some successes have been seen but far too many people still live under these circumstances.

There are decades of experience in industrial nations in cleaning up the most toxic sites and as well as a lot of successful projects that are being implemented in the developing world. Condition of public transport and infrastructure in Addis Ababa city is regarded as one of the poorest in the world. There is no rail way transit service in the capital and thus public transport in Addis Ababa only refers to bus

and taxi services. Research showed that, Daniel, et al (2010), Car ownership among residents is very low. Currently, taxis, city buses and private cars altogether account 30 % of the modal share of which is 26 % bus, 70 % taxis and 4 % private cars. The relative rise in automobile ownership together with the poor condition of the roads, number of main bus stations few and the poorly functioning traffic system have resulted in high level of congestion which is the cause of heavy traffic air pollution around the studied bus stations of the city particularly at peak hours.

1.2 Environmental Air Pollution and Biomonitoring

All the chemicals compounds or elements that are released into the atmosphere are primarily as a result of human activities, and which can cause damage in living organisms, are considered air pollutants, Moriarty (1999). Biomonitors are organisms used for the quantitative determination of contaminants. They are organisms or communities of organisms whose content of certain elements or compounds, histological or cellular structure, metabolic or biochemical processes, behavior or population structure, including changes in parameters, supply quantitative information on aspects of the quality of the environment or changes in the environment. The aim of monitoring is to determine spatial and temporal trends in levels and effects of pollutants that, relative to their sources, are deposited or transported locally, regionally or continentally, Wolterbeek, et al (2002). Biomonitoring is therefore generally seen as a complementary tool to physical systems rather than a substitute. The most widely used biomonitors for air pollution studies are mosses and lichens. Lichens show their sensitivity to air pollution in various ways such as decline in diversity, absence of sensitive species, and morphological, anatomical and physiological changes. They are also proved to be good accumulators of many elements, particularly heavy metals, Abida, et al (2009).

In this work the epiphytic lichen species is used because of its high sensitivity to air pollution. Most lichen species obtain their nutrients from wet and dry deposition. A high proportion of the pollutant load accumulates in lichens through wet deposition. They possess many properties that make them suitable for monitoring purposes. Air pollutants are deposited on lichens in aqueous solution, in gaseous form or attached to particles. The accumulation of pollutants occurs through a number of different mechanisms: as layers of particles or entrapment on the surface of the cells, incorporation into the outer walls of the cells through ion exchange processes, and metabolically controlled passage into the cells, Poikolainen (2004).

1.3 Instrumental Neutron Activation Analysis (INAA)

Neutron Activation Analysis (NAA) is a quantitative and qualitative method for the precise determination of a number of major, minor and trace elements in different types of geological, environmental and biological samples. INAA is based on the nuclear reaction between neutrons and target nuclei of a sample material. It is a useful method for the simultaneous determination of a large number of major, minor and trace elements of in ppb-ppm range without chemical separation, Cristache, et al (2007).

If a sample is subjected to a neutron flux ϕ(E), radio-isotopes are formed at a rate:

$$R = N_o \int ¤(E)±(E)\, fdE \qquad \ldots(1)$$

Where, $N_o = \frac{m N_A}{A}$ is the number of target prior to irradiation, σ(E) the reaction cross section for the production of corresponding radio-isotopes, f the isotopic abundance of the target element, m the mass of the target, A the atomic weight of the target element and NA the Avogadro's number. For a constant

Energy of the flux, like thermal neutrons the equation becomes,

$$R = \frac{m N_A}{A} A¤(E)\pm(E) f \quad \ldots(2)$$

The number of radio-isotopes decaying in the time interval between the end of irradiation and the end of counting is;

$$S = \frac{R}{a} e^{-a t_d}(1 - e^{t_{ir}})(1 - e^{t_{real}}) \quad \ldots(3)$$

The number of photons emanating from the radioactive decay that are detected, S, will be a lot smaller than the predicted value due to many factors like: The geometry dependent photo peak efficiency "ε(E), The gamma emission probability I(E), The geometric correction factor Cg and the self-absorption correction factor K. Including these factors, the total number of detected photons becomes,

$$n = \frac{dN}{dt} = S£_G I¥ C_G K \quad \ldots(4)$$

Combining eq. (2) through eq. (4) the thermal neutron flux will have an expression:

$$¤(E) = \frac{\left(\frac{dN}{dt}\right) A e^{-a t_d}}{£_G I¥ C_G K \pm m N_A \left(1 - e^{-a t_{ir}}\right)\left(1 - e^{-a t_{real}}\right)} \quad \ldots(5)$$

2 Experimental

2.1 Study and Sample Collection Area

The lichen samples were brought to the study area from a place known as Ansas Mariam. It is located to the eastern side of Debre Berhan city where air pollution at this site is considered to be least amount or none. The lichen samples were carefully transplanted around two purposefully selected bus stations of the study area. The collected samples were packed in a polythene bag during transportation. The lichen samples were carefully washed with distilled water to remove soil and dust particles from their surface before their transplantation. The two study areas were the Main bus station in Addis Ketema kifleketema where sample AA1 was exposed and the Megenagna bus station in Yeka kifleketema where sample AA2 was exposed. These cite were selected because of their heavy traffic and highest density of the population working in this area relative to other areas of the city. The study and back ground area are shown in the Fig. 1 and Fig. 2.

For exposing the lichen samples, a 20cmx10cmx10cm wooden box was made The wooden box was covered from the top by plastic materials so that contaminants from supporting trees may not reach the samples by leaching during the rainy season. At the bottom of the boxes a cylindrical shaped water tank, open along its diameter from its top, was fixed for supplying water through a cotton cloth. These samples were placed in a cloth boxes made of silk having area of $1mm^2$ pores on the front side and cotton clothes on the back side. The pores were used as an inlet for air into the lichen samples and the cotton cloth was used for water transportation into the sample.

The wooden box having sample AA1 was placed on a pole 3m tall at nearly 2m distance from the fence of the bus station near the main road. The sample was exposed to air for three months from 7th, June, 2011 to 6th, September, 2011. The exposed sample was collected at the end of the 3rd month. Similarly, the second sample (AA2) was placed on the top of a 3m tall shop about 10m distance from the main road.

Fig.1: Study area around selected bus station in Addis Ababa City

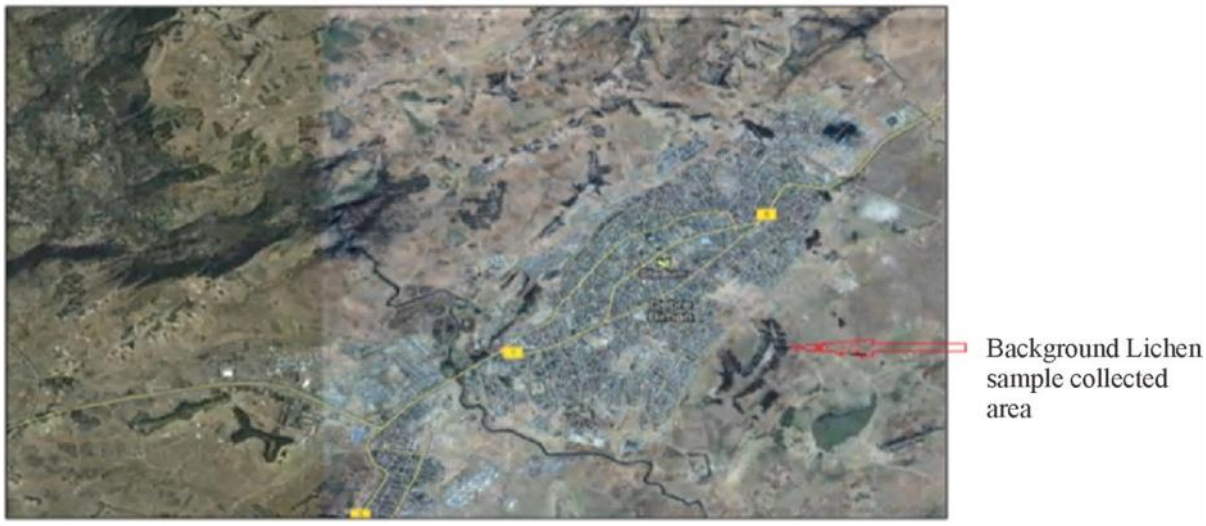

Fig.2: Ansas Mariam artificial forest, near Debre Birhan City, where the lichen samples are collected for transplantation.

2.2 Materials and Methods

Instrumental neutron activation analysis of elements can be done using standard method in which the experimental sample is compared with a standard sample (comparator). The intensity of a characteristic gamma-ray line from the elements in the sample is compared with the intensity of the gamma-ray lines from the comparator or standard. The same expression eq. (5) is used for both elements in the comparator and unknown elements in the sample. The use of comparator method is usually selected to eliminate the geometry factors (C_G) during irradiation and counting. In this work, the comparator method is selected.

2.2.1 Efficiency and Energy Calibrations

The HPGe detector and gamma spectrometer Canberra System was used. The resolution and relative efficiency of the detector for 1332 keV (Co-60) was determined to be 2 keV and 50 %, respectively. The detector and preamplifier are placed inside a low background lead shield and cooled by liquid nitrogen from vertical dipstick cryostat. The integrated signal processor (model 1510) consists of a pulse height analysis system to transform pulses was used. The pulses were collected and stored by a computer-based MCA with 4k conversion gain. The Eu-152 gamma source with known activity was used to calibrate the spectrometer and photo peak detection efficiency of the detector. The absolute detector efficiencies (ε_G) was calculated by using an expression:

$$£_G = \frac{n}{t\,P_¥(E)\,N_O\,e^{-a t_d}} \qquad \ldots(6)$$

where n is the net area under the full-energy peak of gamma-ray energy E, t the counting time, $P_Y(E)$ gamma-ray emission probability at energy E, N_0 the activity of the source (Becquerel) and t_d the decay time the calibrating nuclide. The Energy calibration is done by using two standard sources; Eu-152 and Cs-137 delivered by IAEA

2.2.2 Error Propagation

The main sources of uncertainty to be considered in INAA are the contributions from counting statistics. The uncertainty contribution from neutron self-shielding during irradiation was minimized by taking the mean neutron flux falling on the sample. The mean neutron flux was obtained by taking the average flux falling on the standard placed in front of the sample(maximum Flux) and the flux falling on the standard placed at the back of the sample(minimum Flux) during irradiation time. The counting statistics uncertainty is available from the measurement results as the square root of the measured activity after the back ground is subtracted, as it follows the Poisson statistics, Tzortzis(2004).

Gamma-ray self absorption by the sample mass was corrected using the mixture gamma ray mass absorption equation, Gowda, et al (2004).

$$« = \sum w_i «_i \left(cm^2 \big/ g \right) \qquad \ldots(7)$$

Where: μ = total photon mass absorption coefficient for our mixture,
w_i = weight fraction of i^{th} element in the mixture,
μ_i = total photon mass absorption coefficient of i^{th} element.

The mean value of the gamma ray mass self absorption coefficient was used for the calculation of the actual intensity of the photon. The intensity from the full energy photo peak is corrected using usual photon intensity mass absorption equation.

$$K = \frac{I(x)}{I_O} = e^{-\mu x} \qquad \ldots(8)$$

Where: I(x) = the intensity of the photon at thickness x, and
I_0 = the intensity at the upper surface of the sample

2.2.3 Sample Preparation and Irradiation

The lichen samples were oven dried at 80^0C for 10 h to remove any moisture content. The samples were powdered using agate pestle and mortar. The samples were weighted by a sensitive digital Sanatoriums balance whose sensitivity is 0.0001g. Sample masses used were in the range of 1 - 2g. Disk shaped Polythene sample holders having larger cross section were used. They were sealed by a thin tape. The irradiation and counting of samples was done keeping fixed geometry, so that geometry factor gets canceled while taking the ratio of activity of comparator and unknown sample. The thermal neutron cross section and isotopic abundance values of the sought elements are taken from data compiled by S.F. Mughabaghab (2003) and the gamma emission probability from table of isotopes by Richard B. Firestone (1999). The irradiation facility in our laboratory consists of 2 Ci cylindrical Am-Be source. The KI standards were also sealed in the in same geometry sample holder to be irradiated at the same time with the sample. Two KI standards having equal mass were prepared. The sealed sample was again sealed in between the two standards. The Sample, together with the standards, was irradiated for 3 weeks in Am-Be neutron source for medium and long-lived activation products.

3 Results and Discussion

Addis Ababa city has three main bus stations which are used for the long march road transportation. In addition to this, there are a large number of city bus stations overcrowded by small and large city buses which contribute for traffic air pollution. The other contribution to the air pollution comes from different vehicles used in the city. In this work, the research result of heavy traffic air pollution from the Main city bus station in Addis Ketema known as 'kiehager Awtobs tera' (AA1) and Megenagna bus station (AA2) are presented . The natural abundance and thermal neutron capture cross section for the parent element and the half life, main gamma energy and absolute gamma ray intensity for the A+1 isotopes analyzed is shown in Table1. Results of elemental concentrations in the lichen samples are given in Table2. The result showed that the most dominant air pollutants around the main bus station, as found deposited in lichen sample AA1, were: K, Pd, Co, Eu, Cd, Ge, Cl, Ga, and Mo with concentrations 7680.0 ± 54.0, 7640.00 ± 7.20, 4084.51 ± 17.8, 3884.00 ± 55.5, 3556.00 ±19.10, 2810.00 ± 31.62, 2510.61 ± 3.26, and 2463.50 ± 4.90, 2102.12±12.14 respectively. As the area is located at heavy traffic area and also near Merkato where many materials are locally made and recycled, the concentration of the air pollutants is notably high.

On the other hand the dominant air pollutants around Megenagna bus station area as found deposited in the lichen sample AA2 were: Nd, K, Sm, Eu, Mo, Co, Cd, and Ba with concentrations 6942.0±58.5 ,4203.22±24.52, 3608.58±30:83, 3264.46±42.14, 2867.20 ± 16.90, 2645.32 ±12.84, 1999.00 ± 8.2 and 1792.25 ± 28.9 respectively.

Table 1: The natural abundance and thermal neutron capture cross section of the parent element and the half life, main gamma energy and absolute gamma ray intensity for the A+1 isotope.

Elemet	The Parent	Element	The A+1	isotope	
	f(%)	σ(b)	T1/2	EY(kev)	IY(%)
Er-170	14.9	8.85	7.51h	308.31	64.4
Cd-116	7.49	0.075	2.49h	273.3	28
In-115	95.7	73	54m	1293.5	84.9
Ba-138	71.7	0.45	83.1m	165.86	23.7
Ge-76	7.44	0.06	11.0h	264.4	54
Nd-150	5.64	1	12.4m	116.8	39
Pd-110	11.72	0.7	23.4m	376.7	0.46
Ta-181	100	0.012	15.8m	184.9	24.5
Tl-205	70.46	0.11	3.7m	686.3	90
Ga-71	39.88	4.7	14.1h	834	96
Sm-154	22.7	7.2	22.3m	104.3	74.6
Mo-100	9.63	0.2	14.6m	196.6	9.6
V-51	99.75	4.9	3.74m	1434	100
Cu-65	69.17	4.5	12.7h	578.7	39
Co-60	100	20.7	10.46m	1332	100
Cl-37	24.23	0.42	37.24m	1642.7	31.9
K-41	8.73	0.0058	12.4h	1524	18
U-238	99.27	22	23.45m	74.66	48
Eu-154	47.8	3150	9.3h	970.3	0.59

Table 2: The Elements and their concentration(C) identified in the lichen samples

Element	C in SampleAA1 (ppm)	C in Sample AA2 (ppm)
Er-170	221.02±6.23	837.50 ± 2.86
Cd-116	3556.00 ± 19.10	1999.00 ± 8.2
In-115	93.52± 2.11	103:42± 4.11
Ba-138	343.21 ± 1.10	1792.25± 28.9
Ge-76	2810.00 ± 31.62	ND
Nd-150	1420.00 ± 7.74	6942.0 ± 58.5
Pd-110	7640.00 ± 7.20	1003.42 ± 3.12
Ta-181	507.70± 7.84	622.54 ± 13.10
Tl-205	301.91 ± 1.56	ND
Ga-71	2463.50 ± 4.90	615.12 ± 8.31
Sm-154	266.30 ± 1.54	3608.58 ± 30.83
Mo-100	2102.12 ± 12.14	2867.20 ± 16.90
V-51	85.57 ± 1.74	ND
Cu-65	969.22± 2.93	645.32 ± 1.03
Co-60	4084.51 ± 17.8	2645.32 ± 12.84
Cl-37	2510.61 ± 3.26	ND
K-41	7680.0 ± 54.0	4203.22 ± 24.52
U-238	15.17 ± 5.13	11.99 ± 2.8
Eu-154	3884.00 ± 55.5	3264.46 ± 42.14

4 Conclusion

The research has shown the air condition of Addis Ababa city near two bus stations. There is strong evidence that the air in Addis Ababa city around bus stations has poor air quality situation with respect

to air pollution of these environment. The research revealed that the city has high level of air pollution. Although the city's air quality is poor there is no binding guidelines and no enforcement authority for a better air quality standards and vehicular emissions. The present air pollution policies of the city must be improved by setting a clear and practical vehicular emission policy. Today lack of reliable emissions inventory and lack of consolidated data on measured impacts of air pollution in Addis Ababa are great challenges which must be considered as part and parcel of the development program of the city. The city administration did a lot towards governance, provision of services and encouraging private sector in the development of road construction. Furthermore additional bus stations are under construction which manages bus transports at each out let roads to different regions. Though these efforts have shown a sign of improvements to the overall condition of the city, there are still many tasks to be done in order to minimize traffic air pollution of the city.

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Comparing Effective Treatments for Attention-Maintained and Escape-Maintained Behaviors in Children with Behavior Disorders: Brief Review and Analysis

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Abstract – *This literature review compares treatment for attention-maintained versus escape maintained aberrant behavior in children with behavior disorders. Specifically, studies utilizing time out procedures, differential reinforcement procedures, noncontingent reinforcement, and functional communication training are discussed. It was found that these are effective treatments for attention-maintained behaviors; while escape extinction, positive and negative reinforcement, functional communication training, breaks, and altering the non-preferred stimulus are discussed as effective treatments for escape-maintained behaviors. Similarities between treatment and implications for practitioners are discussed.*

Key Words – *attention-maintained behavior disorders, escape-maintained, functional analysis, treatments*

1 Introduction

An effective way to treat the aberrant behaviors of children with behavior disorders is to first determine the function of their aberrant behavior through a functional analysis (Cooper, Heron, & Heward, 2007). Because treatments for different functions vary so widely, it is difficult to ensure that the most effective and comprehensive treatment option is being implemented without knowing why a child is engaging in a specific behavior (Sigafoos & Tucker, 2000). For example, a time out procedure might be effective for an attention maintained behavior while it would exacerbate an escape maintained behavior (Fisher, Piazza, Cataldo, Harrell, Jefferson, & Conner, 1993). A study by Rodriguez, Thompson, and Baynham (2010) stated that the two most frequent functions of aberrant behavior as determined by functional analyses were attention and escape. In response to the frequency of attention-maintained and escape-maintained aberrant behaviors, the purpose of this paper is to examine the treatment of attention-maintained behaviors compared to the treatment of escape-maintained behaviors in children with behavior disorders

2 Functional Analysis Procedure

The methodology of functional analyses was originally developed to aid in assessment of self-injurious behaviors; however, it has been adapted to be useful in the assessment and treatment of other behaviors as well. Some of those behaviors include aggression (Fisher et. al., 1993: Piazza, Fisher, Hanley, Remick, Contrucci, & Aitken, 1977a), tantrums (Carr & Newsome, 1985), pica (Piazza, Hanley, & Fisher, 1996), and elopement (Piazza, Hanley, Bowman, Ruyter, Lindauer, & Saiontz, 1997b). In a functional analysis the antecedent and consequence surrounding a behavior are manipulated to fit the specific condition. There are four main types of conditions: free play conditions in which the child has access to tangible items and attention, and no demands are placed on them; tangible conditions in which the toy is removed and only represented contingent upon aberrant behavior; attention conditions in which the child is ignored and attention is only provided contingent on aberrant behavior; and escape conditions in which a demand is place on the child and is removed contingent upon problem behavior. Each time behavior occurs in the tangible, attention, and escape conditions, tangible items are represented, attention is provided, and demands are removed respectively, and then the establishing operation is represented 15-30 seconds later. These procedures are typically evaluated in an alternating treatments design (Kazdin, 2011).

When evaluating the results of a functional analysis, it is important to realize that a percentage between 20% and 40% shows a functional relationship between the behavior and that specific function, and that the child may not be discriminating between antecedents and consequences if the behavior occurs at a higher frequency. Behaviors are either maintained by positive reinforcement in the form of access to something which increases the frequency of the behavior, or in the form of negative reinforcement in which the removal of something increases the frequency of the behavior. If behavior occurs during tangible or attention conditions, the child's behavior is maintained by positive reinforcement either in the form of access to toys or access to attention. If the child's behavior is escape-maintained, their behavior is maintained by negative reinforcement in the form of removal of a demand. If large amounts of behavior occur during free play, the child might be automatically maintained by sensory input.

If a child's behaviors range across the board throughout sessions, one way to help clarify the results is by separating the occurrences of behavior by separate topographies. Since different topographies might serve different functions, separating by topographies can help show if one behavior is attention-maintained while another is escape-maintained. For example, the results of a functional analysis in Gonzaga's Behavioral Assessment lab showed that one child's aggression was tangible and attention-maintained, while his property destruction was automatically maintained, resulting in the need for two different treatments Worcester, 2013). In addition, funtional behavioral assessment can be employed to assess and monitor such behaviors as alertness, seizures, accuracy of performance, etc (e.g. Cooper et al., 2007; Jordan, McLaughlin, Weber, Derby, Barretto, Williams, & Luiten, 2003; Oikawa, Derby, McLaughlin, & Fisher, 2011). It can also be employed in typical special education classroom settings (Cooper et al., 2007; Solis, McLaughlin, & Derby, 2003; Worcester, Barretto, McLaughlin, & Blecher, 2013).

3 Treatments Based on Function

3.1 Attention-Maintained Behaviors

As pointed out by Iwata, Zarcone, Smith, and Mazaleski (1993) aberrant behaviors, especially self-injurious behaviors and aggression, tend to be extremely susceptible to positive reinforcement in that they frequently require attention either through a reprimand or through comfort. Because certain aberrant behaviors result in immediate attention, some behaviors persist overtime in order to gain that

attention, and turn in to attention-maintained behaviors. When brainstorming treatments for attention-maintained behaviors, it is important to remember the maintaining variables for their behavior in order to ensure that the child is being taught a replacement behavior to serve the same function. Several different treatments have been implemented to treat attention-maintained aberrant behavior. Some of the most common and effective treatments include time out, differential reinforcement procedures, noncontingent reinforcement, and functional communication training.

Utilizing a time out from attention has shown to be effective at decreasing attention-maintained aberrant behaviors. In one study by Rortvedt and Miltenberger (1994) a time out procedure was used to treat the noncompliance of two four-year-old girls. In the study, noncompliance resulted in a one-minute time out and ten-second delay, in which the child had to be quiet for the last ten seconds. The results of the study showed that both of the participant's noncompliance decreased when time out was implemented. Specifically, the study showed that time out was more effective than a high-probability/ low-probability sequence in decreasing the noncompliance behaviors of the two participants.

In a article by Piazza et al. (1997b) a differential reinforcement of other behavior (DRO) procedure was used to decrease the elopement behaviors of an 11-year-old boy with severe mental retardation, autism, bipolar disorder, and ADHD. During the treatment procedure, the participant was given either attention or a preferred food items every 50 seconds contingent on the nonoccurrence of elopement behaviors. The DRO procedure resulted in near-zero levels of elopement behaviors. In the same study, a differential reinforcement of appropriate behavior (DRA) procedure, along with a blocking procedure, was used to decrease the elopement behaviors of a 4-year-old boy. During this procedure, the participant was given instructions to complete a task and, contingent on 5 seconds of appropriate behavior, was reinforced with either attention or access to running. During treatment sessions, the participant engaged in near-zero levels of elopement. The results of this study support the use of various differential reinforcement techniques to decrease attention-maintained aberrant behaviors in young children with behavior disorders.

Since attention-maintained children have learned that they will receive attention contingent on aberrant behavior, another effective way to reduce the frequency of aberrant behaviors is by providing noncontingent positive attention on a fixed or variable interval regardless of the child's behavior. In a study by Vollmer, Iwata, Zarcone, Smith, and Mazaleski (1993), a fixed interval noncontingent reinforcement schedule was compared to a differential reinforcement of other behavior procedure for three adult-females with developmental disabilities. The results of the study showed that both NCR and DRO were effective procedures to reduce aberrant behaviors, as well as showed that NCR can be used as a treatment procedure rather than as a control session, which is how it has been used in the past. One of the benefits of NCR over DRO is that rapid reductions in behavior can be observed without extinction bursts occurring. After recognizing this benefit, a study by Sigafoos and Tucker (2000) utilized NCR procedure to decrease the challenging behaviors of a 19-year-old male while also teaching the participant a socially acceptable behavior to gain attention. The results of the treatment showed continued evidence for the use of noncontingent reinforcement to decrease aberrant behavior.

Teaching a replacement mand to request for attention, including both verbal mands and nonverbal mands such as raising an arm (Sigafoos & Meikle, 1996), has also been a widely implemented and effective way to treat attention-maintained behaviors. A common highly effective method used to treat attention-maintained aberrant behaviors is functional communication training (Carr & Durand, 1985; Day, Horner, & O'Neill, 1994; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998; Lalli, Casey, & Kates, 1995). In a study evaluating the results of 30 functional analyses for self-injurious behavior, functional communication training was used for 17 out of the 24 participants, with an average reduction of 94.8% (Kurtz, Chin, Huete, Tarbox, O'Connor, Paclawskyj, & Rush, 2003).

3.2 Escape-Maintained Behaviors

Most children with behavior disorders are escape maintained (Cooper et al., 2007; Morgan & Jenson, 1988) in that they engage in behaviors in order to escape a demand. Once a child observes that engaging in a certain behavior is effective at escaping the task, the frequency of that behavior increases leading to an escape-maintained problem behavior. Two important considerations in treating escape-maintained behaviors include ensuring that the child is not allowed to escape demands by engaging in the aberrant behavior and ensuring than an appropriate replacement behavior is being taught. Some of the most effective treatments for escape maintained behaviors include escape extinction, negative reinforcement, functional communication training, breaks, as well as alternating higher and lower preference tasks (Horner, Day, Sprague, O'Brien, & Heathfield, 1991; Mace & Belfiore, 1990),

Durand and Carr (1991) showed that an average of 130 minutes of functional communication training was not only incredibly effective at decreasing challenging escape-maintained behavior, but that the use of functional communication training also resulted in great generalization with decreases in behavior across various environments, people, and tasks. According to another study by Fisher, Piazza, Cataldo, Harrell, Gretchen, & Conner (1993), functional communication training has produced clinically significant reductions in disruptive behavior in every published study. In the study by Fisher et. al. (1993), FCT alone only resulted in one of the four participant's destructive behavior having a 70% reduction. When comparing FCT alone with FCT plus extinction and FCT plus punishment, the results showed that FCT plus punishment was the only treatment package that produced clinically significant reductions in destruction behavior and displayed generalization effects. The results of this study give continued support for the use of functional communication training procedures to treat escape-maintained aberrant behavior.

The comparative effects of positive versus negative reinforcement on escape maintained aberrant behavior has been of particular interest to researchers, with most studies demonstrating the superiority of positive reinforcement over negative reinforcement (Lalli, Vollmer, Progar, Wright, Borrero, Daniel, Barthold, Tocco, & May, 1999). One example is a study by DeLeon, Neidert, Anders, and Rodriguez-Catter (2001) which compared the treatment effects of negative reinforcement in the form of a 30-second break to the effects of positive reinforcement in the form of an edible item. The results of the study showed that positive reinforcement was significantly more effective at decreasing the participant's escape-maintained behaviors than was negative reinforcement. Multiple studies have demonstrated these effects (Piazza et al., 1997a; Lalli & Casey, 1996), showing that positive reinforcement is successful in decreasing escape-maintained aberrant behavior in children.

While many would oppose a time out as a consequence for escape-maintained aberrant behaviors, due to the potential negative reinforcement effects of being allowed to escape the task (Shriver & Allen, 1996), some researchers have observed effectiveness of time out procedures when combined with escape extinction. Specifically, a study by Everett, Olmi, Edwards, Tingstrom, Sterling-Turner, and Christ (2007) utilized a time out and escape extinction procedure in which the instructions were represented immediately following the timeout. The results of this study demonstrated that timeout when combined with escape extinction was effective at decreasing escape-maintained noncompliance.

Changing the non-preferred stimulus associated with escape-maintained behaviors, in ways such as altering (Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991), fading (Pace, Iwata, Cowdery, Andree, & McIntyre, 1993) or removing (Touchette, MacDonald, & Langer, 1985) the non-preferred stimulus, has been shown to be an effective method to decrease escape-maintained aberrant behaviors. For example, in a study by Moore, Anderson, and Kumar (2005), the off-task behaviors of a 6-year-old boy significantly decreased when the task duration was reduced. Another study by Weeks and Gaylord-Ross (1981) demonstrated a correlation between inappropriate behaviors and task difficulty.

Specifically, Weeks and Gaylord-Ross showed that the increasing task requirement served as an antecedent variable occasioning escape-maintained problem behaviors. The results of these studies showed that when the task demand is higher due to a change in the instructional variables, such as an increase in length or intensity, the task itself can become aversive and lead to the emergence of inappropriate escape-maintained behaviors, therefore altering different instructional variables might decrease certain escape-maintained aberrant behaviors.

4 Conclusions

There is not one particular treatment that is effective for every child with attention-maintained aberrant behaviors, nor is there one effective treatment for all children with escape-maintained aberrant behaviors. Instead, the treatment of specific functions varies for each individual child and practitioners must adjust treatments to each child's specific needs.

While each child required individualized treatment procedures, there are certain key features to effective treatments for different functions of behavior. One of the major key features is that the child must be taught an appropriate manner to satisfy that function. For example, attention-maintained children need to be taught socially acceptable behaviors in order to gain attention, either by requesting (as in functional communication training) or by behaving appropriately (as in differential reinforcement procedures). In a similar fashion, escape-maintained children need to be taught appropriate ways to get through tasks, either by requesting for a break (as in functional communication training) or by persisting in tasks (as in escape extinction). In order for the new replacement behavior to be successful at serving the specific function, it is crucial that the child no longer receives the consequence desired by engaging in aberrant behaviors (Horner, Carr, Stain, Todd, & Reed, 2002). Specifically, a child must be taught that engaging in a specific behavior will no longer result in increased attention or in removal of a demand.

Some effective treatment procedures, for both attention-maintained and escape-maintained aberrant behaviors, that meet those two key features include functional communication training (Carr & Durand, 1985; Day, Horner, & O'Neill, 1994; Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998; Horner, Day, Sprague, O'Brien, & Heathfield, 1991; Lalli, Casey, & Kates, 1995; Mace & Belfiore, 1990), time out procedures (Everett, Olmi, Edwards, Tingstrom, Sterling-Turner, & Christ, 2007; Rortvedt & Miltenberger, 1994; Shriver & Allen, 1996), positive attention (DeLeon, Neidert, Anders, & Rodriguez-Catter, 2001; Lalli & Casey, 1996; Lalli, Vollmer, Progar, Wright, Borrero, Daniel, Barthold, Tocco, & May, 1999; Piazza et al., 1997a; Sigafoos & Tucker, 2000; Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993), and altering the instructional variables (Dunlap, Kern-Dunlap, Clarke, & Robbins, 1991; Moore, Anderson, & Kumar, 2005; Pace, Iwata, Cowdery, Andree, & McIntyre, 1993; Touchette, MacDonald, & Langer, 1985; Weeks & Gaylord-Ross, 1981).

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Review The Status of Tourism from the Perspective of The Qur'an

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Abstract – *Today, tourism has made it a big part of the global economy. The importance and necessity of tourism, tourism objectives, surfing lessons in the nature and necessity of working, and tourism among the factors that they consider the Qur'an and had a particular view and humans in different verses to the issue of tourism is encouraged. Islamic Tourism has all the major concepts of sustainable development because, being based on the teachings and instructions of divine revelation and explanation of human's relation, and Islamic thought and the environment are stable. We investigate the efficiency of the Quran in this regard is based on two axis commands and patterns. Verses and narratives of travel and tourism can be downloaded in the background the issue of tourism and travel and also to receive and teach profound experience of the drivers, Consideration and attention to God in the Quran. The birthplace or place of stagnation and stay in a place like life itself has no value, but travel and tourism, movement and circulation, awareness of surroundings and the wide world, some kinds of value are considered. According to some of the verses, with a competent and faithful it also may have.*

Key Words – *Tourism, the Quran, tourism, Islamic, Islamic tourism*

1 Introduction

The Quran in many different ways issued special attention to tourism and in its attitude turnover and tourism as something kindly and is considered one of the great blessings of God, thank to God that man should be. The Quran describes Saba's people, to bring the word of their prosperity and urbanization and speaks of the great blessings that they have due regard, the issue is the possible migration path travels and trips in the beautiful and the facilities and people to be reminded of the blessings. Is expressed in other parts of the report them easy to travel with the unappreciative of security and peace, been excluded and the trips he took a long distance and its comfort, peace, secure and the excursions were deprived of them (Saba verses 15 to 21).

Islamic Tourism has all the concepts of sustainable development because Islam as a religion based on divine prosperous life in which human thought and human sees a stable environment. Islamic countries need to find this type of tourism but the important steps and not removed with the uncertainty in this type of tourism and even other types of tourism have not found a significant place in Islamic countries.

Islamic Tourism in Muslim countries would need to be stated essentially spiritual space in Muslim countries, has its special attractions and many Muslims tend to travel in areas where there are the

dominant culture and Islamic values, observable Islamic customs, including some at least of the solvent and convenience foods in religious practice, a sense of security and so on are should be provided there.

Many Islamic countries want to attract tourists and cultural tourists and that means tourists will travel to Islamic countries it should respect Islamic principles and values to observe.
Importance and necessity of tourism, tourism objectives, working in lessons of nature and necessity of working, and tourism are the most important issues had about them the Quran comments and specific views and basically, the issue of tourism and has encouraged many people.

2 Research Methodology

This study used documents analysis and conceptual that have been identified, various books and documents related to the topic and the components grouped and analyzed according to the research objectives to provide a clearer understanding of the concepts. The documents, which have only been written texts, include primary sources, secondary, articles, research, etc. given the desired keywords, review and review of literature related to the research topic has been discussed.

3 Discussion

3.1 Tourism

Tourism has many different definitions. Tourism is a tool that can be said by which people in leisure time job stress and patterns of everyday life at home status and experience new places, to gain the psychological benefits (Homayoun, 26:2005). Tourism is also the total of these phenomena and relationships arising from the interaction of tourists, investors, governments and host communities, universities and NGOs in the process of absorption, transport, catering and other tourists and visitors (Wearver, 2003).

3.1.1 Islamic Tourism

OIC, Islamic Tourism, based on three conceptual economies, culture and religion has been defined. Islamic tourism development in tourism is considered non-Islamic and Islamic Countries, development of new tourism destinations, and strengthens institutional cooperation between the public and includes culture or religion is a way to exchange information on cultural and religious.

3.1.2 Tourism in Islamic Countries

Some studies show that the Islamic countries in terms of geographical location and natural landscapes are beautiful and pristine. Islamic countries are generally located in an area known as "limbo land". In fact they have a natural ecotourism from less infinity to positive infinity is included. Some Islamic countries have tropical rain forests such as Malaysia, Indonesia and Singapore. Meanwhile, Egypt and Sudan have deserts. The ancient civilization of the Islamic countries and the high potential in various historical periods experienced, some countries have made them attractive. It is no worth that 70 percent of issues related to history and civilization on earth has occurred within the Islamic countries and the pyramids of Egypt, and for many years they have attracted a lot of tourists.

May we look at the geography of the Islamic world with one hand and the history of Islamic countries on the other from the perspective of the Islamic world in the form of the tourism industry, will offers good potential. The geographical landscape that many Muslim countries including Egypt, Iran, Turkey and other countries to enjoy the great powers, have been long-standing civilization and frequency of works and buildings, including mosques, town squares, old cities, monuments and buildings of brick and mud, having numerous old churches and villages, this can be considered an important factors in attracting tourists. Also in terms of geography and natural environment in many Islamic countries such as Malaysia, Indonesia, especially in Lebanon, Iran and some other Arab countries and African Muslim world, location and nature of the climate are very attractive and intact these factors can be considered important for attracting tourists. On the other hand, in terms of civilization and security of buildings, monuments, the natural environment, tourism and ecotourism (kalimat tidak lengkap)

3.2 Tourism from the perspective of the Qur'an

Quran is a book that which is comprehensive foundation in understanding and achieving religious rulings among the first of all to express thoughts and Sciences any researcher from any angle and horizontal viewing the treasures of God's purpose and desired to achieve their desired of course, this point should not be ignored that such matters as (a modern tourism industry and tourism) less, has been discussed in terms of previous scholars. With this expansion, because this issue was not raised in their time or if they had been in some jurisprudential arguments which need to be discussed that need not be discussed in some jurisprudential arguments. Moreover, the past government and the name of Islam and Islamic law is not working the family wishes in connection with international membership relations and issues orders and it will be discussed further hence Inference method is innovative.

3.2.1 The word travel

The Quran, using word travel in various forms and delegations, the command to tourism… (Aleomran, verse 127). A tradition has been before you, once on land and sees... (Nahl, verse 36). Once on land and sees how has the consequence that their work falsely attributed to the Prophet, (Namal, and verse 69) tell traveled in the land and see how that end is criminals.

All these revelations and the like which we can get, the issue of tourism and course and tourism and also received a profound impression, and of the Journey, Consideration and attention to God in the Qur’an.

While they still have not been developed and written in a book about the history and traditions of social and there was no school in this regard and not available or the Arab and Muslim al-Arab island, God, Muslims seem to travel in these categories calls and which of them will engage in this thinking and policy.

Here can be found from the fact that important and pervasive in our time as it (archaeological) is referred and special courses in universities in the world dedicated to, has been around for over 1400 years ago about the invitation and the Qur'an and Islamic teachings.

The Children of Israel crossed the river and drowned harmonics, precise and clear understanding of these concepts depends on its an interpreter or jurist (or historian) to have their comprehensive understanding and this recognition is not possible without the help of archaeological knowledge, Although many of these monuments gradually due to earthquakes, sea fluctuations, given rainfall, soil erosion and the like is changed. However, the invitation to visit Qur'an and the earth, probe and search in the spirit of his followers resurrects and the need for understanding and recognition of

archaeological places the Qur'an makes it clear. Archeology, which is necessary tourists, in fact, the science of reconstructing the past, present and other words, a kind of archeological history of surgery and discover the causes of rise and fall of nations and nations are former. Other groups of Qur'an, a question addressed to the issue of blame and stimulate tourism and have been those who refuse this blaming and questions about. (Yousef, Verse 109). You are not on earth, to see what have been the predecessors of the end? (Hajj, verse 46).

These questions also stimulate and motivate Muslims to move and rotate around the earth. And roam the world and circulating in nature, mountains and plains will discuss this point to get the historic culture and attitude work to end the great civilizations and monuments, geographical not only to study the effects rather, efforts should be traveling on paved and suffering and swept through dormitory to dormitory and around the world and its prospects for progress beside paid sensual trip the Secrets to achieve progress and civilization and they collapse and fall of lesson learned and experienced. Allameh Tabatabaei name interpreter of the Quran writes about these revelations (Tababtabaei, 1971,p: 404).

It is obtained from these verses that the earth travels something kindly and recommended that the religion. Also be desirable if the tourism that is Islam and Muslims from the Islamic system and leave it not suffered harmful and loss otherwise it takes the color of necessity and sufficiency necessary and perhaps leave it is cause religious censure and blame. This point can be found about the system and being forbidden, dominated the unbelievers on the believers and will also benefit from the dignity and greatness of the Islamic community.

The last verses that command will clear the issue of travel and tourism, there are other verses in the Quran, the message is the result and invited to tour and travel in the land to receive the lessons learned from the effects of violent and decisive is the wealthy and including the colonists (Dokhan 26-28).

After their gardens and springs they left and grace and good lands and houses which were flooded with joy we thus had the blessing to other people expounded. History will say when Ali (AS) passed the city Madaen and reached a deficit effects one of the fellows said that the theme of the word: "*The winds blew over the land and the mansion has been on the brink of destruction*." Imam (AS) said, referring to the above verses "Read it and heed these revelations affected how people lived in the blessings and prosperity of ingratitude and sin the blessings they were taken and were involved in the punishment (Ghomi, 1994)

Elsewhere in the Qur'an and the historical traditions of pride, natural such as dignity and humiliation, victories and failures, happiness and misery pointed and explained (Al Emran, Verse 137). Traditions and laws before you actually occurred. Then in Earth orbit and explore the historical past. One of the commentators, the need to develop the field of religious sciences (science, social traditions), the use of this verse and writes: "Directive on these servants of God that exists in society, history and traditions. It is a sign that we Muslims know this knowledge of Quran Sciences and count it the most important and essential knowledge. In addition, the root and source of knowledge, this is the story of the past history has made us realize to travel the land and traditions of its governing, causes of rise and fall of nations and civilizations to achieve"(Reza,1984)

3.2.2 The word tourism

One of the tourists and tourism related words that have been raised in the Qur'an is the word (tourism). These words appear in a place with other boards to the Quran. Sociologists have written such words in its description (Saeh) (Tabarsi, 1973).

Saeh, the soul will be said that the earth rotates and Tourism, the original word, the meaning is constantly moving and going, the direction of the flowing water say (Sayah). Hence, the fasting man said (Saeh), because the slave and obey God and avoid carnal desires during the day and is based on momentum.

Qur'an, while portraying believers and scholars to work on the face value of their personal and social characteristics suggests and one of its features (Saeh) of them counted (Tobeh, verse 112). They are reconciled with God and the God they prayer. With thanks and praise to God soft and quiet walk in the way of life, their individual assignment, and the bow and prostrate in prayer there are two key elements and its two pillars of its social duty enjoined and denying sins, to bring the appeal and borders guards of Allah. In this verse (tourism) placed alongside other value and its meaning cannot be limited to a case such as fast. Symmetric group of commentators to have context and meaning of the verse, it means progress and movement toward devotional centers but Tabatabaei (RA) in explaining the meaning of tourism it is said that (Tabatabaei, 1971)

In the beginning Tobeh Chapter this verse has also been expressed that (Tobeh verse 2) Then rotate the earth for four months and Tabatabai (RA) writes in a commentary on this verse (Tabatabaei, 1971). Tourism, circulating in the earth thus the water flow is constant say (Saeh). God ordered the idolaters of irony is that tourism will be four months in the security and everything I think and where to go what profit is to choose, stay, go or be destroyed.

The revelations of such stagnation and stay in a place that comes to hand as the birthplace and residence were not valuable in itself, It is worth that kind of perspective, believers have of Qur'an.
Astronomers word about the word (Christ) would have stated: (Ebne manzoor, 1985, p493) The word (Sah) means (left), came, and the Word (Christ) are taken from the original and some of the words it walked the earth and they came, then came the night he stood up to the morning prayer therefore, (Christ) here means (Saeh) and tourism.

Wise scientist Mohammad Javad Mughaniyeh in the above word Ali (AS) writes: (Biting and travel to inhabit the great civilized cities, civilizations and accomplishments of each man makes know human inventions and innovations, and the civilization and progress to the show.Horizontal and deeper and wider than they lived in it for them opens. (Mughaniyeh, 2008). Sector-wide discussions of previous tribe's history and stories of the Quran in the past expressed and to note that bed of various events and what he will look into the mental and philosophical sometimes in the pages of history as objective to be retrieved shows the central role and history of infrastructure. And study of history and historical places to visit and roam the events that have occurred within human life has long and theoretical and practical lessons learned many ways can human societies.

4 Conclusions

Islamic Tourism in Islamic Countries would need to be stated: Essentially spiritual space in Muslim countries has its attractions. Many Muslims like to travel to areas where the Islamic culture and values, making them. Islamic values and traditions are respected, including halal and convenience foods in religious practice, provides a comfortable sense of security and it also provides for Muslim tourists.
In today's world that the world has known, has its special place in the tourism industry and safe operation of this industry in the Islamic country of Iran and the first condition for success is that it provides the first substrate and tourism fields and in the context of religious laws and customs of the nation, this important and profitable industry to build an active and dynamic. Tourism can be received in the context of the verses and narrations, the issue of tourism and travel and tourism and the impression and receive a profound journey of this, consideration and attention to God in the Quran. The birthplace or place of stagnation and stay in a place like life itself has no value, Travel and

tourism, but the other side, and the world wide circulation and awareness of surroundings, Value is considered as some kind of verses that they believe it has value.

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The Use of Token Economy and a Math Manipulative for a Child with Moderate Intellectual Disabilities

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Abstract – *The purpose of this case report was to increase a child's skills in adding basic facts to ten using a math manipulative, and a token economy. The participant was an 11-year-old girl with intellectual disabilities. This study took place in the child's self-contained special education classroom located in an elementary school in the Pacific Northwest. The dependent variables were the student's ability to accurately count the targeted numeral amount using a manipulative. The second was rote counting. The results of this study indicated the effectiveness of token economy and the math manipulative. As the outcomes revealed, the student's corrects increased with the use of token economy and math manipulatives. A return to baseline failed to reduce the student's performance indicating maintenance of behavior change over time. The applicability of token programs and manipulatives in math was discussed.*

Key Words – *Addition, intellectual disabilities manipulatives, math facts, token economy,*

1 Introduction

The token economy has been suggested as one of the most powerful motivational strategies to employ (Kazdin, 1982; LaPage, Delben, Pollard, McGhee, VanHorn, Murphy, Lewis, Aboraya, & Mogge, 2003; McLaughlin & Williams, 1988; Naughton & McLaughlin, 1995). Token programs have been effective across a wide variety of student populations including those with behavior disorders (Swain & McLaughlin, 1998), general education students (McLaughlin & Malaby, 1972; 1975; 1976), students with learning disabilities (Inkster & McLaughlin, 1995), and students with intellectual disabilities (B. F. Williams, R. L. Williams, & McLaughlin, 1989). The reasons that the token economy has not widely employed in school settings remains a difficult and puzzling question to answer. Some have suggested that that token programs may be abusive (La Page et al., 2003), can fail to foster individualized treatment (LaPage et al., 2003), or remain difficult to implement and monitor by many classroom teachers (McLaughlin & Williams, 1988). However, the available evidence from

the peer-reviewed literature indicates that token programs are just the opposite (Higgins, Williams, & McLaughlin, 2001; Kazdin, 1977, 1982; Klimas & McLaughlin, 2007; Lolich & McLaughlin, 2012; McLaughlin & Williams, 1988; Swain & McLaughlin, 1998; Truhlicka, McLaughlin, & Swain, 1998). Various techniques have been suggested to assist students in math. These have ranged from number lines, skip counting (Duvall, McLaughlin, & Sederstrom-Cooke, 2002), math manipulatives, games (Koran & McLaughlin, 1990), cooperative learning (Kuntz, McLaughln, & Howard, 2001), individualized instruction (Kuntz et al., 2001), token programs (McLaughlin, 1982), and self-managed drill and practice (McLaughlin & Skinner, 1996; Logan, Skinner, & McLaughlin, 1997). It appears that both consequences as well as teaching strategies and materials have been shown to positively affect student performance in math.

The purpose of this case report was to increase the student's skills of adding basic facts to ten using a manipulative, and the use of a token economy. These data were collected in an Intermediate developmentally impaired classroom, within an urban school district.

2 Method

2.1 Participant and Setting

Our participant was an 11-year-old female with moderate intellectual disabilities. In addition, she had history of brain and back injury due to a car accident when she was 2-years-old. She has been enrolled in an intermediate developmentally impaired (DI) classroom for academics and social skills. The classroom teacher and teaching assistants felt she lacked motivation and did not initiate any situation, unless prompted to do so. Therefore, a token economy was implemented to create a positive and highly reinforcing atmosphere throughout the study. The participant had been in the DI classroom for three years, but had not made many gains in mathematics. The student scored at a beginning kindergarten mathematics level on the BRIGANCE: Diagnostic Inventory of Basic Skills (Brigance, 1983) when it was administered in March of 2003.

Data collection took place in the child’s classroom located in an elementary school in the Pacific Northwest. The classroom contained nine other students of the same or more severe disabilities as the student. There were four other adults in the room who conducted the reliability data during each phase change throughout the study. The first author conducted the research as part of her course requirements from Gonzaga University (McLaughlin, B. F. Williams, R. L. Williams, Derby, Peck et al., 1999).

2.2 Materials

This study required a variety of preferred rewards such as, M&M’s, Sweet Tarts, Markers, and other toys desired by the student; a token economy board; and the number data sheet created by the researcher. The token board was used to indicate when the child earned a reward.

2.3 Dependent Variables and Measurement Procedure

The dependent variable was the child’s ability to accurately count the targeted amount using a manipulative and the accuracy of the sum to the math fact being taught. This was measured by the scoring the number of correct and incorrect answers and sums. The target behavior was having the child count the accurate amount with a math manipulative; and adding a second amount of the

manipulative to obtain the final sum. The participant was not specifically asked to solve an addition problem; rather she was being taught the concept of what it meant to add objects together.

2.4 Experimental Design and Conditions

An ABA single case design (Kazdin, 2011; McLaughlin, 1983) was used to evaluate the effects of token economy and the use of a math manipulative.

1 **Baseline.** During baseline the child was not provided with a reward for the work being completed. She was expected to attempt counting to the number asked by the researcher. For example, "Count nine beans", and the child would count as many as she was capable of at the time. Baseline was in effect for two days not including the data used from the assessment with the *BRIGANCE* (Brigance, 1983). The first author recorded corrects and errors made by the student during the time allotted for math.

2 **Token economy and math manipulative**. After baseline was completed, each session began with the child being provided an opportunity to choose from one of the reinforcers offered to her. Together the student and the researcher set up the token economy board according to what reinforcer was chosen. The first author gave the child an amount to count and she would then respond by verbally counting and moving the math manipulative into a small bowl. A second amount was asked and the student would place that amount in a separate bowl. The third instruction was to tell the researcher the total amount (sum) that was counted between the two containers. Correct responses were marked on the data sheet with a slash through the number asked. Incorrect responses were also recorded by circling the number asked. However, these were not plotted.

A written number line was also constructed to prompt the child with the correct sequence for counting. She was prompted to place the manipulative in a bowl to separate the first amount from the second. The number line was faded out within the first week of data, and a verbal prompt was given only if the child counted incorrectly within the sequence asked. For example, the first author said, "Count twelve," and the child places twelve beans in a bowl. "Next, count five," and she placed five beans in another bowl. The final question was, "how many do you have in all?" The child would respond by counting the number of beans in the first bowl, "12, 13, 14…" until she added all five from the second bowl, and would respond with the sum of "17". Each session lasted about 25 minutes depending on the child's motivation. This condition was in effect for five weeks of school.

During the first week of the token economy intervention, a token was given after every response to motivate the participant. After the first week, a token was given immediately following every five problems.

3 **Baseline.** After the token economy intervention has been in place for several school days, the first author removed the token program. She returned to the same teaching procedure as baseline. However, the math manipulative was still in effect during this return to baseline. This was in effect for two school days.

2.5 Reliability of Measurement

Reliability of measurement was taken once per experimental condition. The number of corrects scored by the first author was compared to that taken by one of the instructional assistants in the classroom. Reliability of measurement was 100% for each of the measures.

3 Results

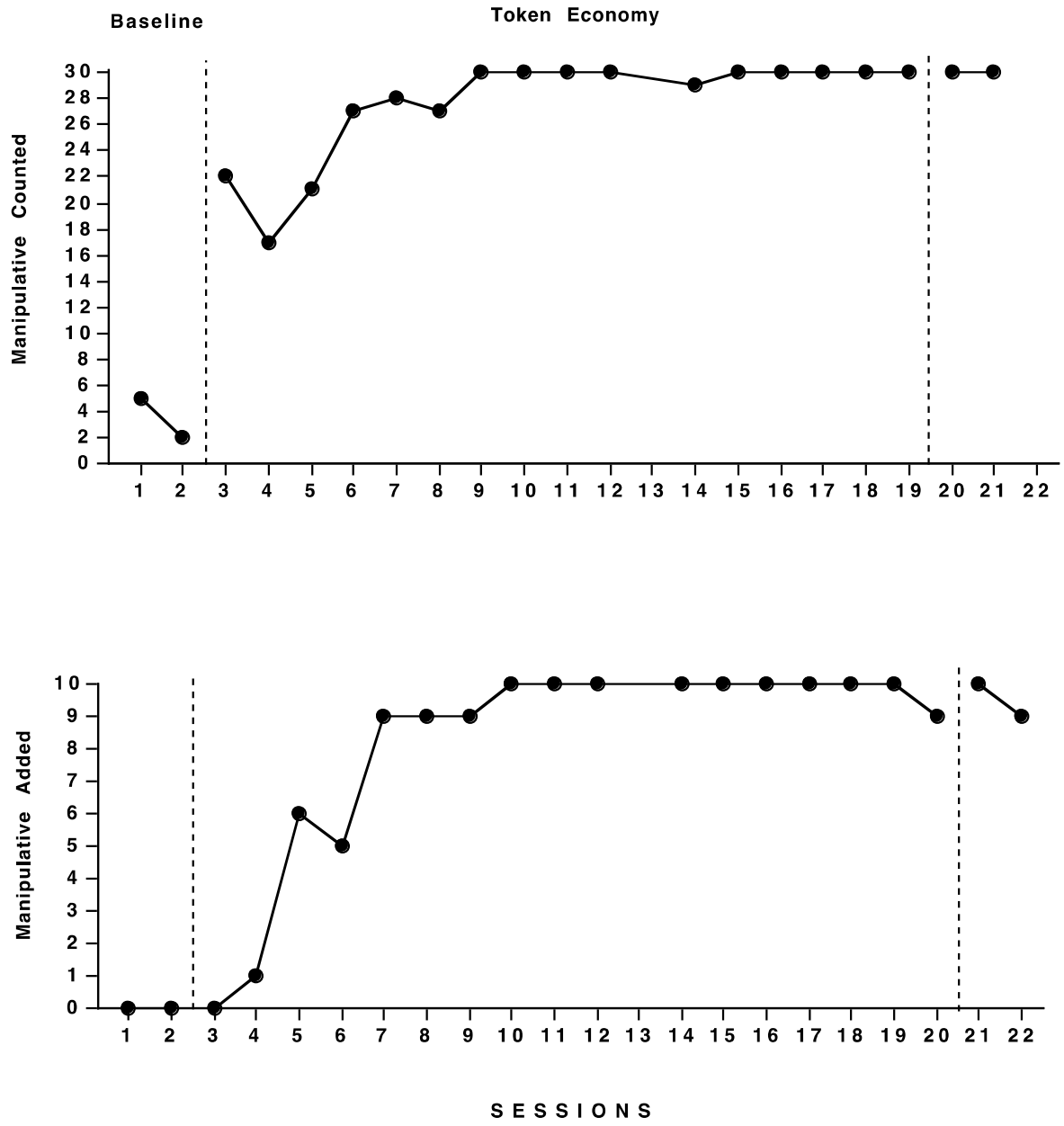

Fig.1: The number of math manipulatives counted (top panel) and added to create a sum (lower panel) during baseline, token economy and math manipulate, and baseline.

The overall results revealed an increase in correct responses with the student's counting (See Figure 1). For baseline, the student counted 3 manipulatives correctly with 26 errors. During token economy, the number of correct manipulatives counted ranged from 17 to 30, with a mean of 28. The number of errors decreased during this phase (M = 3; range 2 to 13).

During token economy, the number of correct manipulatives added to the previously counted set ranged from 0 to 10, with a mean of 8.2. The number of errors decreased during this phase with a range of 0 to 10, with a mean of 2.0.

When a return to baseline procedure was carried out to evaluate the effects of the token economy system, the child responded correctly for each measure.

4 Discussion

The results of this study indicated the effectiveness of token economy and the use of a math manipulative. As the outcomes revealed, the student's errors decreased, and her corrects increased with the use of token economy and math manipulatives.

The follow-up data in the second baseline showed that the child's skills maintained without the use of the token program. Others have urged that keeping certain components of the intervention in place may assist in the maintenance of behavior change (McLaughlin, 1983; Connis & McLaughlin, 1991; Stokes & Baer, 1977; Stokes & Osnes, 1988). In this case report, the math manipulates were still employed.

However, it should be noted that during the first phase, a token economy was needed to increase the rate of correct responses. During the follow-up stage, the child noticed that she was not being rewarded with her token board. This did start to become a distraction for her, but she was still able to attend to the task being asked of her.

The cost of this case report was minimal; however, it may vary with each child due to the fact that they chose the reinforcers. If the reinforcers were more expensive it was possible to discuss alternative ideas such as, playing outside, free time on the computer, etc.

One limitation of this study was the time that it took away from the general education classroom goals and other individual goals of the child. The token economy system has proven to be a successful tool in motivating a child to complete a task (Klimas & McLaughlin, 2007; Lolich & McLaughlin, 2012. Another limitation is the failure of the participant's math skills to revert to baseline levels. It has been suggested elsewhere that academic skills are very difficult to return to baseline levels once they have become well established (Kazdin, 2011; McLaughlin, 1981, 1983).

The benefits of using a token program to assist children in their academic progress have been well documented (Kazdin, 1977, 1982; Williams et al., 1989). However, in the present case report, a token system could motivate and teach a child with intellectual disabilities to count when other efforts in her past had failed to do so. Again, a token program should be considered by a wide variety of school personnel when assisting children in their academic skills.

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Determination of Arsenic in Palm Kernel Expeller using Microwave Digestion and Graphite Furnace Atomic Absorption Spectrometry Method

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Abstrak – *A study on the method to determine arsenic in palm kernel expeller was carried out. Microwave digestion technique is widely applied in the analytical chemistry field. In comparison to conventional sample digestion method, the microwave technique is simple, reduced contamination, usage of safe reagent and matrix completely digested. A graphite furnace atomic absorption spectrometry method was used for the total determination of arsenic in palm kernel expeller. Arsenic was extracted from palm kernel expeller in a closed vessel digestion system with nitric acid and hydrogen peroxide. The results showed that the optimal ashing and atomizing temperatures were 800°C and 2400°C respectively. The limit of detection was estimated to be 0.001 ppm. The mean recoveries of arsenic for repeatability and reproducibility for 1, 2 and 4 ppm were in the range between 79 – 90%. Ten samples of palm kernel expeller from mills were analyzed to contain 0.18 to 3.05 ppm of arsenic. Therefore, is proposed that this method be used to detect arsenic in palm kernel expeller*

Key Words – *Microwave digestion, graphite furnace atomic absorption spectrometry, palm kernel expeller, arsenic, mills.*

1 Introduction

Arsenic has been considered as an essential trace element for normal growth and development of animals (Lasky et al, 2004). However, arsenic is more often regarded as a hazardous element rather than as essential element widely encountered in the environment and organisms (Cullen and Reimer, 1989). Arsenic is extensively distributed in the environment because of its presence naturally as well as from industrial production. Natural arsenic concentration in plants hardly exceeds 1 mg/kg (Porter and Peterson, 1975). This level increases to several folds when plants are coerced to grow in arsenic treated soils, but arsenic is primarily retained in the roots. Studies showed that vegetable grown in arsenic-spiked soils exhibited 7.1 and 5.0 mg/kg in the roots and shoots respectively Jones and Hatch, 1945). In tomato and bean plants, arsenic is primarily concentrated in the roots, and a small quantity is translocated to the pods (Cobb et al., 2000). A similar pattern is observed in Tamarik (*Tamarix parviflora)* and Eucalyptus (*Eucalyptus camaldulensis*) where the roots accumulate more arsenic compared to the shoots (Tossell et al., 2000).

In Malaysia the level of arsenic in oil palm is not well established. Contamination of arsenic may come from the use of herbicides such a monosodium methyl arsenate (MSMA), disodium methyl arsenate (DSMA) and cacodylic acid (dimethylarsenic acid) in oil palm plantations. However these compounds are not in used anymore. Numerous methods are available for extracting arsenic from various matrices and analyzing total arsenic (Hudson-Edwards et al., 2004). The most common

methods for extracting total arsenic from soils and sediments involved wet ashing of sample using one or a combination of acids such as sulphuric acid, nitric acid, hydrochloric acid, boric acid, hydrogen fluoride and hydrogen peroxide. Ashing digestion can be carried out using hotplate or microwave oven (Mucci et al., 2003).

During the past few decades, microwave digestion method has become widely used since they are more reproducible, more accurate and less time consuming than conventional digestion on hot plates in open crucibles and lost of analyte is minimum (Kingston and Jassie, 1988). Arsenic can be determined using the following methods: colorimetry, hydride generation system in combination with atomic absorption spectrometer (Slemer et al., 1976) and atomic fluorescence spectrometry (Chen et al., 2001). Graphite furnace atomic absorption spectrophotometer (GFAAS) is another analytical instrument used for trace element analysis. It has been widely used to determine lead in food (Chen et al., 1999), biological samples (Dabeka and McKenzie, 1992) and environmental samples (Cabrera et al., 1994).

The main objective of this study was to test the effectiveness of microwave system for the digestion of palm kernel expeller and subsequently analyzing using graphite furnace atomic absorption spectrophotometer.

2 Materials and Methods

2.1 Reagents

All reagents were of analytical grade unless otherwise stated. Double-distilled water (Milli Q Millipore 18.2 mΩ-cm resistivity) was used for dilution. Nitric acid (65% w/v) and hydrogen peroxide (30% w/v) were of suprapure quality (E.Merck, Darmstadt). All the plastic and glassware were cleaned by soaking in diluted nitric acid-distilled water (1+9) and were rinsed with distilled water prior to use.

2.2 Arsenic Standard Solution

A standard stock solution of arsenic (1000 ppm) was purchased from BDH Laboratory Supplies.

2.3 Working Standard Solution

Working standard solution of 100 ppm and 1 ppm were prepared by diluting the standard solution with appropriate volumes of Milli Q water. Working standard for 100 ppb was prepared by adding 1 mL of 1 ppm and 2 mL of nitric acid.

2.4 Sample

About 0.5 g palm kernel expeller was spiked with 500 µL, 1 mL and 2 mL of 1 ppm working standard solution to produce 1 ppm, 2 ppm and 4 ppm respectively.

2.5 Preparation of Standard Curve

A working standard solution of 25 ppb, 50 ppb, 75 ppb and 100 ppb were prepared by diluting the 1 ppm working standard solution with appropriate volumes of Milli Q water.

2.6 Analytical Procedure

Microwave digestion procedure was applied for palm kernel expeller sample. About 0.5 g of palm kernel expeller was weighed. Then 6 mL of nitric acid (65% w/v) and 2 mL hydrogen peroxide (30% w/v) suprapure quality were added. A blank digest was carried out in the same way. The digestion conditions for the microwave system were shown in Table 1. After treatment, the contents were cooled down, then the resultant residue was dissolved in 25 mL Milli Q water for arsenic determination by graphite furnace atomic absorption spectrophotometer.

2.7 Apparatus

Zeeman graphite furnace atomic absorption spectrophotometer AAnalyst 600 with standard transverse heated graphite atomizer (THGA) B3000641 and arsenic electrode less discharge lamp (As-EDL) were made by Perkin Elmer (Germany). Argon was used as the pure/inert gas. The instrument operating parameters are summarized in Table 2 and Table 3. For sample digestion, a Milestone Ethos MOD with Terminal 1024 closed vessel microwave digestion system with pressure and temperature controller was used.

2.8 Analysis of Arsenic in Commercial Palm Kernel Expeller

Ten different palm kernel expeller samples were collected from 10 different mills in Malaysia. The samples were preserved in covered polyethylene bags, tagged properly and kept in room temperature until analysis.

2.9 Statistic Analysis

The data obtained from the analysis were calculated using computer programme Microsoft Excel for Windows.

Table 1: Microwave oven heating program for the decomposition of palm kernel expeller

Step	Time (Minute)	Temperature 1 (˚C)	Temperature 2 (˚C)	Microwave Power (Watt)
1	15 min	500	180	100
2	15 min	500	180	100
3	15 min	1000	200	120
4	10 min	1000	200	120
5	20 min	0	50	30

Table 2: Instrument parameters for the determination of arsenic in palm kernel expeller using graphite furnace atomic absorption spectrophotometer

Parameter	Setting
Wavelength (nm)	193.7
Slit width (nm)	0.7
Signal measurement	Peak area
Lamp	Electrode less discharge
Lamp current (mA)	380
Purge gas	Argon
Sample volume	20 µL
Modifier volume	5 µL

Table 3: Temperature program for the determination of arsenic in palm kernel expeller by graphite furnace atomic absorption spectrophotometer

Temperature (˚C)	Ramp Time	Hold Time	Internal Flow (ml/min)	Gas Type	Read
120	1	30	125	Argon	
800	10	30	250	Argon	
2400	0	5	50	Argon	+
2500	2	3	250	Argon	

* Temperature injects: 70 ˚C.

3 Results and Discussion

3.1 Matrix Modification

Matrix modification is an essential step in the determination of easily volatile elements by graphite furnace atomic absorption spectrophotometer. The most common matrix modifiers used in arsenic determinations are palladium, palladium-magnesium nitrate and nickel nitrate.

Palladium-magnesium nitrate was selected as a modifier since memory effects were observed when the nickel modifier was used (Bozsai et al., 1990). An interelement compound was formed between arsenic and palladium, which has a higher heat of vaporization than pure arsenic. Therefore, a higher ashing temperature can be used and the effects of interference are diminished. Magnesium nitrate behaves as an ashing aid during the thermal pretreatment step in graphite furnace determinations. Spectral interferences caused by aluminum and phosphate are possible at the primary resonance line (193.7 nm) of arsenic. It should be possible to almost eliminate these interferences with the Zeeman background correction technique (Bettinelli et al., 1989; Welz et al., 1988; Riley, 1982).

Characteristic mass for arsenic is quite high, and therefore a rather large absolute mass of arsenic should be injected into a graphite tube in order to obtain a reasonable sensitivity. This means that a

higher sample volume should be used or that a preconcentration step is necessary. However, with a larger sample volume, a longer sample drying phase is needed, and there is also a maximum sample volume that can be dispensed onto a platform.

Therefore, a sample volume of 20 mL was selected for routine use. With very low arsenic concentrations, two or more sample dispensing-drying steps can be used in order to increase the absolute amount of arsenic in the graphite furnace. One should remember that this will also increase the amount of matrix introduced into the furnace. About 5 mL of modifier solution was injected onto a sample. Larger volumes of modifier had produced wider and flatter absorption signals, therefore 5 mL of modifier was determined to be the optimal volume in arsenic determinations.

3.2 Method Performance

Evaluation of quality parameters such as the linearity, recovery percentage (repeatability, and reproducibility) and limits of detection are essential to assess the method performance (Zanella et al., 2000). Calibration curve was obtained by analyzing three times each, four different solutions of known concentrations of analyte included between 25 and 100 ppb. The curve equation $y = bx + m$ calculated with linear regression method to determine samples concentration was utilized.

The calibration curve data for standard arsenic is shown in Table 4 and the calibration curve is in Fig.1. The equation of the curve and the R2 value (0.999) shows the good linearity of the analytical method and the method is feasible to be used. Values of coefficients of variation are less than 5% for all concentration (25 ppb, 50 ppb, 75 ppb, and 100 ppb) and to be considered acceptable.

Table 4: Parameters values obtained from the calibration curve

Concentration of Arsenic Standard (ppb)	Average Value (ppb)	Mean of Areas	Standard Deviation	Coefficient of Variation (%)
25	26.14	0.0412	0.0003	0.71
50	51.25	0.0807	0.0020	2.44
75	73.96	0.1165	0.0036	3.09
100	99.83	0.1573	0.0012	0.74

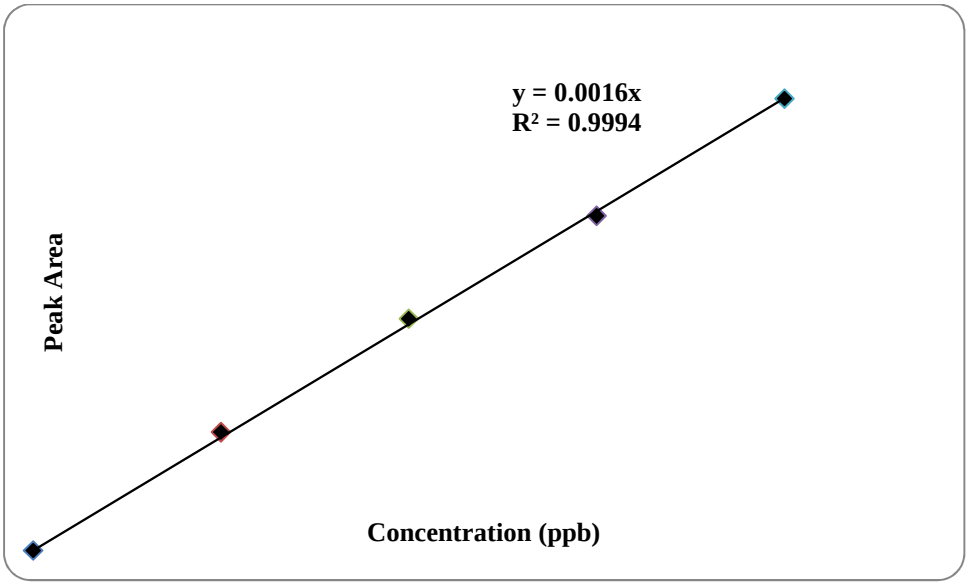

Fig.1: Calibration curve for the determination of arsenic by means of the graphite furnace atomic absorption spectrophotometer technique

The limit of quantification (LOQ) was stated as a concentration below which the method could not operate with an acceptable level of precision and trueness. The limit of detection (LOD) was the lowest concentration of arsenic in palm kernel expeller samples that was detectable but not necessarily quantified, distinguished from zero (signal/noise >3). These limits were established based on the mean recovery and relative standard deviation results obtained for the replicates of spiked samples. Limit of detection was found to be 0.001 ppm, limit of quantification was 0.006 ppm.

Recovery test for repeatability and reproducibility were performed by spiking several concentrations of arsenic standard to palm kernel expeller, which was then analyzed using the established method. Recoveries for repeatability from palm kernel expeller at 1, 2, and 4 ppm were found to be 80.40 ± 4.55%, 90.59 ± 4.74%, and 85.15 ± 5.06%, respectively (Table 5). Recoveries for reproducibility from palm kernel expeller at 1, 2, and 4 ppm were found to be 79.20 ± 3.18%, 89.10 ± 3.11%, and 80.35 ± 6.25%, respectively (Table 6).

All recoveries were greater than 80% with coefficient of variation less than 10% and to be considered acceptable. The results obtained show that the established method is capable of yielding a satisfactory recovery.

Table 5: Percentages of arsenic recoveries for repeatability test

Concentration of Spiked Arsenic (ppm)	Average Value (ppm)	Standard Deviation	Recovery (%)	Coefficient of Variation (%)
1	0.810	0.037	80.40	4.55
2	1.810	0.086	90.49	4.74
4	3.406	0.187	85.15	5.06

Table 6: Percentages of arsenic recoveries for reproducibility test

Concentration of Spiked Arsenic (ppm)	Average Value (ppm)	Standard Deviation	Recovery (%)	Coefficient of Variation (%)
1	0.792	0.025	79.20	3.18
2	1.782	0.055	89.10	3.11
4	3.214	0.201	80.35	6.25

3.3 Analysis of Arsenic Content in Commercialized Palm Kernel Expeller

Palm kernel expeller from the mills was analyzed for their arsenic contents by atomic fluorescence spectrometer with conditions optimized as described. The quantitative results detected in the samples were as following: 0.006 and 0.027 ppm for mill A, 0.006 and 0.011 ppm for mill B, 0.006 and 0.012 for mill C, 0.005 and 0.006 ppm for mill D, 0.006, 0.007 and 0.012 ppm for mill E, 0.006 ppm for mill F, 0.009 ppm for mill G, 0.007 ppm for mill H, 0.011 ppm for mill I and 0.025 ppm for mill J (Table 7). These were all below the maximum permissible concentration (4 ppm), allowed by the EU as ingredient for animal feed (EU Commission Directive, 2003).

Table 7: Results of determination of arsenic content in palm kernel expeller from different mills

Mill	Number of Samples	Number of Replicates	Average Arsenic Level (ppm)
A	3	9	1.39
B	3	9	0.18
C	3	9	3.05
D	3	9	1.31
E	3	9	0.22
F	3	9	0.84
G	3	9	1.54
H	3	9	1.49
I	3	9	2.12
J	3	9	2.03

4 Conclusion

The microwave digestion method studied is suitable for the decomposition of palm kernel expeller, since good recoveries for arsenic were obtained. Digesting palm kernel expeller with microwave digester has the advantages of time-saving and more complete digestion. In addition, the graphite furnace atomic absorption spectrometry has high sensitivity and it only takes few minutes for the time taken to complete an analysis of an individual sample. The method described herein coupled microwave digester and graphite furnace atomic absorption spectrometry, which demonstrated features of a rapid, safe and accurate analysis of arsenic in palm kernel expeller. The arsenic contents in palm

kernel expeller from mills analyzed by the present study were minimum all below the maximal permissible standard of 4 ppm for animal feed.

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Ultra Wide Wavelength Division Multiplexing Optical Code Division Multiple Access Communication Systems in Wide Area Optical Communication Networks

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Abstrak – *The effect of dispersion of fiber on the performance of OCDMA system and to find the limitations imposed by dispersion on number of user and length of transmission. It has been observed that in the bit error rate performance curve the error is decreased when the number of subscriber is increased side by side the optical power is reduced when the users is added. This paper has presented the ultra wide wavelength division multiplexing optical code division multiple access (OCDMA) communication systems in wide area optical communication networks and the transmission efficiency to be evaluated in order to determine the impact of multi access interference.*

Key Words – *Signal to noise ratio, BER, UW-WDM, Optical orthogonal codes, and Ultra multi users*

1 Introduction

Earlier optical fibers have been used for point to point communication at a very high speed [1-3]. Often the optical fiber offers much higher speed than the speed of electronic signal processing at both ends of the fiber. So to be able to take the full advantage of the speed in optical fibers one of the basics concepts in fiber optic communication is the idea of allowing several users to transmit data simultaneously over the communication channel. This is called multiple access. There are several techniques to provide multiple access and one of them is fiber optic-code division multiple access (FO-CDMA). In FOCDMA each user is assigned one or more binary signature sequence, so called code words. The data to be send is mapped onto the code words and the different users code words are mixed together and send over the channel. At the receiver end a decoder, which is individual for each user [4], compares the incoming sequence with stored copies of the code words to be able to extract the information bits. Fiber optics is a particularly popular technology for local area networks. In addition, telephone companies are steadily replacing traditional telephone lines with fiber optic cables. In the future, almost all communications will employ fiber optics. Multi- access techniques are required to meet the demand for high speed, large capacity communications in optical networks [5-7], which allow multiple users to share the fiber bandwidth. Multiple access schemes available for optical LAN'S include [8, 9] Time division multiple access (TDMA); Wavelength-division multiple access (WDMA); and Code division multiple access (CDMA).

In the present work, OCDMA scheme has been an increasing interest for fiber optic systems in wide area optical communication networks because it allows multiple users to access the system asynchronously and simultaneously. OCDMA is expected for further ultra high speed and real time

computer communications where there is strong demand for the systems to support several kinds of data with different traffic requirements. I have analyzed the performance in terms of SNR and BER. We have taken into account several kinds of data (such as code length parameter, number of active users) with different bit rates.

2 System Analysis

Assume that each receiver receives equal power Preceived from each transmitter. In the best case, all the codes are orthogonal to each other and we assume this is the case. Ideally, when the transmitter code and the receiver code are matched to each other, all the received power goes to either the upper or the lower photodetector of the receiver depending on whether a 0 or a 1 bit is sent by the transmitter. Otherwise, the balanced receiver will receive equal power Preceived/2 by both of its photodetectors. As in all other communication systems, the receiver is subject to thermal noise given by [10]:

$$\left\langle I_{th}^2 \right\rangle = \frac{4kT}{R_L} B_d = 8® kT B_d^2 C \quad \ldots(1)$$

Where k is the Boltzman constant ($1.38X10^{-23}$ J/K), T is the ambient temperature, R_L the receiver load resistance, and B_d is the receiver bit rate and can be expressed as follows:

$$B_d = \frac{1}{T_b} = \frac{1}{2® R_L C} \quad \ldots(2)$$

Where T_b is the bit period, and C is the load capacitance.

Suppose M users are active, M-1 of which are unmatched interfering users. Assume the codes are ideal. Since unmatched channel power splits equally at the photodetectors of the balanced receiver, if a 0 is detected, the upper and lower detectors will detect power can be expressed as the following expressions:

$$P_U = P_U^0 = P_{received} + 0.5(M-1)P_{received} \quad \ldots(3)$$

$$P_L = P_L^0 = 0.5(M-1)P_{received} \quad \ldots(4)$$

Similarly, if a 1 is transmitted, the upper and lower detectors will detect power can be expressed as follows:

$$P_U = P_U^1 = 0.5(M-1)P_{received} \quad \ldots(5)$$

$$P_L = P_L^1 = P_{received} + 0.5(M-1)P_{received} \quad \ldots(6)$$

The output photocurrent for a transmitted 0 and 1 bits are given by [10]:

$$I_{Sig.} = I_U - I_L = \Re P_U - \Re P_L = +\Re P_{received} \quad \text{for a 0 bit} \quad \ldots(7)$$

$$I_{Sig.} = I_U - I_L = \Re P_U - \Re P_L = -\Re P_{received} \quad \text{for a 1 bit} \quad \ldots(8)$$

In either case, the shot noise in the output is given by [11]:

$$\left\langle I_{sh}^2 \right\rangle = \left\langle I_{sh-U}^2 \right\rangle + \left\langle I_{sh-L}^2 \right\rangle = 2q\,B_d\left(I_U + I_L\right) = 2q\Re M P_{received} B_d \quad \ldots(9)$$

Where q is the electron charge (1.6x10-19 C), and $\Re$ is the detector responsitivity. Shot noise is due to the particle nature of light. However, in an environment where all the users share the same bandwidth and transmit simultaneously, the incoherent summation of signal powers of the same wavelengths will give rise to excessive fluctuations in the detected power due to the wave nature of light which undergoes constructive and destructive interference [12-18]. The same mechanism also gives rise to the spatial intensity variations in coherent images called “speckle”. The speckle noise model for a detector detecting a photocurrent I is [19, 20]:

$$\left\langle I_{sp}^2 \right\rangle = \frac{2I^2 B_{elec}}{m K \neg_{opt}} \quad \ldots(10)$$

Where B_{elec} is the electrical bandwidth of the photodetector and v_{opt} is the optical bandwidth used. K is the number of modes in a fiber if multi mode fiber is used and m=1 for polarized light and m=2 for unpolarized light. The number of modes in a multi-mode optical fiber can be evaluated using the density of states. It can be proven [22-25] that the number of guided modes Mg in a graded index fiber is given by:

$$K = \left(\frac{g}{g+2}\right)\left(n\,k_w\,a\right)^2 \Delta n \quad \ldots(11)$$

Where g is the index exponent and equal to 2 for a parabolic refractive index profile, n is the core refractive index, k_w is the wave number and is equal to $2\pi/\lambda$, λ is the optical signal wavelength, a is the fiber core radius, and Δn is the relative refractive index difference. For a commercial graded index multi-mode fiber with a = 62.5 μm, n=1.49, and g = 2.

In addition, if B_{opt} is the total optical bandwidth encoded, only one half of the total spectrum will fall on each photodetector, v_{opt} = 0.5 B_{opt}, because of spectral filtering. $\Re P_U$ and $\Re P_L$ give the photocurrent. Therefore, the output speckle noise is given by [26]:

$$\left\langle I_{sp}^2 \right\rangle = \Re^2 P_{received}^2 \left(M^2 + 1\right) \frac{2B_d}{m K B_{opt}} \quad \ldots(12)$$

Since single mode fiber components are used, and the waveguide devices are polarization dependent, K=m= 1.

Assuming a large number of active users so that the distribution of shot noise and speckle noise can be approximated as Gaussian, the three noise components arising from different mechanisms are independent and the total noise is their sum:

$$\left\langle I_n^2 \right\rangle = \left\langle I_{th}^2 \right\rangle + \left\langle I_{sh}^2 \right\rangle + \left\langle I_{sp}^2 \right\rangle \quad \ldots(13)$$

To estimate the throughput, assume for simplicity, that transmission is lossless except for the splitting loss at the star coupler. Signal propagation loss and connector loss can be easily accounted for by scaling up the transmitter power proportionally. For a network with M subscribers, the received power per user will be P_t /M. In the worst case, all M subscribers are transmitting at the same time. If the

system is shot noise limited (e.g. when a large optical bandwidth and multi-mode fiber with many modes are used), the throughput is given by [27, 28]:

$$S_{sh} = \left(M\ B_d\right)_{sh} = \frac{0.5\,\Re\,P_T}{q\,SNR} \quad \text{bit/sec} \qquad \ldots(14)$$

Where P_t is the transmitting power in mWatt, and SNR is the signal to noise ratio.

For a large number of supported users transmitting at moderate power, the system will be speckle noise limited and the throughput is given by [29, 30]:

$$S_{sp} = \left(M\ B_d\right)_{sp} = \frac{K\,B_{opt}}{2M\,SNR} \quad \text{bit/sec} \qquad \ldots(15)$$

Therefore the total throughput is given by:

$$S_T = \frac{0.5\,\Re\,P_t}{q\,SNR} + \frac{K\,B_{opt}}{2M\,SNR} \quad \text{bit/sec} \qquad \ldots(16)$$

It is theoretically found that the SNR is shot noise limited when the total received optical power M P_{rec} is large and is approximately given by [31]:

$$SNR = \frac{\sim\ \Re\,P_R}{2q\left(\sim +1\right)^2 M\,B_d} \qquad \ldots(17)$$

Where α=0.5 for amplitude shift keying (ASK) and 1 for phase shift keying (PSK). Where the repeater spacing can be estimated based on the transmitted signal and received signal power by the following formula [32]:

$$R_S = \frac{1}{\pm}\log_{10}\frac{P_T}{P_R} \qquad \ldots(18)$$

Where σ is the signal loss which can be expressed as the following expression [33]:

$$\pm = \pm_I + \pm_S + \pm_{UV} + \pm_{IR}, \quad \text{dB/km} \qquad \ldots(19)$$

Where: $\pm_I \equiv the\ \text{int}rinsic\ loss \cong 0.03$, dB/km, and …(20)

$$\pm_S \equiv Rayleigh\,scattering = \left(\frac{0.75 + 66\Delta n}{\text{a}^4}\right)\left(\frac{T}{T_0}\right), \quad \text{dB/km} \qquad \ldots(21)$$

Where T is ambient temperature, and T_0 is a room temperature (300 K), Δ and λ are the relative refractive index difference and optical wavelength respectively. The absorption losses α_{UV} and α_{IR} are given as [13]:

$$\pm_{UV} = 1.1\times10^{-4}\,\mu_{ge}\,{}^{0}\!/_{0}\ e^{4.9^{\text{a}}}, \quad \text{dB/km} \qquad \ldots(22)$$

$$\pm_{IR} = \left(7 \times 10^{-5}\ e^{-24/a}\right)^2 \quad \text{dB/km} \qquad \ldots(23)$$

Where ω_{ge} % is the weight percentage of Ge, the correlated ω_{ge} % and the mole fraction x under the form:

$$\mu_{ge}\,\% = 213.27x - 594x^2 + 2400x^3 - 4695x^4 \qquad \ldots(24)$$

The bit error rate of OCDMA communication system can be estimated as the following [33]:

$$BER \approx \left(\frac{2}{®.SNR}\right).\exp\left(\frac{-SNR}{8}\right) \quad , \qquad \ldots(25)$$

The total aggregate bit rate throughput S_T, the dispersion limited transmission distance for OCDMA communication systems are given by the following formula:

$$L = \frac{M\ f_0}{S_T^2\,¦} \qquad \ldots(26)$$

Where f_0 is the center frequency, and η is the fiber dispersion coefficient in ps/nm.km can be expressed as follows [34]:

$$¦ = ¦_{source} + ¦_{receiver} + ¦_{mat.} \quad , \qquad \ldots(27)$$

The three components of the system that can contribute to the system rise time are as the following:

i) The rise time of the transmitting source η_{source} (typically equal to value of 16 psec).
ii) The rise time of the receiver $\eta_{receiver}$ (typically equal to value of 25 psec).
iii) The material dispersion time of the fiber η_{mat} which is given by the following equation:

$$¦_{mat.} = -\left(\frac{\Delta a.a}{c}\right).\left(\frac{d^2 n}{da^2}\right) \quad , \qquad \ldots(28)$$

Where Δλ is the spectral line width of the optical source, and c is the velocity of light ($3x10^8$ m/sec).

Where n is the refractive index of pure Silica material and can be expressed within empirical Sellemier equation as [35]:

$$n = \sqrt{\frac{A_1 a^2}{a^2 - A_2^2} + \frac{A_3 a^2}{a^2 - A_4^2} + \frac{A_5 a^2}{a^2 - A_6^2}} \quad , \qquad \ldots(29)$$

While the first and second diffraction of refractive index n, with respect to optical signal wavelength λ, is given by [36]:

$$\frac{dn}{da} = \frac{-1}{n}\left(\frac{A_1 A_2^2 a}{\left(a^2 - A_2^2\right)^2} + \frac{A_3 A_4^2 a}{\left(a^2 - A_4^2\right)^2} + \frac{A_5 A_6^2 a}{\left(a^2 - A_6^2\right)^2}\right), \qquad \ldots(30)$$

$$\frac{d^2n}{d\mathrm{a}^2}=\frac{1}{n}\left(\frac{A_1A_2^2\left(3\mathrm{a}^2+A_2^2\right)}{\left(\mathrm{a}^2-A_2^2\right)^3}+\frac{A_3A_4^2\left(3\mathrm{a}^2+A_4^2\right)}{\left(\mathrm{a}^2-A_4^2\right)^3}+\frac{A_5A_6^2\left(3\mathrm{a}^2-A_6^2\right)}{\left(\mathrm{a}^2-A_6^2\right)^3}-\left(\frac{dn}{d\mathrm{a}}\right)^2\right), \quad \ldots(31)$$

The set of parameters of empirical equation coefficients of silica material are recast as the following [36]: A_1=0.066347, A_2= 0.06651766 $(T/T_0)^2$, A_3=0.44064, A_4=0.115015 $(T/T_0)^2$, A_5=0.899, and A_6=9.903168 $(T/T_0)^2$. Where T is the ambient temperature, and T_0 is the room temperature. Based on Eqs. (18, 26), the number of repeater stations can be given by [37]:

$$N_S=\frac{L}{R_S} \quad \ldots(32)$$

3 Simulation Results and Performance Analysis

The model has been presented the ultra wavelength multiplexing in OCDMA communication systems for wide area network applications under the set of the wide range of the operating parameters as shown in Table 1 is listed below.

Table 1: Proposed operating parameters for our suggested OCDMA transmission system [2, 5, 8, 13].

Operating parameter	Definition	Value and unit
T	Ambient temperature	300 K ≤ T ≤ 375 K
R_L	Load resistance	50 KΩ
C	Load capacitance	0.02 pF
$\langle I_{th}^2 \rangle$	Thermal noise	$20\text{x}10^{-16}$ A ≤ $\langle I_{th}^2 \rangle \le 100\text{x}10^{-16}$ A
$\Re$	Detector responsitivity	0.8 A/Watt
$\langle I_{sh}^2 \rangle$	Shot noise	$25\text{x}10^{-16}$ A ≤ $\langle I_{sh}^2 \rangle \le 150\text{x}10^{-16}$ A
B_{elec}	Electrical bandwidth	1 MHz
$\langle I_{sp}^2 \rangle$	Speckle noise	$20\text{x}10^{-14}$ A ≤ $\langle I_{sp}^2 \rangle \le 100\text{x}10^{-14}$ A
M	Number of active users	1000 ≤ M ≤ 10000
B_{opt}	Optical bandwidth	1.28 THz
P_T	Transmitting power	100 mWatt ≤ P_t ≤ 1 Watt
x	Germanium doping	20 %
P_R	Received desired signal power	100 μWatt
λ	Optical signal wavelength	1.3 μm ≤ λ ≤ 1.55 μm
Δn	Relative refractive index difference	0.003-0.009
f_0	Center frequency	200 THz

Based on the model equations analysis, assumed set of the operating parameters as listed in the Table 1 above, and based on the series of the figs. (1-9), the following facts are assured:

i) Fig. 1 has assured that total throughput decreases with increasing number of active users or subscribers and with decreasing transmitted signal power.

ii) Figs. (2, 3) has indicated that signal to noise ratio increases and bit error rates decrease with increasing transmitted signal power and decreasing number of active users.

iii) Figs. (4, 5) have proved that transmission distance increasing with increasing both number of active users and operating optical signal wavelength and operating at room temperature.

iv) Figs. (6, 7) have assured that repeater spacing increases with decreasing both relative refractive index difference and ambient temperatures over room temperatures and increasing operating signal wavelength.

v) Figs. (8, 9) have indicated that number of repeater stations increases with increasing total number of subscribers. While operating in room temperature, that results in decreasing number of repeater stations and thus to decrease overall systems costs.

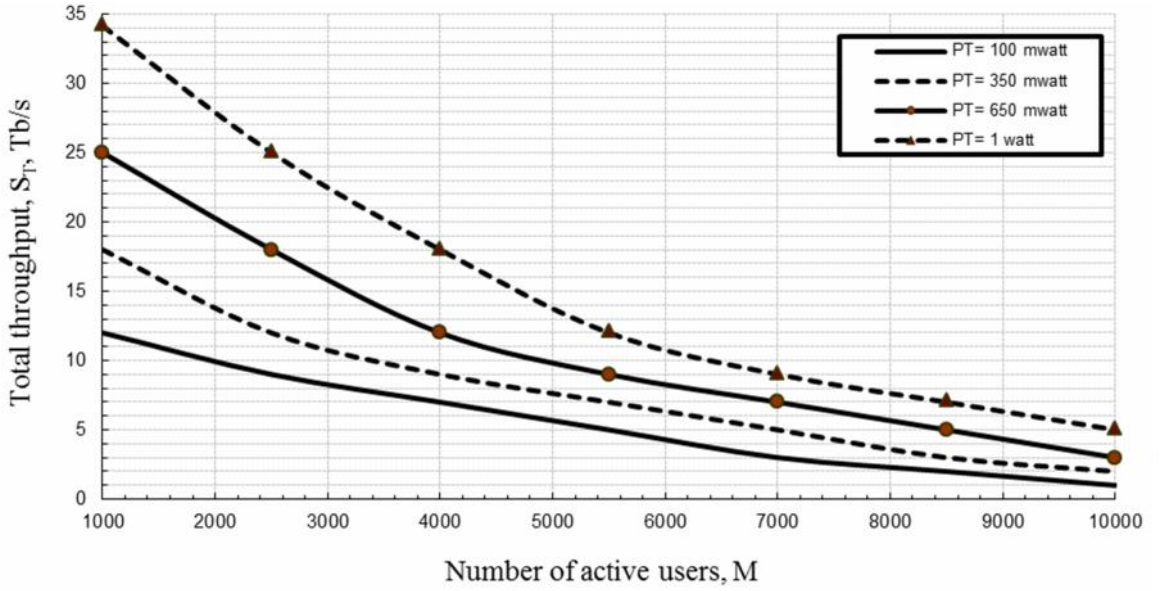

Fig.1: Total throughput in relation to number of active users at the assumed set of the operating parameters.

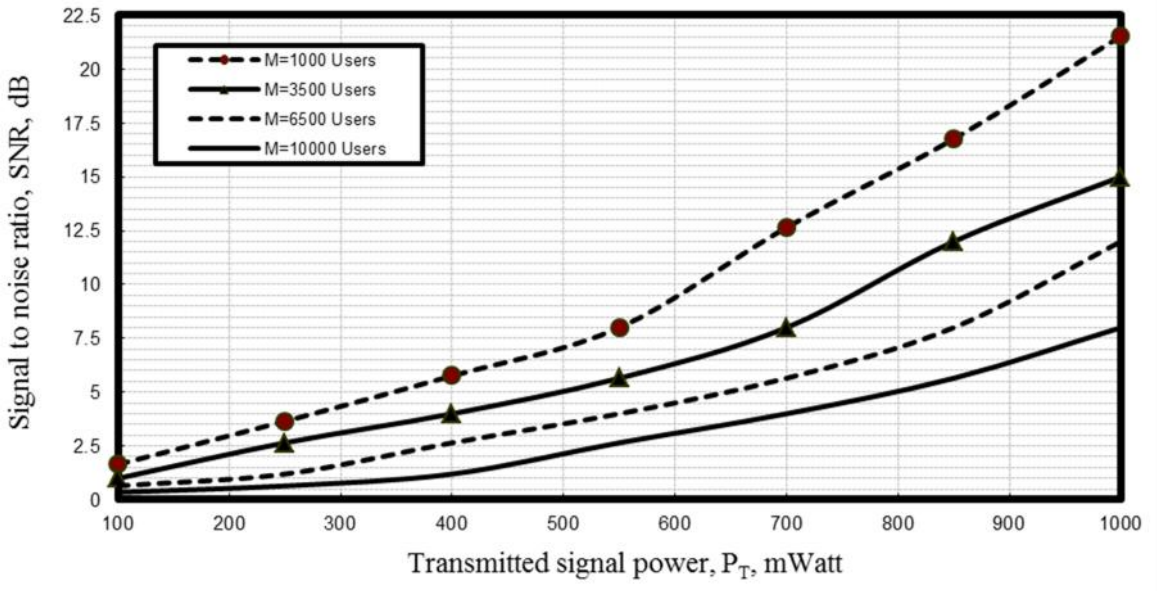

Fig.2: Signal to noise ratio in relation to transmitted signal power and total number of active users at the assumed set of the operating parameters.

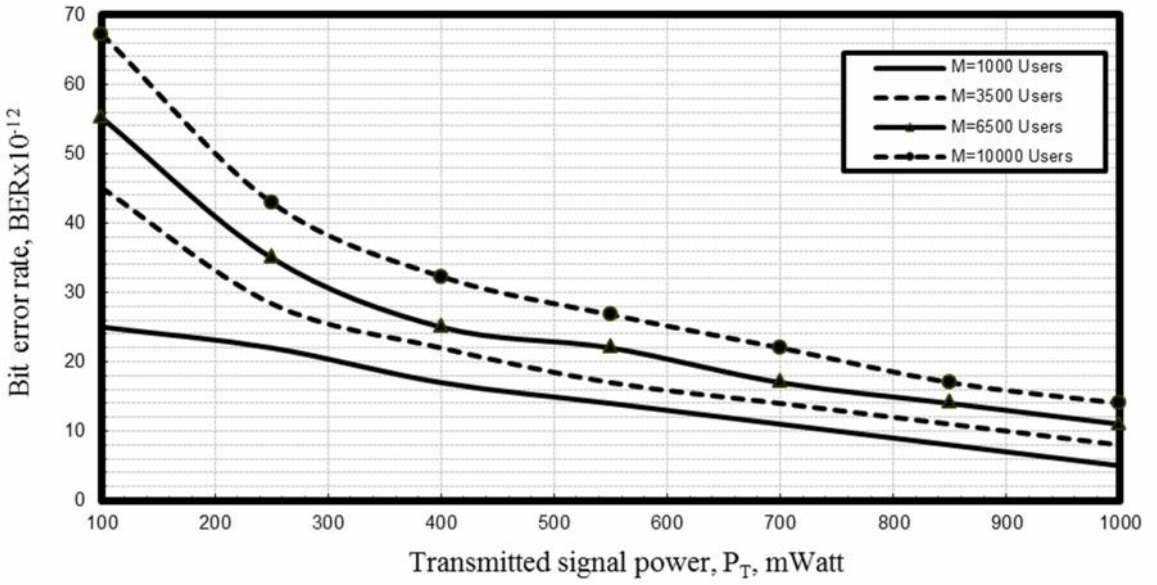

Fig.3: Bit error rate in relation to transmitted signal power and total number of active users at the assumed set of the operating parameters.

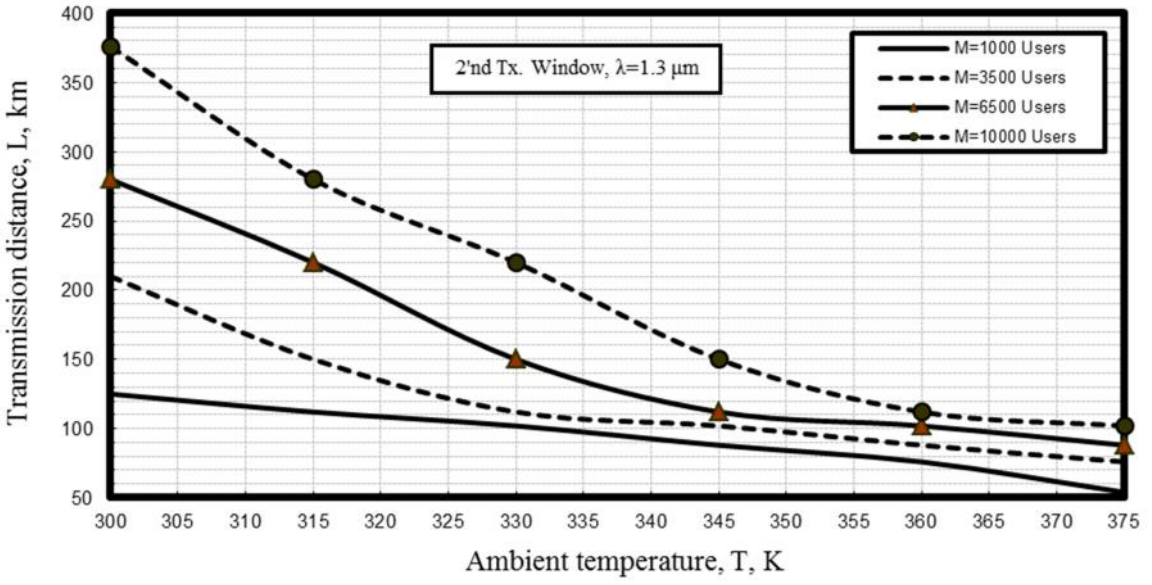

Fig.4: Transmission distance in relation to ambient temperature and number of active subscribers at the assumed set of the operating parameters.

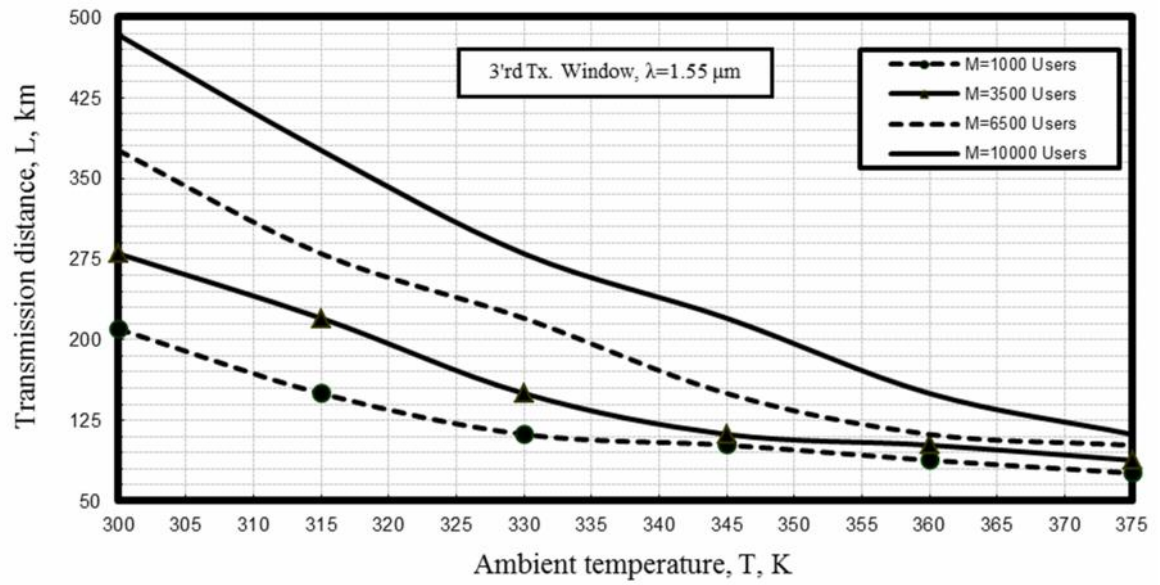

Fig.5 : Transmission distance in relation to ambient temperature and number of active subscribers at the assumed set of the operating parameters.

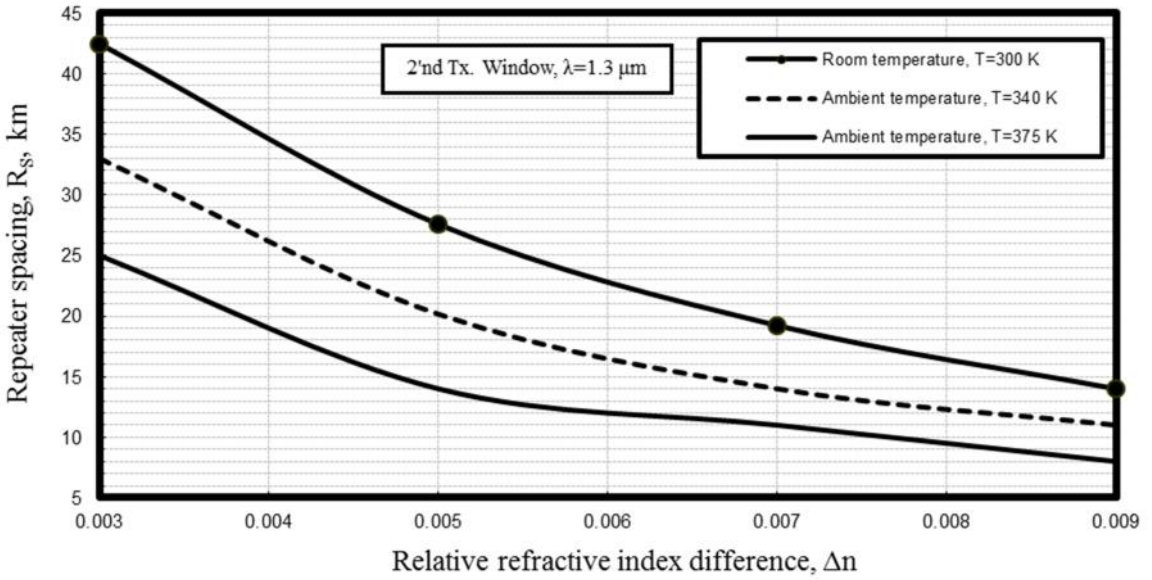

Fig.6: Repeater spacing in relation to ambient temperature and relative refractive index difference at the assumed set of the operating parameters.

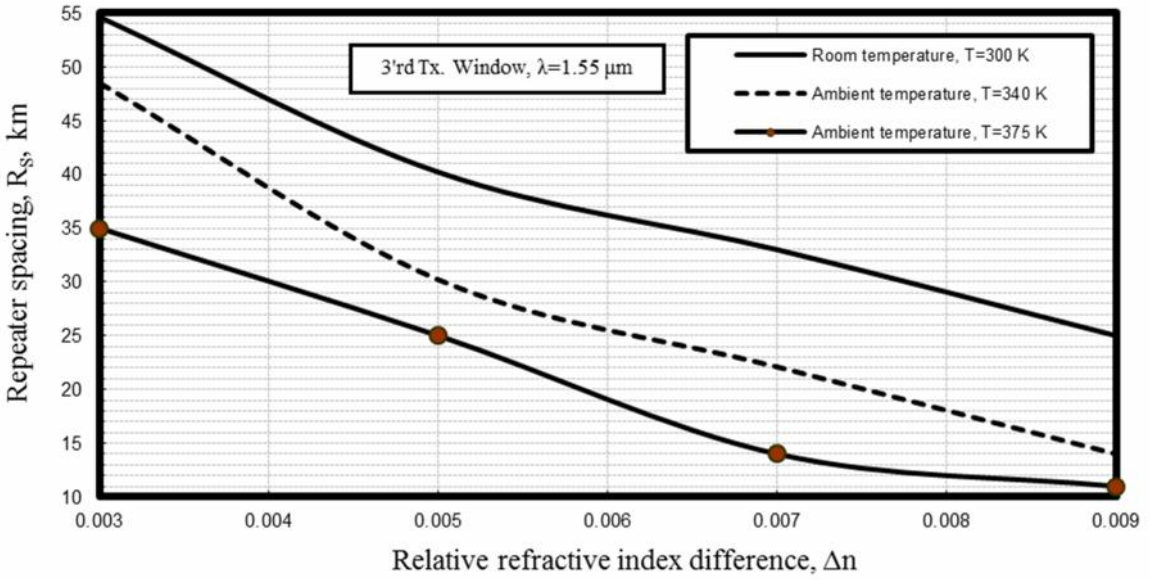

Fig.7: Repeater spacing in relation to ambient temperature and relative refractive index difference at the assumed set of the operating parameters.

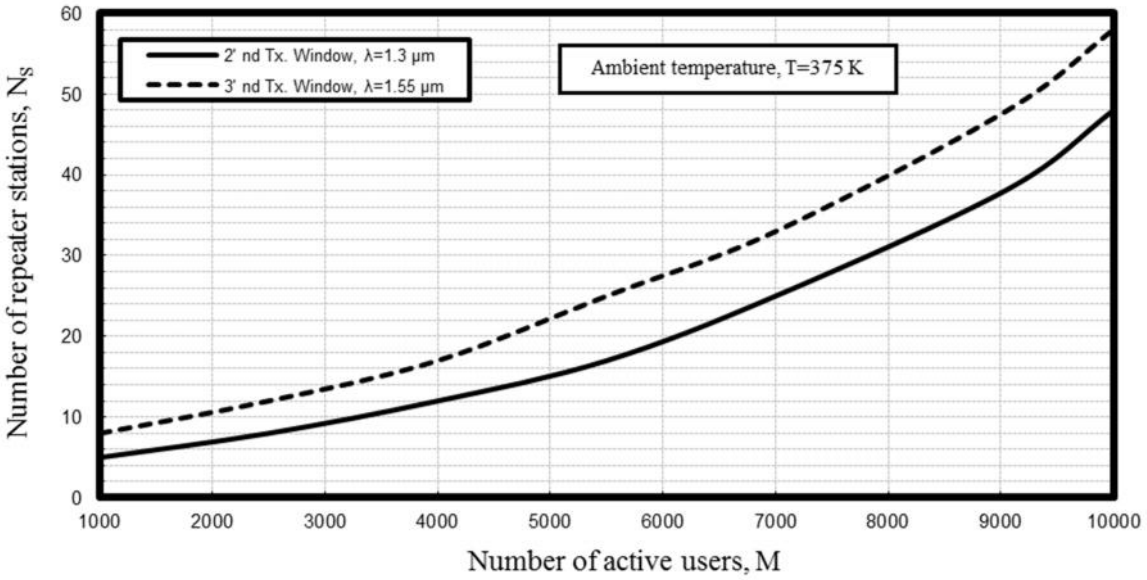

Fig.8: Number of repeater stations against number of active users at the assumed set of the operating parameters.

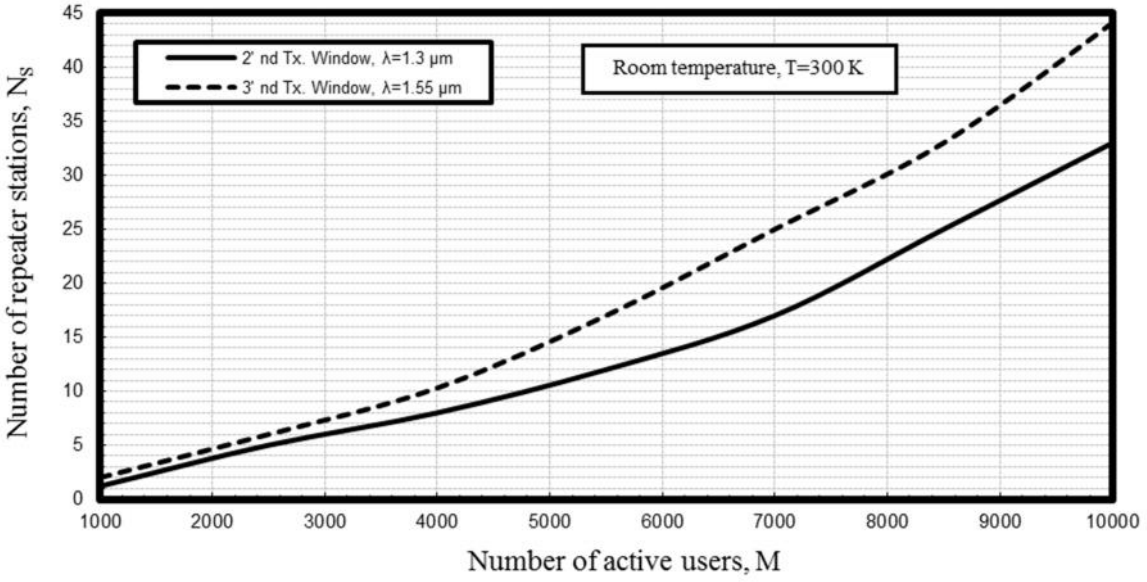

Fig.9: Number of repeater stations against number of active users at the assumed set of the operating parameters.

4 Conclusions

The model ultra wide wavelength division multiplexing (UW-WDM) optical code division multiple access (OCDMA) communication systems in wide area optical communication networks (WAOCNs). It is theoretically found that the total throughput decreases with increasing number of active users over the system, while increasing with increasing transmitted signal power. SNR increases and BER decreases with increasing transmitted signal power and with minimum number of subscribers. Relative refractive index difference and high ambient temperatures are the main dramatic factors that reduces transmission distance and repeater spacing and increasing number of repeater stations overall the

OCDMA communication systems. It is recommended to operate at third transmission window in order to decrease number of repeater stations over all OCDMA communication networks.

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Cost Benefit Analysis in Kosmaç Limestone Deposit, Republic of Kosovo

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Abstrak – *In this paper is present a functional model as very important for the economic evaluation study in the deposits of carbonate rocks. One such model is applied to mineral deposit limestone "Kosmaç" which uses the company Doni Fert. So for a fair assessment of investment in technology to acquire a cubic meter of useful minerals, should question Benefit/Cost Analyses (B/C) for these mineral resources in Kosovo*

Key Words – *cost benefit, deposit, doni fert, kosovo, limestone, reserves*

1 Introduction

Kosovo is rich in deposits of carbonate rocks (Fig.1), which include limestone, dolomite and marbles. Total deposits of carbonate rocks in Kosovo are 402 (Table 1) behave geological reserves 25,135.7 (Mill.m^3). These resources, together with geological deposits of silicate rocks represent a good basis for development economic of Kosovo (Barth, et. al., 2006). Therefore for these geological resources necessary planning and evaluation exploitation of these row mineral. Therefore, for evaluation of capital investment in this segment of economy should be taken into the current level of scientific achievement and technological possibilities of production, applying method called Cost Benefit Analyses (B/C). Cost benefit analysis during the implementation of projects using limestone provides a more appropriate basis for assessing the perspective of deposit exploitation through implicit forecast costs and potential effects arising during conduct of mining activities.

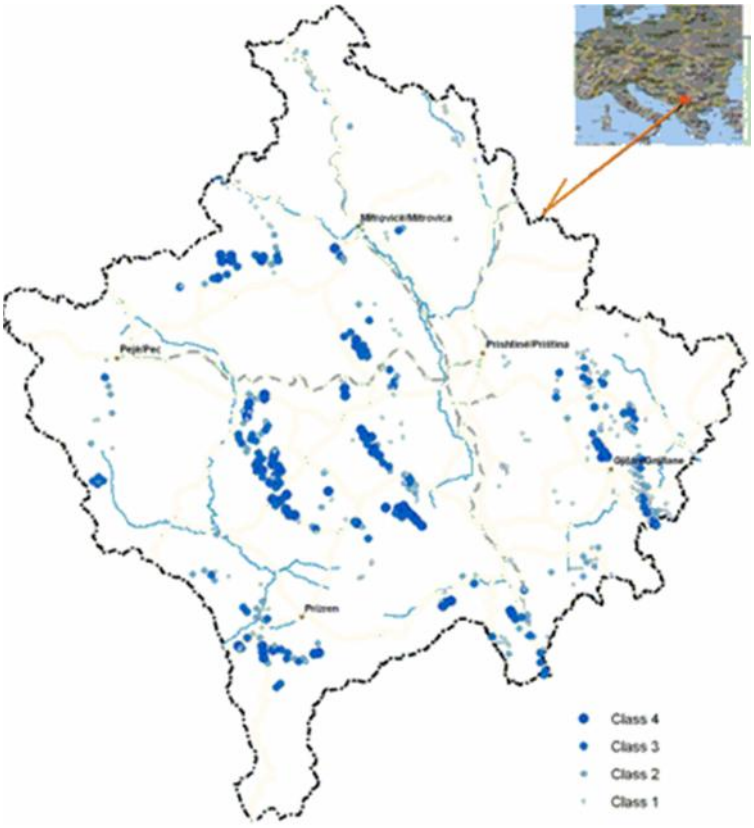

Fig.1: Spatial Distribution of Mine ability of Carbonate Hard Rocks.
1: 1,000,000 (Beak, 2006, modified)

Table 1: Geological Reserves of Carbonates Hard Rocks and Silicate Hard Rocks

Commodity Group	Deposit (Total)	Geological Reserves (mill m^3)	Area (km^2)
Silicate Hard Rocks	460	15,233.1	262.0
Carbonate Hard Rocks	402	9,902.6	196.6
Sum	862	25,135.7	486.6

2 Assessing the Cost of Opening and Use of the Limestone Deposit

Given the analysis of economic evaluation of the process of surface exploitation of mineral deposits useful addition to technological and technical indicators to analyze the level of investment and production costs as the main evaluation factors extraction and processing costs and selling price 1[m^3] of limestone rock. In determining the cost of extraction and processing of 1 [m^3] limestone usually have to take into account all the necessary actions that enable exploitation and processing and therefore also in this context the building structure of the sale price that 1 [m^3] should be based on the costs that are made during production (exploitation). Income from carbonate rocks fractions benefit can be filed on the basis of the

relation (1) who expresses the amount of product between annual production and selling price per unit product:

$$\mathbf{R=S\ (Qy\ \ Ps\ )} \qquad [€] \qquad ...(1)$$

Where : R = Revenue from the sale of production
Qy = Annual production
Ps = Product selling price per unit

Selling price of a unit of limestone fractions (Ps) said the amount of the cost of expenses (Cp) and profit planning (P).

$$\mathbf{Ps = Cp + P} \qquad ...(2)$$

Where : Cp = cost price
P = planned profit

The cost of gaining 1 [m^3] factions carbonate rocks is determined by the amount of expenses directly (Dc) and indirect (Ic).

$$\mathbf{Ps = Dc + Ic} \qquad ...(3)$$

Where : Dc = direct costs (these are the costs of labour, materials and equipment costs)
Ic = indirect costs

Operating costs (Oc): submit expenses for engaging the workforce in the manufacturing process (Mp)

$$\mathbf{Oc = Mp} \qquad [€/m^3] \qquad ...(4)$$

Material costs (Mc): represent the costs necessary for the implementation of certain operations technological process: drilling-blasting, loading, separation, etc. To carry out these operations in the process of using beneficial minerals needed: fuel, explosive etc**.** **(**Mc_{fe}**)**

$$\mathbf{Mc = \Sigma\ (Mc_{fe})} \qquad [€/m^3] \qquad ...(5)$$

In the realization of every technological process during the development of mining activity in the utilization of useful minerals, different materials are needed, such as: fuels, explosives, oils etc. Therefore, it is of course that in this case to determine the amount necessary to other materials used consumables normative act production work.

Operating costs of equipment (O_{ce}): represent the commitment costs of the equipment necessary for carrying out the process (O_{ce}):

$$\mathbf{O_{ce} = \Sigma\ O_{ccp}} \qquad [€/m^3] \qquad ...(6)$$

Indirect costs (Ic) - represent expenses that are not made directly from the working process, in other words these expenses belong to nature: deposit geological research, drafting technical

documentation technology, infrastructure construction, various compensations properties that will be included in mining activity and royalties (Hyseni, et.al., 2012). Drafting of technical documentation: it includes these expenses shown in Table 2.

Table 2: Drafting of technical documentation

Item	Expense
Exploration	10 000 €
Elaboration of geological reserves	5 000 €
EIA (Environmental Impact Assessment)	5 000 €
Project design of exploitation limestone	5 000 €
Total	**25 000 €**

Compensation: Any company that uses any useful mineral reserves is regulated by legal acts to compensate the damage caused to the environment and the community in the form:

Royalties: The holder of the license for the use of mineral raw material is obliged to pay 2% of the value of revenues from the sale of limestone products.

The Water: The holder of the license is obliged to pay 0.5% of the value of revenues from the sale of limestone products.

Forests: The holder of the license is obliged to pay 1% of the value of revenues from the sale of limestone products when using field was previously forested.

Environment: The holder of the license is obliged to pay 1.5% for emission of gas and dust from the value of revenue from the sale of limestone products.

Depreciation of equipment: Mining Equipment has investor have value 552 000 € where the depreciation is annual estimates of 12% (Table 3).

Table 3: Equipment which are necessary for the realization of the utilization

No	Type of equiment	Measuring units	Time (h)	Quantity	Value (€)	Total (€)
1	Drilling machines	50 kW	9000	1	Subcontractor	
2	Hydraulic excavat. with hammer	180 kW	9000-14000	1	250000	250000
3	Auto truck	348 kW	12000	4	30000	120000
4	Charger	180 kW	13000	1	50000	50000
5	Mobile separation	200 kW	14000	1	100000	100000

No	Type of equiment	Measuring units	Time (h)	Quantity	Value (€)	Total (€)
6	Transformer	250 kVA	-	1	20000	20000
7	Container	6X2 m	-	4	5000	5000
8	Plateau for row material	5X8 m	-	1	2000	2000
9	Fences	1800 m	-		5000	5000
						552000

Table 4: Cost of loading the fragmentation and transfort 1[m^3] limestone

No	Item	Time capacity [m^3/h]	Cost of 1 hour [€/h]	Specific costs [€/m^3]
1	Uploading	120	44.40	0.37
2	Crumbling	100	135.83	1.36
3	Transport	41	37.75	0.92

According to the data (Table 4) is presented a summary of the cost of 1 [h] job mining equipment, which are engaged for loading, transport and crumbling, and drilling costs-blast 1.43 €/m^3 (Bytyçi. A, 2010). While detailed estimates of expenditure for earning 1 [m^3] limestone fractions is given in the following Table 5.

Table 5: The costs of production of 1 [m^3] carbonate rock with separation

Type of costs	**Unit measuring**		**Unit**	**Unit**	**Anual costs**	**Total**
			[€/m^3]	**[%]**	**[€/year]**	**[€/ 32 year]**
Personal income	**Salaries**		**0.62**	**0.08**	**31000**	**992000**
		Anual production 50,000 m^3/y				
Tailing	€/m^3	Random 10% Qy	1.63	0.21	8150	2608000
Drilling-blasting	€/m^3	50000 m^3/vit	1.43	0.18	71500	2288000
Secondary Crumbling	€/m^3	Assumption 6% for Qy	1.46	0.18	4380	140160
Uploading	€/m^3	50000 m^3/y	0.37	0.05	18500	592000
Crumbling and separation	€/m^3	And other activities	1.36	0.17	68000	2176000
Transportation	€/m^3	50000 m^3/y	0.92	0.12	46000	1472000
Countable value of spending			7.17	0.91	216530	
			7.79	**0.99**	**247530**	**9276160**
	Annuities					
Royalties	2% carrying value of expenditure		0.02	0.002	4950	158400
Forestry	1% annual income value		0.01	0.001	2475	79200

Type of costs	Unit measuring	Unit	Unit	Anual costs	Total
		[€/m^3]	[%]	[€/year]	[€/ 32 year]
Personal income	**Salaries**	**0.62**	**0.08**	**31000**	**992000**
Waters	0.5% annual income value	0.005	0.006	2037	65184
Environmet	1.5% annual income value	0.015	0.0012	1240	39680
		0.05	0.01	10702	342464
		7.85	**1.00**	**258232**	**9618624**

Determining the cost of using 1 [m^3] carbonate rocks based on annual costs by the use of 50,000 [m^3], so in this case the cost is around 7.85 €/ m^3. Economic evaluation is pick up the cost of producing 1 [m^3] of fractions 0/90 mm, for which the annual costs are calculated according to the formula (1) and expression (2) which can be formed selling price fractions produced by the company, "Doni Fert" if we arrange in advance the rate of margin (profit) that usually ranges between (20-30)% of the value of spending where our case is taken 26%, then the dot have P = 2.1 [€/m^3].

Ps = 7.85+2.1

Ps = **9.95** [€/m^3]

Given this calculated sales price fractions 0/90 mm, and annual production of 50,000 m^3, revenues are:

P= 50000 x 9.95

P= 497500 [€/y]

After determining the revenue from the sale of products carbonate rocks should be compared with the costs that are created in order to have an overview about which usually gross profit represents profit excluding VAT (value added tax). So the company, "Doni Fert" its production plan has these factions the carbonate rocks (Table 6).

Table 6: Sale price 1 [m^3] limestone rock

No	Item	Unit	€/m^3
1	Crushed rock fractions 0/90 mm	m^3	10.0
2	Rock without separation	m^3	5.50
3	Buffer (0-60) mm Class II	m^3	6.35

Annual degree production costs (by tab.3) are € 247,530, in addition to the cost of production also have to add the cost of marketing, sales, financial management and control and other administrative costs, such costs typically range (5-6.5) % where the case will be € 14,851**€.**

Therefore, gross profit could be:

$$Pg = P - (Ps + P*0.05) \quad ...(7)$$

Pg = **472615 €**

While net profit is determined after deduction of 16% VAT

$$P_n = P_b - 0.16\ P_b \quad ...(8)$$
$$P_n = \mathbf{396700\ €}$$

3 Cost Benefit Analysis of Opening and Exploitation Deposit

Methods used for the evaluation of Cost-benefit analysis of almost all projects in mining activity and other works are: Method return deadline invested assets Pay-Beck (PB), net present value (NPV) and the internal rate of return (IRR). Today such assessments there are software packages such as the Xeras, Runge mining co, Enginea etc. To have a fair and objective estimations on the use of limestone deposit, Kosmaç "Doni Fert" Company where above is laid out in detail the analysis of benefit costs 1 [m^3] of the rocks so. Therefore, direct investment, according to data from the deposit are districts I_d^1 = 32,000 €.

Opening deposit is associated with a phase advance called administration-bureaucratic, which must be performed a variety of procedures ranging from research license, wide legal property procedures drafting of technical documentation. All of these have a cost that our case in question have not been affected, so the investments made for this phase amounted I_d^2 = 25,000 €.

Total investment in this field can be determined by:

$$It = (I_d^1 + I_d^2) \quad ...(9)$$
$$It = 57000\ \mathbf{€}$$

So the decision on such investments in this deposit will be based on the calculation of the Net Present Value (NPV), which could be based on the service of this project as well as production costs. Benefits from investment in the future in this deposit will be compared with the cost of the project generated:

$$\mathbf{NPV} = \left[\frac{P_n}{(1+r)^n} - It \right] \quad ...(10)$$

NPV = 26165 **€**

Where : Pn = Income
It = Total investment
R = The interest rate (discount rate) by (FTSE Euro top 300) proposes 5%
n = Exploitation time deposit (n = 1, 2, 3, , 32) years

As NPV value > 0, the project may qualify as both profitable and acceptable. From the above analysis, we believe that the same important role plays the interest rate," r" in the profitability of the investment project.

Internal rate of return (Pohl, 2011) for the project of opening and using limestone rock deposit "Kosmaç" can be assigned according to the expression:

$$\mathbf{IRR} = \left[\frac{P_n}{(1+j)^n}\right] - It = 0 \qquad ...(11)$$

Or in the form of explicit:

$$\left[\frac{P_n}{(1+j)^n}\right] = It \qquad ...(12)$$

Where : n = time use of deposit (n = 1 year)
J = Marginal efficiency of investment

IRR calculation period one year deals n = 1, then the expression (12)

$$j = \frac{P_n - I_t}{It} \qquad ...(13)$$

j= **5.96**

Efficiency limit value is higher than the interest rate (discount rate) (j> r).

The B/C ratio of a cash flow is the ratio of the present worth of benefits to the present worth of costs. This is defined as**:**

$$B/C = 1.54 \qquad ...(14)$$

If the B/C ratio is greater than one, then the investment is acceptable. If the ratio is less than one, the investment is not acceptable (Baritu & Omitaum 2007). Calculation of B/C is 1.54 exploitation project of limestone deposits 'Kosmaç "Doni Fert Company, may qualify as profitable because revenues are greater than the value of the expenditure.

4 Conclusion

This form of exploitation project evaluation through the limestone surface Cost benefit analysis is an argument to justify the capital investment in this branch of the economy. The bases for this assessment are superficial exploitation costs, while respecting the environment. In this case is necessary to use norms that arise from the current legal acts in compliance with the directives of the European Community (EU) and the current broad experiences of many

companies involved in this activity in relation to costs that are needed to perform the whole technological process in the production of 1[m^3] fractions of carbonate rocks. Economic assessments according to the calculated data show that the deposit has perspective and the positive business.

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Global Hybrid Method for Computing the Minimum Distance Between a Point and a Plane Parametric Curve

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Abstrak – *Global convergent hybrid method is presented for computing the minimum distance between a point and a plane parametric curve. First, it uses a first order geometric iteration method. If iterative parametric value satisfied local Newton convergence condition and convergence in appropriate area, then turning to Newton iteration method. This hybrid method's sensitivity to the choice of initial values is nonexistence. Experimental results show that the algorithms under consideration are robust and efficient*

Key Words – *point projection, newton's method, global convergence, parametric curve*

1 Introduction

In this paper, we discuss how to compute the minimum distance between a point and a spatial parametric curve and to return the nearest point on the curve as well as its corresponding parameter, which is also called the point projection problem (the point inversion problem) of a spatial parametric curve. It is very interesting for this problem due to its importance in geometric modeling, computer graphics and computer vision (Ma & Hewitt, 2003). Both projection and inversion are essential for interactively selecting curves (Ma & Hewitt, 2003; Yang, et. al., 2004), for the curve fitting problem (Ma & Hewitt, 2003; Yang, et. al., 2004), for the reconstructing curves problem (Johnson & Cohen, 1998; Piegl & Tiller, 2001; Pegna & Wolter, 1996). It is also a key issue in the ICP (iterative close for construction and rendering of solid models with boundary representation, projecting of a space curve onto a surface for curve surface design (Besl & McKay, 1992). Many algorithms have been developed by using various techniques including turning into solving a root problem of a polynomial equation, geometric methods, subdivision methods, circular clipping algorithm. For more details, see Cohen, et al. (1980); Besl & McKay (1992); Press, et. al. (1992); Zhou, et. al. (1993); Limaien & Trochu (1995); Piegl & Tiller (1995); Pegna & Wolter (1996); Johnson & Cohen (1998); Hartmann (1999); Elber& Kim (2001); Patrikalakis & Maekawa (2001); Piegl & Tiller (2001); Polak & Royset (2003); Ma & Hewitt (2003); Yang, et. al., (2004); Hu & Wallner (2005); Johnson &.Cohen (2005); Selimovic (2006); Chen, et al. (2008); Chen, et. al. (2009); and Li,et. al. (2010), and the references therein. In the various methods mentioned above, there are two key issues in the projection and inversion problems: seeking a good initial value, using a Newton-type iterative method for computing the root.

These methods have the same charrators of using a Newton-type iterative method finnally. But it dosen't guarantee to be convergent when using a Newton-type iterative method. In order to avoid the sensitivity of the choice of initial values ,we firstly use a first order geometric iteration method, and secondally decide wethere the condition of partial convergence judge theorem is met by using the

partial convergence judge theorem of local Newton-type iterative method and by judging whether the modulus of the minus of the modulus of two parameters' values meet the specific code number. If the conditon is met, call the Newton-type iterative method. So it is convergence globally, and we have raised the speed of convegence. Then we can get good computing results.

2 Algorithm Analysis and Realization

The footpoint of test point *P* employed in first order geometric iteration computation is as follows: Test point *P* is projected onto the tangent line when parametre is t_0 along the plan parametric curve, then the footpoint *q* is created. Now, the footnote q can be demonstrated as $c(t_0)$ and $c'(t_0)$:

$$q = c(t_0) + \Delta t c'(t_0) \quad ...(1)$$

If there are two vectors $x, y \in R^2$, the inner product can be demonstrated as $\langle x, y \rangle$ and the norm of vector *x* can be shown as $\|x\|$. So equation (1) can be converted to:

$$\Delta t = \frac{\langle c'(t_0), q - c(t_0) \rangle}{\langle c'(t_0), c'(t_0) \rangle} \quad ...(2)$$

This geometric iteration of first order is globally convergent.

The testification is as follows:

Theorem 1: iteration (2) is a first-order and global convergence.

Proof: In order to prove that method (2) is a first-order and global convergence, we first deduce the computation expression footpoint *q*. We suppose parameter $\sim$ is the corresponding parameter when test point *p* is projected onto the the parametric curve $c(t)$, among which $p = (p_1, p_2)$, $c(t) = (f_1(t), f_2(t))$. According to the requirement of computing the minimum distance between a point and a plane parametric curve, we can have the following expression of relation:

$$(p - h) \times \vec{n} = 0 \quad ...(3)$$

Among which , $h = (f_1(\sim), f_2(\sim))$ and normal vector $\vec{n} = (-f_2'(\sim), f_1'(\sim))$。

Then equation (3) can be rewritenn as:

$$(p_1 - f_1(\sim)) f_1'(\sim) + (p_2 - f_2'(\sim)) f_2'(\sim) = 0 \quad ....(4)$$

From equation (4), we have the relational expression:

$$p_1 = \frac{f_1'(\sim) f_1(\sim) - f_2'(\sim) p_2 + f_2'(\sim) f_2(\sim)}{f_1'(\sim)} = \frac{a_0 a_1 - b_1 p_2 + b_0 b_1}{a_1} \quad \ldots(5)$$

In expression (5), $a_0 = f_1(\sim), a_1 = f_1'(\sim), b_0 = f_2(\sim), b_1 = f_2'(\sim)$。
Now we begin to deduce the expression of footpoint *q*.

Footpoint ***q*** is the intersection of Test point p and parametric curve $c(t)$ when $t = t_0$。 We might as well set tangential equation equation as:

$$\begin{cases} x = f_1(t_0) + f_1'(t_0)w \\ y = f_2(t_0) + f_2'(t_0)w \end{cases} \quad ...(6)$$

Here w is the parameter of the tangent line. The linear equation of the straight line which passes test point *p* and be perpendicular to the tangent line can be expressed as:

$$\begin{cases} x = p_1 - f_2'(t_0)s \\ y = p_2 + f_1'(t_0)s \end{cases} \quad ...(7)$$

Combining (6) and (7), we can get the following expression

$$w = \frac{(p_1 - f_1(t_0))f_1'(t_0) + (p_2 - f_2(t_0))f_2'(t_0)}{f_1'^2(t_0) + f_2'^2(t_0)} \quad ...(8)$$

Expression (8) is substituted to (6), then:

$$\begin{cases} q_1 = f_1(t_0) + f_1'(t_0)\dfrac{((p_1 - f_1(t_0))f_1'(t_0) + (p_2 - f_2(t_0))f_2'(t_0))}{f_1'^2(t_0) + f_2'^2(t_0)} \\ q_2 = f_2(t_0) + f_2'(t_0)\dfrac{((p_1 - f_1(t_0))f_1'(t_0) + (p_2 - f_2(t_0))f_2'(t_0))}{f_1'^2(t_0) + f_2'^2(t_0)} \end{cases} \quad ...(9)$$

Then we substitute (9) to (2), the simplified relational expression is:

$$\Delta t = \frac{(p_1 - f_1(t_0))f_1'(t_0) + (p_2 - f_2(t_0))f_2'(t_0)}{f_1'^2(t_0) + f_2'^2(t_0)} \quad ...(10)$$

Now, we set $e_n = t_n - \sim, a_i = (1/i!)(f_1^{(i)}(\sim)), b_i = (1/i!)(f_2^{(i)}(\sim)), i = 0,1,2,3,...$, About $f_1(t)$, $f_2(t)$, we use Taylor the expression:

$$f_1(t_n) = a_0 + a_1 e_n + a_2 e_n^2 + o(e_n^3) \quad ...(11)$$

$$f_2(t_n) = b_0 + b_1 e_n + b_2 e_n^2 + o(e_n^3) \quad ...(12)$$

Further more, we have:

$$f_1'(t_n) = a_1 + 2a_2 e_n + o(e_n^2) \quad ...(13)$$

$$f_2'(t_n) = b_1 + 2b_2 e_n + o(e_n^2) \quad ...(14)$$

Now, expressions (11)-(14) are brought into (10), and Taylor expansion from Maple is employed to get the following:

$$e_{n+1} = -\frac{(-2a_1b_2p_2 + 2b_2a_1b_0 + b_1^2a_1 + 2b_1a_2p_2 - 2b_1a_2b_0 + a_1^3)}{a_1(a_1^2 + b_1^2)} e_n + o(e_n^2) \quad ...(15)$$

The demonstration above is the proof that iteration (2) is first order and convergent.

Now we begin to illustrate that iteration (2) is globally convergent, that is to say, this convergence method is free from sensitivity of choosing initial iteration point. Our demonstration is similar to that of literature (li, et. al., 2010; Li, et. al,). If iteration begins from the left side of parameter $\sim$, footpoint q is definitely at the right side of iteration point. So Δt is a positive real number. Thereupon, the following iteration sequence is defined through expression (2).

$$t_n = t_{n-1} + \Delta t_{n-1}, \quad ...(16)$$

Here $\Delta t = \frac{\langle c'(t_{n-1}), q - c(t_{n-1})\rangle}{\langle c'(t_{n-1}), c'(t_{n-1})\rangle}$。 When $t_n < \sim$, sequence t_n is a strict, monotonic and increasing sequence. When $t_n > \sim$, it is several times of iteration, sequence t_n is converged to $\sim$. This kind of iteration sequence is similar to weakening simple pendulum. Of course, if initial iteration point begins from the right side of parameter $\sim$, the convergence state is similar to that begins from the left side. Although this geometric iteration is first order and globally convergent, it is not so efficient. We find that when parametric iteration value approaches the end value, the iteration step length minifies to the minimum, and the number of iteration times magnifies to the maximum. Besides, when initial iteration point is far from actual value, the corresponding iteration step is very large. Expression (17) is Newton iteration method

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)} \quad ...(17)$$

This is a second order iteration method, the convergence speed of which is obviously faster than that of first order iteration convergence. However, the limitation of Newton iteration method is that it is sensitive to the initial point. Newton iteration method is the most efficient and effective only when the conditions are satisfied. Therefore, we present the judge theorem of partial convergence of Newton iteration method.

Theorem 2: Let $f:[a,b] \to [a,b]$ be a defferentable function, as a result, when $\forall x \in [a,b]$, we have:

$$\left| \frac{f(x)f''(x)}{f'^2(x)} \right| < 1 \quad ...(18)$$

So there exists a fixed point $l_0 \in [a,b]$ in Newton iteration expression (17). At the same time, the iteration sequence $\{x_n\}$ generated from expression (17) can be converged to the fixed point l_0 when $\forall x_0 \in [a,b]$.

The justification of this theorem can be achieved by the convergence judge theorem for fixed-point iteration method.

Comparing the advantages and disadvantages of first order geometric iteration and second order Newton iteration, we put forward the mixed method. That is, we begin with the first order iteration method, and change into the second order Newton iteration when the parameter value of iteration matches the condition of partial convergence of Newton iteration, and when the first order iteration step has not varied a lot, or the variation is comparatively stable. Theoretically speaking, the iteration parameter value is sometimes not convergent, although it is convergent when it matches the conditions of partial convergence of second order Newton iteration. When the first order geometric iteration step has not varied a lot, or the variation is comparatively stable, it guaranteed that the iteration parameter value is within the range of partial convergence of Newton iteration.

The following computing method is employed to realize our hybrid algorithm.

Hybrid algorithm:

Set an Error tolerance ι_1, a Code number ι_2, the number of iteration times *n*, an initial estimated value x_0, a first variable bUseNewton indicating whether it is appliable to Newton iteration method, a second variable bIsCloser indicating whether it is within the range of using Newton method:

```
bool bUseNewton =false;  //Newton method is not used at first
bool bIsCloser  =false;   //Assumed that it is not within the range of use Newton mehod
n=0;
do
{
    (1 )   If  ((bUserNewton==true)&&(bIsCloser==true))
                  x_n =Newton(x_n-1);// use Newton method
           Else
                  x_n =firstOrder(x_n-1);// use first order convergence method

    (2)    To judge whether Newton method can be used
           Step 1  :   x_0 = x_n;
           Step 2  :   computing  η = |f(x_0)/f'(x_0)|;
           Step 3  :   computing  K = |f''(x_0)/f'(x_0)|;
           Step 4  :   h = Kη
```

Step 5 : If(h<1)
bUseNewton =true;
else
bUseNewton =false;

(3) To judge whether it is within the appropriate area of using Newton iteration method

Step 1 : x1= x_n ,x2= x_{n-1} ;

Step 2 : If($\| x_1 | - | x_2 \|$ <code number ι_2)
bIsCloser = true;// it is within the appropriate area of using Newton method.
else
bIsCloser = false;

}While($\| x_n | - | x_{n-1} \|$ > error tolerance ι_1)

In this paper, the mixed global algorithm is discussed on the basis of plane parametric curve. Actually, this algorithm can be applied to any n-dimension Euclidean space in which the computation of the minimum distance between a point and a parametric curve is needed.

3 Example

Professor Hu provided an iteration method of second order global convergence in reference Hu & Wallner (2005), (now Hu-iteration for short). Here, we consider the plane parametric curve $c(t) = (t, \sin(t))$, and code number is 0.2. We compared the different methods of first order geometric iteration, second order Newton iteration, second order Hu-iteration and the mixed iteration method we proposed. Table 1 shows the results of adopting different methods to computing the different initial iteration parameter value t_0 . In this table, NC means that it cannot be converged to the needed root. From table 1, we can find that the mixed method we used is faster in convergence speed than first order geometric method and Hu-iteration method, while Newton method is sensitive and unstabel to initial point.

Tabe 1: Comparison of the numer of iteration times by emplying different methods to compute different initial iteration parameter value

$p=(1,2)$	$t_0=-5000.0$	$t_0=-4.0$	$t_0=5.0$	$t_0=7.0$	$t_0=8.0$	$t_0=10.0$	$t_0=11.0$	$t_0=40000.0$
First order method	351	353	352	352	349	350	350	355
Hu-iteration method	400	30	32	32	33	29	31	2523
Newton method	NC	NC	NC	NC	NC	NC	NC	NC
Mixed method	15	19	17	17	15	17	15	23

4 Conclusion

The present paper discussed the issue of the distance of a point projected to a plane parametric curve and the reverse. Data has shown that the hybrid method we proposed is robust and effective. Our next objective is to give a more-high-level global convergence method to compute the minimum distance between a point and a plane parametric curve, and we try to present the strict relational expression of parametric curve and code number.

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Social Capital and Poverty Alleviation; Some Qualitative Evidences from Lahore District

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Abstrak – *The present study focuses on the newly emerged concept of social capital and its relationship with poverty alleviation in some slum areas of the Lahore city. The basic assumption of the study was that social capital empowers an individual through connecting ones with various social groups, institutions and structural networks. The resultant factor is that the individual, through his/her strong social ties, exposes to new options and resources in a variety of ways, and at the same time learns various ways (both legitimate and illegitimate) to get benefit from these resources. The universe of the present study consisted of those married people (both male and female) whose monthly income was equal to 2500 rupees. A total of 15 respondents were selected purely on the basis of purposive sampling and case study method was used as method of data collection. An interview guide was used as a tool for data collection. The qualitative analysis of all the case studies was made. The case studies demonstrated that family, friends, relatives and neighbours were the major sources of social capital and role of social capital was decisive in the improvement of their living standard specially by exposing them to various options and resources, which enabled them to improve their living standard. At the end, the researcher concluded that social capital facilitates different resources which are crucial in reducing poverty*

Key Words – *Social Capital, Biradri, Social Ties, Resource Facilitation, Poverty Alleviation*

1 Introduction

People and groups continually interact with other people and groups. These multiple contacts are organized into social networks and these networks of relationship link the individual directly to other people, and through these others, indirectly to even more people. One's network, for example, consists of primary ties (like relatives, family and close friends) and secondary ties (like classmates and colleagues). "This multiplicity of relationship constitutes a web of relationship among people" (Robertson. 1987:174). Human relations based on the network of connections that facilitates the people to interact in a better way. Interaction among people constitutes a chain of relationships, which generates familiarity and acquisition among people. The familiarity and acquisition among people bind them into different social groups.

Interaction between individuals or social groups may constitute a focal point where all actors gather their resources and activities. Collection of the group's resources sometime, offer to their members for the utilization of the resources. When a relationship facilitates resources and have economic benefit

can be stated as "social capital" - network of relationship, which has economic benefits. Through network of relationships, one may fulfill his/her needs and may expose to different opportunities and new options.

> "... social intercourse among the individual and families who make up a social unit if (an individual comes) into contact with his neighbours and they with other neighbours, there will be an accumulation of social capital, which may immediately satisfy his social needs and which may bear a social potentiality sufficient to the substantial improvement of living standard in the whole community" (Hanifer 1916; Cock and Narayan 1999).

Basically, the original idea of social capital is that one's association with family, friends, and neighbours facilitates the resources for the welfare of the individual. In other words this can be stated that social capital may produce opportunities or exposes one to the new reservoir of resources. Actually, social capital is not a name of a tangible good rather it's a "collective intelligence of society" that functions collectively for the solution of the problem and welfare of the individual.

Individual's web of relationship mostly depends on his/ her friends, colleagues, relatives and family. When one faces any problem, he/she first tries to consult these channels at a time or turn by turn to get a better solution of the problem. People consult these sources because they know that these people could be a source of problem shooting for them or can suggest a better suggestion of their problem. But the question that arises here, why people consult these channels even in the absence of problem? The answer could be that People consult others to get the better out-come of their work and to save their resources. So, this can be stated that social capital also has problem solving characteristic, which plays a vital role in the achievements of certain ends.

Grootaert, (1998), stated that by understanding this definition, two assumptions underlie this concept: networks and norms, which exist in society, are empirically associated and these networks and norms 'have important economic consequences". The key feature of this definition is social capital facilitates, coordinates and helps an individual to achieve better performance. The main sources of social capital are family, community, friends, social groups, ethnicity, firms and organizations.

2 Literature Riview

2.1 Relationship between Social Capital and Poverty

Poverty is rampant and exists almost in all societies especially in developing countries where majority of the population is at the worst hit. It is not merely a Pakistan or third world phenomena. With the exception of few it's a global phenomenon "one in every five persons lives in the world below poverty line" (Ahmad 1997).

In developing set-ups, there are various approaches to reduce poverty like literacy programmes, public employment policy, and micro credit schemes etc. But these conventional approaches have failed to produce desirable results. Otherwise, poverty should be disappeared from society. Continuous persistence of poverty, despite hectic efforts to eliminate it proves the fact that it has the ability to trap and prevail upon them unless it is addressed from its roots. Persistence rather growth of poverty proves that poverty is still trapping the people in its net and pushing them in the worst conditions. As Ahmed stated:

> "....several efforts have been made to alleviate the poverty during the past four or five decades — both in theory and practice — but have almost failed to make any meaningful

> assault on poverty. Even today, more than one fifth of the world population continues to be trapped in absolute poverty (Ahmed 1997).

By following previous evidences, this can be concluded that only giving money to the poor is not a proper way to reduce poverty for a long time, or could be stated as a temporary method to reduce poverty. The only and effective way to reduce poverty can be to give empowerment of individuals, and by making him/ her a productive member of society. However, empowerment of individuals creates sense of responsibility and promotes participatory development in society. Empowerment of people and their participation in the society can be achieved only through connecting the individuals with different social institutions (e.g., education, economic, political, etc.). This goal can be achieved with the development and promotion of social capital — that might activate individual's capacities and at the same time may produce opportunities for the empowerment of individual. Empowerment of individual further activates one's hidden capacities and thereby makes him/her a productive member of society.

At lay level, poverty is perceived as to be a result of scarcity of money and resources. But actually this may not be the reality but in fact poverty is the one's inability to mobilize the available resources. "Poverty is not by accident it is by design". On the face, it does not look true but in reality it may be true, because the true causes of poverty starts when society divides the people into different social groups on the basis of their socio-economic characteristics. Accordingly, nature of the resources also divided in accordance with the division of people: limited resources and opportunities for poor people or for low socio-economic groups, good quality of resources are for the rich or for upper socio-economic groups, this may be stated a design of poverty, which is creation of society. This division of people into different socio-economic groups may effects the one's strength of access to the resources, which are available in society.

Poverty is not a matter of resources rather it's a matter of scarcity of access to the available resources and the inability to exploit the available resources. Rich are rich because they have adequate access to the good quality of resources and poor are lack in access to the available resources. As Schiller (1976) concluded that "Poor are poor because they do not have adequate access to the goods, ... jobs and income".

2.2 Concepts and Approach to This Study

Few would disagree with the fact that social capital is crucial in reducing poverty and in economic development. Previous evidences showed that poverty reduces only through the availability of money and providing infrastructure to the poor. By utilization of the resources and money, which were provided to them, poor improved their living standard and reduced their poverty.

It has increasingly been realized that availability of financial capital, human capital and physical capital (infrastructure) is not enough in reducing poverty or in economic development. There should be another capital in the process of economic development that named social capital. As Grootaert stated:

> "It has now become recognized that these three types of capital (financial capital, human capital and physical capital) determine only partially the process of economic growth because they overlook the way in which the economic actors are organize themselves to generate growth and development-The missing link is social capital" (1998).

2.3 Why Social Capital, is Capital?

Any individual in social set up has some social network or relationship with other people. Without social relationships it would be difficult for the individuals to live in society. Individual is a product of a group, (male and female), that's why, he/she, is needed a group life. Social network is an attribute of social capital, which has the ability to produce resources and opportunities for the benefits of the individuals. It is often seen that some people have good relation with the influential person or have a strong network of friendship. In spite of having strong network they cannot solve their problems or draw benefits from those people. When relations with others are beneficial or effects one's socio-economic condition, known as social capital because "Social Capital is 'capital' only if it effects persist" (Groateaert 1998). Narayan, (1999), Synthesized the Collier's notion that social capital is 'social' because it focuses on the social behaviour of individual, and it is 'capital' because it concerns with social interaction that contribute to productivity with some durability i.e. they are repeated and not casual.

For social interaction to be social capital must have persistence in the process of interaction "Putnam define the concept of social capital as a form of a social interaction which have persistence" (Grootaert, 1998). Grootaert, (1998), termed that continuity of social interaction as constituting social capital and social capital stock increases when "there is a long term change in the amount of social interaction. The most obvious and clear example is that if a village's community is needed a school for their children and village community organizes itself collectively to built a school for the children which is a result of social interaction. The school is not a social capital but a physical capital, which is a product of social network. However, social interaction in this case has a clear and persistence economic benefit. However school provides an opportunity for the development of social capital, which ultimately effect economic activities. Because children get education from school, which, ultimately improve the living standard as it has been proved that 'higher the education greater would be the income' (Weeks 1992).

2.4 Conception of Poverty

Borgatta and Borgatta, (1992), stated that the word poverty is derived from the French word "Pauvre" (meaning 'poor') and simply means the state of lacking material possessions of having little or no means to support one-self.

The most comprehensive definition was given by Lewis, (1992), that poverty not only as economic deprivation, or the absence of something but also as a way of life, the presence of sub-cultural values and attitudes passed down from generation to generation.

Lewis. (1992), further stated that poverty is not simply the lack of economic resource or name of economic deprivation, rather other combinations interact with economic deprivation and constitute poverty. Lewis blamed that poverty is also a product of one's adoption of sub-cultural values and way of living standard that affect one's social status.

According to these definitions it could be concluded that poverty is an abstract and highly subjective state. One's lack of material possession, poor living style and deviation from societal values can be called poverty.

2.5 Poverty line

The researcher uses subjective approach - refers to the position of an individual or household in relation to an income "just sufficient" to ensure the satisfaction of an individual or house-hold expenditure - in defining the level of poor/poverty for this research. The researcher defined poverty line 2500 Rupees per month per family having at least four heads.

According to Haq (1999), absolute poverty line, (1993-94), of the Pakistan was 385 Rupees per head per month; as most of the respondents family members were more than 6, and the average monthly income for per family having 6 heads was near to 2500 rupees per month that's why, the researcher drew 2500 rupees as poverty line.

World Bank Development Report, (1990), reported 375 U.S dollars as a poverty line for sub-continent per capita per year. As majority of the respondents were more than 6 and the researcher converted this amount into Pakistani rupees, which was near to 2500 hundred rupees, therefore the researcher fixed 2500 as poverty line-385 rupees per capita was defined as a level for absolute poverty according to Haq(1999). But researcher used subjective approach in defining poverty. This permits the researcher to draw 2500 rupees per family per month (having at least four heads) for poverty line.

The respondents belonged to urban areas of Lahore City, where the cost of life was relatively high as compare to rural areas. That's way the researcher drew 2500 rupees per month as poverty line. Majority of the respondents belonged to labour class. Researcher first did survey about the average monthly income of a labourer and (which was not more than 2500 rupees per month) then the research fixed 2500 rupees as poverty line.

Due to variation among these valuable sources of findings, the researcher drew his own poverty line according to the need and demand of the study.

2.6 Review of the Relevant Literature

This literature review may highlight the different aspects of the present study.

Narayan, (1995), studied to find the relationship between poverty and social capital in Rural Tanzania. This study was a nationwide participatory research project that involved 6000 people in eighty-seven villages of Tanzania. The major goals of the project were to check the validity of participatory research methodologies and to explore the forms and impacts of social capital at the local level that effects the economic activity. Narayan examined social capital by participating in their activities and use of qualitative methodology. The number and types of groups, which were found in the village, trends in membership in groups and reason for joining were explored in the study. The key finding of the project was that level of social capital had effects on income level: one standard deviation increase in village level social capital increases the household's income by 20 to 30 percent. It was also found that increase in village-level social capital increase the educational year of person.

Herbert, (1997), launched a project, which was implemented by the Australian Department of Social Security. The principle part of the project was to improve the living standard of poor Australians with the expansion of their social networks and pattern of relationship. This project was an experiment to determine whether social capital is intended to improve low-income families through access to information participation in work both paid and volunteer work and expansion of social network can improve the standard of living of Australia's poor. The key findings of the study were that improvement and expansion of poor's social capital increase building social capital for poor and increases their ability to work in the community. The project was also found on the premise that

standard of living cannot be based solely on the income of a family. Working and participation in the social life of one's community were important measures of well-being.

Townsend, (1994), conducted a research in India to check the relationship between social capital and social capability. Research showed that social capital increases the ability of the Poor to allocate resources, efficiency and increased their resilience to hazard. A study of 750 households from 45 villages in Tanzania suggested that social capital had a remarkable contribution in the household well-being and "welfare". Townsend measured social capital by measuring membership in groups and networks. The key findings of the project were that village level social capital was a key contributor to household welfare even after taking into account the size of household, male schooling, female schooling, household assets, and market access. In some cases the effect of village level social capital outweighed that of market access than female schooling. On the other hand, household-level social capital appeared to be less significant than village-level social capital.

Coleman, (1988), studied that social capital has positive impact on the quality of education. A study of U.S. schools showed that those school, which were religious based and situated in tight communities had lower dropout rates than in other public and private schools, even after controlling religion and household financial position.

Eggeben et al. (1995), used Coleman's conceptualization of social capital within families, the set of mutual obligations and interpersonal relations between parents and their offspring. The authors used this framework to assess the high school completion and family structure. The authors used sample data from 1990 current population survey. The major focus of the study was to assess the relationship between high school completion and family structure. Family structure was found to have an effect on the student's performance. Parents with low level of educational attainment or human capital had negative effect on the student's academic achievement and dropout rate. The authors concluded that student's academic achievement couldn't be separated from the family structure.

3 Methodology

3.1 Research Method

The researcher has used case study method in the present research. In case study method, data are gathered about the previous experiences of a person in an effort to understand his/ her behaviour. Since case study method is qualitative, intensive and comprehensive approach. Therefore, it was decided to use this technique to conduct research on social capital and poverty.

3.2 Universe

The universe of the present study consisted of those married people of *Dhana Sign* village Near *Shah Di Khoi* with having at least four heads (both male and female) whose monthly income was up to 2500 Rupees.

3.3 Sampling

The researcher selected 15 cases purely on the basis of purposive or judgmental sampling.

3.4 Tool for data collection

For present study, interview guide was used as a tool for data collection. Different items were included to gain information about the role of social capital in reducing poverty.

4 Result and Discussion

4.1 Result

The present study is a qualitative in nature, hence a qualitative, rather than quantitative, analysis is being presented, as the numbers of cases were too small to use any sophisticated statistical analysis.

This analysis is based on all respondents (15), which the researcher interviewed while conducting the study. The case studies revealed that 6 out of 15 respondents belonged to the age group of (41-50), 3 belonged to the age group between (61-70) and rest of the respondents belonged to the other categories. The case studies revealed that 10 out of 15 respondents got education with the help of family; 7 got education with the help of their family, 2 with the help of their friends and one with the help of an unknown person, rest of the 5 respondents were illiterate.

It was analyzed that majority of the respondents (14) belonged to the male category and rest of the one was female. It was analyzed that 14 out of 15 respondents were earned 2500 rupees per month. Almost all respondents acquired financial help from different channels to whom they consulted. Family supported financially to 6 respondents, 4 respondents acquired financial help from their brothers, 3 respondents took financial help from their friends and rest of the respondents (2) took money from their colleagues, cousin, in laws and from on the basis of same *Bradri*.

All respondents had good and problem sharing relations with their relatives. It was learnt that 7 out of 15 respondents visited to their relatives after 2 or 3 months; 2 respondents visited to their relatives after 6 months and one year. But it was analyzed that almost all the respondents visited to their relatives in case any need or on different occasions (i.e., marriages, deaths etc.). The data revealed that 9 out of 15 respondents consulted different people before taking any decision; 2 respondents consulted their friends before taking decision and rest of the respondents consulted to their uncles, neighbours, relatives, sons, wives, husbands and daughters. Almost all respondents who consulted different channels in decision-making acquired good and positive suggestions from them. Majority of the respondents (10) acquired psychological and emotional support from their families. Rest of the five did not give any response. Out of 15 respondents, 6 acquired different helps from different channels when they were in serious medical emergency. Among these 6 respondents; one respondent acquired free medical treatment with the help of his son; one was treated with the help of his neighbour who worked in the hospital and others were treated with the help of their friends, colleagues and neighbour community.

It was analyzed that 7 out of 15 respondents started new business with the financial help of others; 2 with the help of their cousins; one with the help of friend, neighbour and colleagues and 2 respondents started business with the financial help of their parents. Rest of the 8 respondents did not try to start a new business and never asked any one for help.

Majority of the respondents (10) got different jobs by utilizing their relations rather on the basis of their own effort. 4 out of those 10 employed with the help of their uncles; 2 acquired jobs with the help of their family and friends. Rest of the 4 respondents employed by activating their neighbours, colleagues and in laws.

With the exception of 1, all respondents were not the legal members of any political association. Almost majority of the respondents (14) had no any access to their political representator (MPA, MNA, and Councilor). Mostly respondents (13) did not try to meet their political representator and asked about their problems. All political representator of that community did not visit to their area. One respondent had good relation with the S.H.O police of their area and achieved desirable benefits with the help of that S.H.O.

In some cases (6) respondent's wives fulfilled their basic needs with the help of their neighbours. These wives of the respondents acquired help by demanding oil, sugar, floor and others things of daily usage. One respondent's wife also consulted the expert neighbour in delivery process. 10 out of 15 respondents accommodated by their relationships with different people; 4 respondents got home with the help of their uncle; 2 respondents acquired temporary residence by utilizing their friends. In some cases (4) the respondents took house and residential plots due to their in-laws (2) cousin (1) and unknown person. Rest of the 5 respondents already had their own accommodation. 2 out of 15 respondents employed their 2 sons with the help of in laws (1) and uncle. In one case, the in-laws up brought the daughter of the respondent.

4.2 Discussion

The present study was conducted to know the dynamics of individual's social relationships and their impacts poverty alleviation. After the analysis of the case studies, it was found that the dynamics of relationships are multidimensional and associated with the one's nature of relationship with others.

This research pointed out that family is an important and basic source of social capital. One's nature of social capital depends substantially on the nature and status of the family and its social capital. For instance, if one belongs to the influential and socially well connected family correspondingly his/her nature of social capital will be of expanded and well wired in the society.

It can be stated that children's level of education depends on their parent's level of education. The empirical data pointed out that majority of the respondents (6) were literate at primary level and 5 respondents were illiterate. Correspondingly, majority of the respondent's children (25) were literate at primary level and among all those children of the respondents (72), 18 children were altogether illiterate. By following this empirical data, it can be stated that there is a positive association between parent's education level and academic achievement of their children. This supports the findings of Eggeben et al, (1995), that parents with low educational achievements had negative impact on children's academic achievements and dropout rate.

Social capital is a force that sometimes influences a large portion of the life. Similarly, respondent's nature of social capital may determine the future of the children or the children's future could be the reflection of their parent's social position in society. However, out of 68 children of the 15 respondents, only 3 children were worked at good position. Among rest of the children (65) majority of the children were belonged to labour class and low-level profession like labour, conductor etc. This finding contributes the research of Gordon and Swift, (1993), that occupation of children is determined to a large extent by one's parent's social class and children of high-class occupation people acquire good job as compare to working class group child rather their education should same.

Poor are potentially able to allocate resources for their well-being. However, everyman on the earth generates the needed resources from society. However, 10 out of 15 respondents generated jobs for themselves by utilizing their friends, parents, relatives and neighbours. Likewise, 5 respondents started new business with the help of their social capital. This evidence shows the resource generating ability of the poor. Respondent's acquired job, started business with the help of their social capital as

Townsend, (1994), emphasized that social capital increases the efficiency of the poor to allocate resources.

Interaction with neighbour communities is critical in the well being of the people. But the empirical data gave evidences that majority of the respondents (14) had no connection with the residents, of neighbour communities. In some cases, respondents did not visit the neighbour communities even once in their life. Although, all neighbour communities were situated nearest from the residents of the respondents. This kind of situation restricts their social capital and social exposure of the respondents, which bound the individual to live and work within an environment. This type of people enjoyed limited resources and opportunities, therefore majority of the respondents belonged to labour class. This finding is correlated with Friedman's and Krackhardt's, (1994), finding as quoted by Narayan, (1999), that exclusion from the social network of dominant group leads to achieve low status. This finding also negatively correlated with the Herbert's, (1997), finding that expansion of social network increases the bridging social capital and ability to work. Because of the absence of interaction with neighbour communities, the respondents did not acquire any sort of help from them. By following these findings, this can be stated that respondents had bounded themselves and they did not want to cut the net of their exclusion from society.

In this research, it was also found that after family, relatives are crucial in solving the problems. Respondents, who had good relations with their relatives acquired financial support as well as jobs and free accommodation from their relatives. This empirical data again supports the Herbert's, (1997), finding that expansion of social network increases the bridging social capital and ability to work. This finding also supports the findings of Buckley, (1996), that intergenerational relationships caused local stability and security that resulted in big turn of economic activity. In some cases, the respondents visited to their relatives after years. Such type of respondents acquired negligible help from their relatives. This finding supports the Homan's, (1972), notion that greater the interaction between individuals greater the attraction would be there. In all cases, it was seen that all respondents visited to their relatives in case of need or problems. This finding suggests that relatives are the source of social capital and produce resources for the well being of the individual.

Role of friends is important in the certain achievements of respondents. Sometime, friend's contribution in the achievement of desirable goal cannot be seen but actually, friends played important role in target achievements. Philosophically, all respondents had their friends. Among those, there were few respondents who acquired substantial help from their friends. Among 15 respondents 4 respondents acquired financial help from their friends and 2 respondents got education and accommodation with the help of their friends. Consequently, such type of help contribute in the betterment of the respondent's life. Additionally, 2 respondents who got education and accommodation with the help of their friends established their families in a better way. Those 2 respondents who acquired financial help married their children by utilizing that money. These findings are in accordance with the findings of Grootaert, (1998), that local association and network have positive impact of development and well being of household. It can be stated that friends are also important in improvement of standard of living.

People who work together within an environment are known as colleagues. Similarly, the respondents of this research had their colleagues. The empirical data showed that only 7 respondents consulted their colleagues in multiple needs; 2 cases consulted their colleagues when they were needed money. Rest of the five respondents consulted their colleagues for different needs (e.g. job, decision making and marriage of their children). This empirical data suggests that colleagues can be a source of social capital, which effect, the social status. Consequently, such types of help, which the respondents acquired from their colleagues, may contribute in reducing problem and improvement of living standard.

Interaction with neighbours and other members of the community is important in daily life because it is difficult to live without contribution of the other people. Only 6 respondents had frequent interaction with their neighbours and the residents of the community and rest of the respondents were busy in their works and had not enough time to meet their neighbours. Among those 6 respondents, one respondent was financially supported by his neighbour and rest of the 5 respondents married their children, started business and acquired job with the help of their neighbours. In some cases, respondent's wives fulfilled their needs by demanding goods of daily usage due to their strong ties with other neighbour women. This sort of exchange saved their resources and improved the efficiency. On the basis of this data, this assumption can be stated that increase in social relations increases the generation of resources. This assumption again supports the Herbert's, (1997), finding that expansion of social network increases the bridging social capital and ability to work.

Associations with influential people of the community and political representative are very important in problem solving because influential people and political leaders are the sources who can generate resources and solved the problems. Analysis suggests that there was only one case who had good relation with the S.H.O of the area (who lived in the community) and got desirable benefits by utilizing his relation with S.H.O. (But at the time of interview there was no any influential person in the community). One respondent increased his/her social capital by having association with S.H.O. of the police and acquired desirable benefit. This finding suggests that social capital increases the number of resources as Herbert, (1997), concluded that expansion of social network increases the bridging social capital. There was no such case which had interaction with his/her political representator (MNA, MPA, Counselor). This finding shows the respondents level of network with the influential and resources generating people. Therefore, no respondent acquired substantial benefit from influential people, which could lift him/her from worst condition. So, absence of interaction with influential people could be state a factor of their poverty. Krackhardt and Friedman, (1994), concluded that, exclusion from the social network of dominant group leads to achieve low status.

It was found that there was no association or committee among the residents of community that could solve the problems of community. Correspondingly, residents of the community had to solve their problems individually. By following this, it can be assumed that limited stock of their social capital could also be the cause of their worst condition and limited resources. This contention is negatively correlated with Narayan's, (1995), findings that increase in village level social capital increase the income by 20 to 30 percent.

There were only 2 cases whose *Bradrimates* lived in their community. Between these 2 respondents, one started new business with the help of his *Bradrimates*. In second case, *Bradrimates* preceded the case in the high court instead of the respondent. This finding shows that ethnic based relation can be a source of social capital and solve the problem for the welfare of the individual. This contention supports the finding of Townsend, (1994), that village level social capital can be key contributor for the well being of household. Buckly, (1996), also stated that intergenerational relationships caused local stability and security that resulted in big turn of economic activity. Almost, all respondents were agreed with the affectivity and benefits of having relations with people. Respondents argued that relations with people are beneficial and have potential to produce different sort of opportunities and economic resources. Surprisingly, all respondents were agreed at the point that association is critical in the improvement of living standard and in reducing poverty.

The last and the most important question of this discussion is that if association with people provide opportunities and resources for the well being of individual, then why the respondents were poor although they had a network of associations with people? Nature of resources and opportunities depend on the connection with the status of the group. If someone is associated with a group of upper class people, then he/she may enjoy and acquired the substantial resources and opportunities. Contrary to that, if one is associated with a group of poor people or have interaction with poor then the chances

of acquiring resources become rare. As Aston et al, (1999:3), stated that, "group members enjoy those resources which are available to the whole group". This assumption is true in accordance with empirical data of this research. Respondents enjoyed those resources which were available to their group e.g. one respondent had interaction with police officer of the area, and he achieved desirable benefits with the help of police officer. One respondent had good familiarity with the chairman of the department, and he acquired a job in the same department with the help of that chairman. Respondents were poor despite having association with different groups because the groups to whom they were connected were also poor. Those groups had not enough potential to produce resources; therefore the majority of respondents could not improve their living standard. Only 2 respondents were connected with upper class people and improved their living standard.

5 Conclusions

Keeping in view the empirical facts yielded by the present research, the researcher drew the following conclusions:

Family, friends, relatives, neighbours, colleague and ethnic groups are the major sources of social capital. Strong ties with these channels facilitate the resources and opportunities in the improvement of living standard and solve the problems. The researcher further concluded that social capital provides opportunities to produce financial capital, physical capital and human capital.

It was concluded that social capital could be conducive to reduce poverty if it flows through proper institutional arrangements, and increase the functioning of an individual in the process of economic development. Furthermore, education, job opportunities, financial help, accommodation, health facilities, good suggestions, and psychological support are crucial in reducing poverty and as findings suggested, that one can gain access to these resources by utilizing his/her social capital and these are the products of social capital.

Limited amount of help does not affect the one's status at considerable level. It could be concluded that in spite of getting all sorts of possible help, the respondents were poor because the respondent's channels of acquiring help were not the potential people of the society. Majority of the respondents often acquired help from those people who were also belonged to the low socio-economic status and the demanded help of the respondents was not enough which could reduce their poverty for a long-time. Therefore, the respondent's poverty sustained.

Respondents acquired level of help was not sufficient to alleviate their poverty but help in the maintenance of their status quo. The respondents rarely touched those institutions, which produce the reservoir of recourses for the improvement of income like business firms, education institution, political authorities, etc and also did not try to interact with the productive member of society, in spite of living in the centre of the city and well developed communities. Therefore, the respondents remain poor

The empirical data suggest that absence of interaction with resource oriented people and political representator, lack of association between the residents of the community, absence of interaction with neighbour communities and absence of membership in institutions (economic, political, education) were the major factors which effect the respondents level of social exclusion.

Findings show that respondents acquired nature of resources from their relations enabled them to live in society as poor. Just imagine, if these sources (relations) are fused, then what will be the future of the lives of the poor? And if it happens then it can be stated that there would be no better option for the subsistence of the poor, as they are already lack in economic capital, human capital and least

connected with social institutions which led them to live in worst condition. At the end, it can also be concluded that social capital is inevitable for the subsistence of the poor because it constitutes supplement for the existence of the poor.

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