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# EXTRACTS FROM ON HEAT AS THERMAL ENERGY RESPONSES FROM SURFACES AND NEAR SURFACES OF MATERIALS

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## **Prolegomenon**

The treatise (dissertation), *On Heat as Thermal Energy Responses from Surfaces and Near Surfaces of Materials*, is a set of synopses concerning heat in human experiencing. The set consists of five modules (synopses) - a history of heat, a philosophy of heat, a physics of heat – thermal physics, a mathematics of heat, and heat as an industrial process – the heat exchanger. The study on heat as thermal energy responses from surfaces and near surfaces of materials is primarily a macroscopic endeavor, or classical thermodynamics and heat transfer, which became an intellectual and academic journey open to new paths of questioning. The new paths of questioning did not yield quick and final answers; rather the new paths were found unfolding possibilities for future scientific research and theoretical inquiries. The possibilities could be briefly summarized as the following: 1) there is an anthropological, and herein an ontological, distinction between the controlled use of fire and the caused use of heat, in which fire and heat are analytically technological experiences; 2) the study of thermodynamics formed a bases for technological advances yet artificially severed a real equilibrium from a nonequilibrium continuum of material objects; 3) thermal equilibrium could be further understood mathematically in the context of topological spaces; 4) there has been inconclusive progress for the probabilistic theories from statistical mechanics to quantum field theories as a reasonable bridge between the microscopic and macroscopic realities supervening on our reality; and, 5) a deeper understanding of heat transfer and thermodynamics, especially with industrial heat processes, could be obtained in an analysis of quasi-particles' movement and transport through lattice materials.

## **Extracts from On Heat as Thermal Energy Responses from Surfaces and Near Surfaces of Materials**

### **Thesis Statement and Thought Experiment**

We examine a specialized engineering problem called an anomaly within heat as thermal energy responses from surfaces and near surfaces of materials can be explained scientifically and yield practical results which can further be utilized to improve the technologies of heat transfer in the industrial setting.

“The thought experiment on thermal energy responses from surfaces and near surfaces of metals originated while reading 'Thermoelectricity' by D.K.C. MacDonald. In a section on metals MacDonald states, “The density of conduction electrons in a metal are very high, and they obey the Pauli exclusion principle. This means that they have to be “spread over” a very large number of momentum states...The higher the density of free electrons accommodate them; hence  $\zeta_0$  (Fermi energy at absolute zero), and therefore  $T_0$ , increases with the concentration of free electrons in the metal.” (MacDonald, 1962) ... “However, in a real metal or semiconductor the electrons are not moving in a void so to speak, but are continually interacting (“colliding”) with the ionic lattice which makes up the very material of the conductor ... a temperature gradient causes energy to flow through the atomic lattice in the form of thermally generated lattice waves (Debye waves or phonons) ... The streaming phonons will then have a tendency to “sweep” the electrons along with them from the hotter to colder end of the conductor. This sweeping or “dragging” of the electrons because of the flow of heat in the lattice is what is known as the phonon-drag effect; it was explicitly pointed out by Gurevich (Gurevich, 1945, 1946) as a possible source of thermoelectricity...” (MacDonald, 1962)

“During the review of MacDonald's material as quoted above I began to visualize a real world anomaly on the surface of a thermal oxidizer .... Using my ISG K6800 infrared thermal imager to record the temperature of an active thermal stress hole, I recorded temperatures in excess of 1900°C when the maximum temperature of the thermal oxidizer was expected to be 872°C.” (Hargis, 2011)

## **Research Methodology**

We have approached our studies with a scientific research methodology that entails observation; identifying cause and effect; performing analysis and synthesis; construction of hypotheses concerning the nature, conditions, and connection of the observation; making inductive inferences; deducing logical rules and consequences; testing the hypotheses; forming predictions based on the hypothesis; constructing a mathematical model; and identifying fallacies and errors in the data, process, hypothesis and model. (Wilson, 1990)

## Extracts from the Discussion

“Thermal energy responses” is not a well-defined concept in the scientific literature. After feeling inspired by the concept while formulating a term or set of terms to encapsulate my thought experiment, I discovered through a literature search that “thermal energy responses” has been used rather loosely in environmental science for geothermal energy systems, such as borehole heat exchangers. Heat as thermal energy responses from surfaces and near surfaces of materials describes a set of thermodynamic states in relative nonequilibrium states and in transitional equilibrium states. Transitional equilibrium is simply the thermodynamic condition of a system in the process of changing from one equilibrium state to another equilibrium state, a process that is often encountered in complex process equipment. Relative nonequilibrium is the thermodynamic condition of nonequilibrium heat transfer dependent on the variables that define complex process equipment's dynamic properties. In other words the condition is not absolute or reversible. The system is in transition, constantly and continuously in time while presenting discontinuous, dissipative, and 'jump' behavior. Nonequilibrium conditions could be understood as transitional equilibrium, briefly described above, with the caveat that a state of thermodynamic equilibrium is readily understood and measured in transitional states and nonequilibrium conditions occur at a critical point.

Given complex process equipment, say a heat exchanger of considerably large volume, operating continuously at well maintained temperature and constant pressure. The temperature is well maintained by burner controls, and fluid flows entering and exiting at a constant rate. The fluctuation of temperature is well maintained within a narrow range of temperatures. The interior fluids of the heat exchanger are in continual transitional equilibria. Heat is exchanged, transferred, thermodynamically between the heated tubes and the fluid as the temperature is well maintained from the energy source called a burner. The heat exchanger is a closed system, for thermodynamic purposes, with refractory materials simulating an adiabatic state ... mass in the form of fluids are exchanged continually and heat is contained within practical limits. A final state of equilibrium is reached only when the system is 'shut down' and allowed to obtain atmospheric temperature. Over a sufficient duration of time the protective insulatory refractory materials deteriorate and the structural steel shell suffers thermal stress resulting in the relative adiabatic boundary compromised by holes or cracks, allowing heat to escape to the surrounding atmosphere. Without shutting down the system but providing remedial control of the escaping heat through the application of steam, the escaping heat will not approach an equilibrium state as long as the source of heat is actively maintained. The system is in a nonequilibrium thermodynamic state, at least at the point or points open to the atmosphere. At the point or set of points open to the atmosphere is the area of our scientific

research, from surfaces and near surfaces of materials. At the point or set of points open to the surroundings is a particular heat transfer dynamic that I call thermal energy responses. Allowing the system to deplete its energy source (such as gas, steam, et cetera), the burner, and halting the heated turbulent fluid flow, will bring the system to equilibrium over time. The same result occurs during a shutdown of the process. Given the approximate known parameters of the system's insulatory and structural materials and the operating parameters, such as pressure, fluid flow, convective heat, energy source (burner), input and output temperatures, we can approximate the useful life of the process and the system. The approximate useful life does not directly represent the experimentally tested parameters of the materials taken separately or the process parameters taken separately. For example, the material such as ceramic insulation rated at 982.22°C (1,800°F) and refractory brick rated at 1,537.78°C (2,800°F), have a useful life well below the time measured by experimental tests taken separately. Combining these materials, in a relatively constant temperature environment of well-maintained pressure and volume though turbulent fluid flow, appears to alter the expected useful life, shortens the anticipated time of optimum operation. (BNZ Materials, 2011; Cerablanket, 2007; Harbison, 2003; Green, 1953)

Our mathematical treatment of thermodynamics and heat transfer is fully dependent on a topological interpretation of critical points, and is appropriately represented by Rene Thom's theory of the classification of critical points arising in smooth functions. Thom's theory is called Catastrophe Theory and is often defined as “... the study of how equilibria  $\psi(c_\alpha)$  of  $V(\psi_j; c_\alpha)$  change as the control parameters change.” (Gilmore, 1981), where  $\psi(c_\alpha)$  is the state variable of gradient systems,  $\psi_j; c_\alpha$  are control variables, and  $V$  represents the potential force or condition of the gradient system. Investigating Thom's theory has required a thorough review of the literature covering topologies and manifolds for clarifying and applying the mathematical results from differential topology, point-set topology, and global analysis. A critical point is an example of a continuous phase transition. A critical point is often described as a divergence of the correlation length, in which the dynamical process rate slows. The correlation length is the relevant length scale related to critical phenomena. (Perry, 1984) The critical temperature of a substance is the temperature at and above which the vapor of the substance cannot be liquefied, regardless of the quantity of applied pressure on the subject matter (mass). And concurrently, the critical pressure of a substance is the pressure required to liquefy a gas at its critical temperature. (Fukuyama, 2009; Paloposki and Liedquist, 2006)

A major difficulty, if not the singular major difficulty, with an empirical verification of our treatise is the complex and difficult set of tasks in replicating the initial observations that have led to the thermal anomaly and the main contention for our thesis. A

notable experiment and the implications involved can be seen in a recent, 20<sup>th</sup> century, “extraordinary claim” of cold fusion which was centered on “excess heat” observed in a physical chemistry experiment, involving a deuterium-palladium system, by Fleischmann and Pons. (Beaudette, 2002) The initial observation of an anomaly is not invalidated by the subsequent inability to replicate the complex and difficult set of tasks, but as Beaudette affirms, “The protocols of science require that the scientific community evaluate a significant measurement claim.” (Beaudette, 2002); The initial observation and the exact replication of the complex and difficult set of tasks require verifiable and reliable precise measurements of the anomalous power, excess heat, but again as Beaudette affirms, “The key to a successful measurements claim resided in a precise design of the instrument or cell, which was configured not so much to enhance anomalous power production as it was to make possible its precise measurement.” (Beaudette, 2002); A complex and difficult set of tasks for setting up an empirically verifiable experiment for anomalous power, excess heat, can be defined, though such definition does not ameliorate the experiment set up or approached. “A complicated experiment is one that contains uncontrolled factors sufficiently influential to determine the experiment's outcome.” (Beaudette, 2002); An anomalous heat phenomenon as a single event, a singular observation, can lead to broad scientific discoveries. “A single event is, in principle, sufficient to bring about a revolutionary outcome. It follows that each claim of well-measured anomalous power, *without exception*, must be undone to dismiss the claim. ...” (Beaudette, 2002)

The work, “Excess Heat”, provides sufficient reasons to “take” the in-field thermal anomaly presented by an industrial heat exchanger as reasonable point of scientific inquiry and lay the conceptual foundations for future inquiry. Over time there were several observations of the recorded anomaly made from field technicians, utilizing diverse thermal imagers inspecting different heat exchangers and boilers. These observations were not formally documented, rather dismissed as interesting but with no present concern for inspection purposes.

In a broader approach, we will use the 'caused use of heat'. The narrower approach, used by archaeological and paleoanthropological practitioners, emphasizes the controlled use of fire as a time dependent marker for human development. The narrow approach is thoroughly appropriate and has led to interesting research results and healthy scientific debates. The 'caused use of heat' extends the time dependent markers to a technological series of human events which culminates in our modern heat exchangers and industrial furnaces. The first human to cause the use of heat is not known. We do know, with reservation, the first human to cause fire's use occupied the Qesem Cave near present-day Rosh Ha'ayin, Israel. The first documented aetiological heat transfer experiment is three hundred thousand years ago. We can reach into the past to discern a cause among our kind because

cause coupled with purpose, existence, and knowledge forms a continuity for human experiencing.

The present-day science of nonequilibrium thermodynamics begins with Boltzmann. Classical thermodynamics, with the laws of thermodynamics, has become equilibrium thermodynamics, the limiting case, the ideal case, the foundation for reaching beyond elementary principles and into nonequilibrium thermodynamics and the statistical mechanics of phenomena. Equilibrium is a fundamental cause of heat transfer. Equilibrium is not contingent on the position, momentum, or spin of particles, rather equilibrium exerts both a passive and active cause to effect the transfer of thermal energy from a source (object) measured at a greater temperature to a source (object) measured at lesser temperature (second law). A fundamental equilibrium is "ultimately" at the root of a philosophy of heat which is the natural progression for human experiencing ... And the entropy is not a fundamental cause, force, or principle, but rather contingent upon a fundamental equilibrium.

Thermal science is ... knowledge mapped onto the potential for human problem resolution, the applied knowledge for the caused use of heat. Here, in discussing thermophysics, the measurables are Euclidean spaces, phase spaces, Hamiltonian spaces, and vector spaces, whether we approach macroscopic arrays, ensembles, lattices, monatomic surfaces, microstates, or discrete quanta. The between are the boundaries and surfaces through which heat is transmitted. The temperature differences are also measurables on the surfaces and near surfaces of the Euclidean spaces ... measurables on measurables. It is at and in the between, the boundaries and surfaces that heat becomes an 'inter-action' we can call thermal energy responses. Thermal phonons when reaching the boundaries or surfaces of materials, through convection or conduction, become radiant energy emitted off the surfaces, yet there remains a continuity of measurement (observability).

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# IMMIGRATION ISSUES & CONFLICTS FACED BY LATIN AMERICA

## (A PERSPECTIVE ON COLOMBIA, GUATEMALA, EL SALVADOR, MEXICO & ARGENTINA, VENEZUELA AND ECUADOR)

Dr Kemal Yildirim\*

The complete version of this summarised article is available at:

<http://stclements.edu/articles/Immigration.pdf>

### Abstract

Immigration issues in conflict will be studied in this article with the framework of a comparative approach such as concentrating by irregular migration routes through these Latin countries with Current Emigration Trends on Economic and social costs.

*Keywords: Immigration, Latin, Argentina, Colombia, Argentina, El Salvador*

### Introduction

I have reviewed seven countries in this article such as Colombia Guatemala, El Salvador, Mexico and Argentina, Venezuela and Ecuador in terms of emigration prospects with emigration flows as well as the Refugee and Asylum Policy issues with Ongoing Concerns.

However, this article indicates that migration processes alone cannot be solved on its own but it remains to be a regional conflict by itself and it is necessary to take some measures to slow down immigration increase in these countries to the OAS (Organization of American States) need to implement new policies to develop status of new incoming immigrants. Perhaps the NGO's need more power to play role for shaping immigration issues.

### Colombia

Although Immigration to Colombia seems to remain limited following its independence in 1819, over the course of the 19<sup>th</sup> and 20<sup>th</sup> centuries, occasional migrant flows arrived from some of the Middle Eastern countries such as Syria, Lebanon, Palestine, and European Union like Germany, Italy, Spain, France, and Japan, but Colombia did not experience the same large-scale immigration seen elsewhere in Latin America.

Nowdays Colombia also attracts attention of thousands of new immigrants from Venezuela in last centuries, Syrian, Lebanese, and Palestinian immigrants first arrived in Colombia in the 1880s. An estimated 5,000 to 10,000 Middle Easterners settled between 1890 and 1930, making them the second-largest immigrant group. These communities transformed commerce and

trade in Colombia and had significant political involvement in the first half of the 20<sup>th</sup> century. Although the flow of Arab-Christian immigrants decreased in the late 1900s, a large number of descendant communities remain active. Regional and hemispheric migration flows have prevailed in Colombia since the 1960s. Venezuela, the United States, and Ecuador have been the leading countries of origin for immigrants in recent years. According to the United Nations, more than 133,000 immigrants lived in Colombia in 2015, representing 0.2 percent of the population of 47 million. A substantial number are returning migrants holding dual citizenship.

### *Internal Displacement and Colombian Refugees*

Meanwhile, far more Colombians are displaced by violence within their own country than live abroad. the UN High Commissioner for Refugees (UNHCR) records indicate that there are 7.3 million registered IDPs in Colombia so at least half of those displaced, primarily from rural areas, have fled to slums of the 27 largest cities. There may be also an estimated 340,000 Colombians live as refugees abroad, primarily in Venezuela, Ecuador, the United States, Canada, Panama and Costa Rica. While many refugees and IDPs are formally registered with UNHCR, a large number of Colombians living abroad remain unregistered and as a result are unable to access basic services in their host countries but we know that Venezuelans are more interested to immigrate to Colombia due to current economic recession.

As Colombia continues to emerge from civil war, a number of migration-related issues have emerged to test the country's newfound migration management capacity.

By taking control of vast portions of territory over the course of the war, rebel groups forced millions to flee their homes. Fighting between rebel groups, paramilitary organizations, and Colombian armed forces caused an uptick in displacement over the last two decades. As the FARC now abandons its long-occupied territories, remaining rebel groups have stepped into the vacuum, resulting in further displacement and violence in areas where state presence is almost nonexistent. In the first three months of 2017, more than 3,500 people were

displaced along the Pacific coast as paramilitary groups such as the Autodefensas Gaitanistas de Colombia continue fighting for control of territories where Afro-Colombians and indigenous peoples live.

Government-provided emergency assistance is available for IDPs in urban centers, for a three-month period. Many IDPs are not aware of their rights, and as a result, do not register for assistance. This has led to the establishment of informal settlements which sometimes become hotspots for drug trafficking and extortion. Despite precarious conditions in urban settings, most IDPs in cities expect to establish permanent residence there and are reluctant to return or relocate to rural areas.

While the flow of refugees to neighboring countries has decreased in recent years, the need for protection remains high. Continued violence in some parts of Colombia makes voluntary repatriation unpopular for most refugees. There are still a lot where Colombia needs to take as a measure to slow down the immigrant flow from Venezuela nowadays.

## Guatemala

Guatemalan migration from the civil war and post-war periods has profoundly transformed many communities within Guatemala, and the country as a whole, but it is still too early to assess whether these changes have in any way advanced human development in Guatemala. Among the broad issues for a longer-range assessment are questions such as: Can human development needs be met in Guatemala, so that migration becomes voluntary rather than necessary? And what are the human consequences for individual Guatemalans and their communities of the migration processes that are almost certain to continue?

In recent decades, immigration to [Guatemala](#) has led to an increase in desire for more businesses and tourist attractions, after there had been a considerable drop from 1950 to 1980.

The [Jewish](#) immigrants arrived in Guatemala mid-nineteenth century, although historically [Cuba](#), [Guatemala](#) and [Mexico](#) were the routes used by Jewish immigrants to go to the [United States](#). [Guatemala](#) was not a route favorable to the [Jews](#), and the governor tries to limit their arrival. In 1932, the governor ordered the expulsion of all Jewish traders in the nation. Even after [World War II](#), Guatemala had a large [Jewish influx](#), from [Greece](#), [Turkey](#) and [Poland](#). Most Jews live in the city of [Guatemala](#), with the rest in [Quetzaltenango](#) and [San Marcos](#). As of 2012, 900 Jews were living in Guatemala<sup>1</sup>

## El Salvador

The number of Salvadorans residing in the country totals about 6.2 million. But it is estimated that anywhere from 817,000 to 2.7 million Salvadorans, or another 13 to 40 percent, live outside the country. While Salvadorans can be found in almost any part of the world, an overwhelming majority migrate to the United States. According to U.S. census data, they are predominantly of working age and a high percentage are women. In fact, analysis published in the UNDP report shows that Salvadoran women dominated migration flows to the United States in the 1960s and 1970s.

With the outbreak of civil war in the 1980s, not only did migration increase significantly, but men started to migrate in far greater numbers than women. Despite the onset of peace in 1992, migration to the United States has continued. Evidence from recent field work in 18 municipalities of El Salvador indicates that, after the earthquakes of 2001, young people from the countryside have been migrating to the United States at a faster rate than ever before.

## Argentina

I personally feel that Argentina is one of the best to attract immigrants for last two or three centuries. For most of its history, Argentina has been characterized as a country of immigration. Yet global forces, combined with a recent history of economic, political, and social instability, have slowly transformed Argentina into a country of immigration, emigration, and transit. Whereas millions of Europeans — predominantly from Spain and Italy — made their way to Buenos Aires and beyond at the turn of the 20th century, many of them and their descendants have returned to Europe or gone elsewhere. Since the 1990s, dismal employment prospects coupled with strong foreign-labor demand and, at times, favorable visa policies in countries including the United States, Spain, Italy, and Israel have given rise to a new wave of emigration. Most recently, Argentina's economic collapse in 2001-2002 saw significant emigration flows of Argentine nationals and immigrants alike. In the past five years, an estimated 300,000 people (many of European descent) have left. Despite these outflows, however, Argentina's strong demand for predominantly unskilled, low-wage labor ensures its role as a regional immigration hub, consistently attracting new economic migrants from its neighbors in the southern cone of Latin America.

Furthermore, while many foreign workers in Argentina have short-term migration prospects (anticipating another move either home or abroad), others are permanent, as demonstrated by increasing permanent immigration rates in recent years.

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<sup>1</sup> *Jewish Virtual Library* Jacqueline Shields [The virtual Jewish World--Guatemala Archived](#) Retrieved 4<sup>th</sup> December 2014.

## *Recent Migration & Current Emigration trends*

After gaining its independence from Spain in the early 19th century, Argentina adopted an open immigration policy and encouraged immigrants to embrace the country as their own. For a short period at the end of the 1880s, the government went so far as to subsidize immigrant boat passages. It is estimated that the country received over seven million immigrants, predominantly from Spain and Italy, between 1870 and 1930.

European migration to Argentina began declining in the 1930s during the global economic depression, bouncing back slightly before again decreasing in the 1950s as the economic and political situation in Europe improved after World War II.

Net migration rates in Argentina remained comparatively strong until the 1980s, however, through increased flows from neighboring countries with less robust economies such as Paraguay, Uruguay, Bolivia, and Chile, whose natives sought employment and higher wages. Due to intense urbanization from rural-urban internal migration flows, many of these southern cone migrants filled the rural labor demand in Argentina.

While regional immigration flows to Argentina continued in the 1980s and 1990s, economic opportunities abroad and a lack of opportunity at home caused many Latin Americans to migrate. Growing Argentine emigration rates, particularly of the young and highly skilled, closely follow the larger Latin American trend of those seeking more stable economies and social conditions in Western industrialized nations. An estimated 1.05 million Argentines were living abroad as of March 2005 — double the number from 1985.

The United States is one country that has experienced an increase in Argentine immigration flows over the last decade with over 60 percent living in just three states: California, Florida, and New York. The majority of permanent immigrants enter under family reunification provisions, whereas most temporary immigrants enter the United States as specialty workers (H-1B visa), exchange visitors (J-1 visa), and intracompany transferees (L-1 visa).

A strong foreign labor demand and favorable citizenship policies in Spain and Italy — applicable to Argentines who can prove Spanish or Italian ancestry — help explain why these countries also receive a large proportion of Argentine immigrants and Latin American immigrants in general. Argentina's relatively unstable economy and the European Union (EU) policy granting citizens free movement within EU territory have further promoted this trend.

Remittances to Latin America make up nearly one-third of the world's total share. Although remittance

flows to Argentina are not among the regions largest, their significance continues to grow.

## **Mexico**

Immigration into Mexico, compared to emigration of its nationals and transit migration, is comparatively meager.

The foreign-born population increased between 1990 and 2000 by slightly more than 150,000, amounting to around 500,000, about 0.5 percent of Mexico's total population.

Among those aged 5 and older, the U.S. born were the dominant group with 63 percent of the total, up from 57 percent in 1990. Although Mexico is home to a small number of U.S. retirees, the vast majority of U.S. citizens in the 2000 census were children, 90 percent of whom had at least one parent born in Mexico. Moreover, according to INEGI, more than 90 percent of all foreigners below the age of 10 were born in the United States.

Those from Europe, particularly from Spain, accounted for 11.9 percent of all foreign born, followed by those born in Central America (11.2 percent), South America (7.3 percent), and the Caribbean (2.4 percent). The remaining 4 percent came from the rest of the world.

## **Ongoing Concerns**

The most pressing task facing the Mexican government should be seriously reengaging the United States in negotiations on the migration issue.

Arguing in favor of a thoughtful resolution of these issues is the realization that tightened immigration enforcement is unlikely to change the economic and social realities that build migration pressures.

However, the Calderón administration seems to be aware that U.S. policy is unlikely to change, even more so given the recession and high unemployment in the United States.

The government believes that development and job creation in Mexico are keys to breaking Mexico's migration cycle. But the strategy for job creation rests almost exclusively on sound conditions to attract and promote private — domestic and foreign — investment.

While the Calderón government has prioritized national security, the rule of law, and the fight against drug trafficking and organized crime, it has made several attempts to professionalize migration personnel and to modernize migration facilities to better manage transit migration. Several programs have also been enacted to regularize "transborder migrants" in the southern regions.

A fair amount of rethinking will be needed to honestly address the contradictions of migration policies heavily driven by restrictive considerations in increasingly interlocked contexts. The challenge will be to understand clearly the enduring nature of the economic, social, and communications forces at work even while looking at the entire process through the security lens.

The current dilemmas facing Mexico and the United States with regard to migration are the same old ones. Either the two countries accept the reality of Mexicans entering the United States — whether temporarily or permanently — and open avenues for orderly movement, or both countries engage forcefully and cooperatively to achieve a real "partnership for prosperity" within a framework of multifaceted integration.

## Conclusion

The migration-induced changes taking place in El Salvador today are profoundly transforming the country's economy and society. Yet over the last two decades analysts and policymakers did not sufficiently take into account the impacts, and thus continued to plan for a country that no longer exists. Essentially, El Salvador cannot be understood as a country of 6.2 million people living in 21,000 square kilometers, but rather as a nation with more than eight million citizens living inside and outside the national borders.

Many policymakers continue to try and find ways for migration and remittances to develop immigrant-sending areas, especially on the local level. The UNDP El Salvador report concludes, however, that migration and remittances can contribute to local development (and in fact are already doing so) but they cannot be the motor that drives either the national or local economy.

In short, migration processes alone cannot solve all of El Salvador's economic problems. Local and national development requires local agendas for improving the social, cultural, political, and economic fabric of a community.

Return migrants can contribute with skills learned abroad, and migrant associations in the United States can make investments that stimulate local economic activity or support social services such as education, health care, and recreational activities. The challenge is ensuring that all Salvadorans, not just households with migrants abroad, can benefit from improvements.

Argentina's most recent policy development seems to be the immigrant regularization program for non-Mercosur citizens residing in the country since June 30, 2004. The majority of these migrants are from China or Korea although some Latin Americans also participated.

Two-year temporary legal status is granted to all successful applicants. Immigrants may then choose to renew their status for another two years before seeking permanent citizenship. This regularization program, similar to other recent policy developments, was created to foster formal employment, immigrant integration, and a universal-rights oriented framework. Beginning July 7, 2004 unauthorized immigrants had 180 days to apply for regularization. As of November 8, 2005 the program had adjudicated 900 applications.

Argentina's economic and political conditions become increasingly stable, so too does the country's migration profile. Argentina can expect to continue to receive significant regional immigration flows while continuing to act as a sending country. As a result, immigrant remittances will continue to play a role in the country's economy, although, according to current trends, Argentina will remain less dependent on remittances than its Latin American neighbors.

Contrary to global trends, recent migration policy developments in Argentina are framed towards creating a more open immigration regime. In most immigration countries, such as the United States and the UK, security concerns as well as the desire to control and limit increasingly large migration flows are driving policy reform. By opening access to the country, especially for regional immigrants, Argentina provides an interesting case study of free movement for the developing world.

Eschewing more restrictive immigration policies of the past for a human rights and immigrant integration guided system means international migration will continue to influence Argentina's landscape.

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# IMPACT OF EFFECTIVE MANAGEMENT ON GOOD LEADERSHIP - NIGERIA AS A CASE STUDY

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To underscore the importance of this discourse, permit me to observe the ease and flippancy with which writers and public commentators on the subject use the terms, albeit, generously. Empirical evidence suggests that a number of people, who talk about “leadership” directly, or otherwise, refer to “management”. Often times, the lure of leadership makes certain nations to institute leadership training programs for youths who are yet to appreciate basic fundamentals of management, a case of the horse before the cart. In appreciating these Siamese twins, let us first recognize that both terms aim at achieving allocation of resources, secondly, both are people-led, and finally, both work towards set objectives. Having taken the aforesaid into cognizance, we could then proceed with the rest of the discussion as follows: definition of the two concepts; an attempt to establish a relationship between management and leadership to ascertain their synergy, or otherwise; review a few case studies with the aid of data obtained from sampled opinion. Structured questionnaires would be analyzed using simple statistical correlation ratio (SCR).

## DEFINITION

### Management

The Webster’s 9<sup>th</sup> New Collegiate Dictionary (1991) defines “Management”, first, as *art of managing; conducting or supervising something (as a business)*; secondly, as *judicious use of means to accomplish an end*; and thirdly, as *a collective body of those who manage or direct an enterprise*. No doubt, the definitions have thrown up a number of issues oscillating between *management* and *leadership*. For instance, leaders, more often than not, direct followers and allocate resources, however, before proceeding on this, let us further seek dictionary explanation of “leadership”.

### Leadership

The same Dictionary defines “*leadership*” as *office, position of a leader or capacity to lead*. A review of leadership literature reveals its varied dimensions. Historically, early theories on leadership attempted to associate its success with trait attributes, drawing conclusions from the US Army whose *Alpha Test* aimed at identifying officers with requisite traits to lead at war front during the First World War {WW1}, Sashkin & Sashkin (2004). The period (1920-1945) kept researchers on the subject busy at validating the

efficacy, or otherwise, of trait theory. By 1948, they came to a conclusion that no statistical evidence exists in support of *trait* impact on leadership; indeed, a study by Ralph Stogdill of Ohio State University (US) terminally ended the relevance of trait theory.

### Management Leadership Synergy

The term “management” gained currency in the 19<sup>th</sup> century when engineers and accountants got engaged in entrepreneurship (Wikipedia, 2016 update). They promoted the mantra of leadership by providing creative and intellectual path to business growth (Udendeh, 2010). Description of management and leadership suggests that each plays key roles of making judicious use of means to accomplish an end. Emphasis on mutual inclusiveness of the two terms by management theorists does not, in any way, imply non-existence of distinguishing features among them. For instance, management thrives where objectives subsist; just as capacity to lead underscores the essence of leadership. Both concepts hold a number of variables constant, for example, it presupposes that anyone that aspires to lead shall first go through the process of management. Secondly, such process shall encompass judicious allocation of scarce resources; hence effective management serves as evidence-based leadership selection process. The above postulates render sociology of leadership a little bit more complex to comprehend. Complex in the context of challenges of time limit (if any) when transmission of effective management to good leadership is guaranteed; whether good managers are, necessarily, potential good leaders; and whether effective management should serve as pre-condition for good leadership.

To attempt an answer to these posers, we need to first, look at a few illustrations in aid of feasible compass to the discussion. The famous American company, General Electric (GE), was initially an electric bulb making company. Its brand new employee, Jack Welch, at 24 but with a Ph.D in chemical engineering, blew up the company’s laboratory in the course of search for product expansion. It’s like breaking the egg to make an omelet; accordingly, management of GE accepted the error as part of the learning curve. He subsequently matured to become the best manager of materials, finance and human being (Welch, 2001). When an opportunity threw up, the shareholders had no other option than to elevate Welch to the position of Chief Executive Officer (CEO) of the company. His success at GE between October 1960 and September

2001 spanning a period of 41 years, of which 20 were at the CEO level, has become a compulsory literature in several US business schools.

In financial industry, the story is not complete without a mention of Mark Carney, the extant Chief Executive of Bank of England (BoE). He left his tenure uncompleted as Governor of Central Bank of Canada in 2011 to assume duty in foreign land, England, on account of the success he recorded in Canada during the global financial crisis of 2007/8. Canada was insulated from the crisis despite its proximity to the US, the boiling point, due to Mark's initiatives and managerial agility in staving-off the crisis. Mark prepared his financial management ground at Goldman Sachs as an investment banker. Below is a brief summary of Mark's role in Canada during the 2007/8 financial crisis: Available information has it that Mark is an alumnus of Oxford and Harvard universities where he trained variously as an economist with a first class in the discipline. He worked with Goldman Sachs as an investment banker where he cut his teeth in financial deals. He subsequently moved to Bank of Canada as a deputy governor and member of monetary policy committee (2003-4) and, thereafter, as deputy minister of finance (2004-7). He assumed the headship of Bank of Canada following the retirement of his predecessor; David Dodge, in 2007 (Wikipedia, 2016 update). Mark's tenure at Bank of Canada was characterized by global developments of significant magnitude to financial stability notable among them were massive tax cut (personal and corporate); resurgence of dollar currency; rise of BRICS {Brazil, Russia, India, China and South Africa}; global financial crisis {GFC} and increase in consumer debts. Mark's ingenuity staved-off the ensuing head winds against Canadian economy, majorly, insulation from heat of GFC.

In March 2007, at the initial stage of the crisis, Mark reduced interest rate by 50.0 per cent to 1.0 per cent, from 2.0 per cent. After a year, he further collapsed it to zero from April 2008 to 2009. The US Federal Reserve (Fed), along with European and Japanese financial authorities, belatedly toed Mark's line of thought afterwards and even bought back government bonds massively; a step Canada refused to take. Instead, Mark persuaded the Canadian minister of finance to approve *guarantees* to the issued asset-backed commercial paper (ABCP) worth C\$35 billion for the comfort of Europeans banks that invested heavily in it. Mark further reached out to top EU bank executives to get them restructure their maturing obligations, a step most of them were unwilling to take initially. Prior to this, Mark had earlier netted a deal that endeared him to Canadian financial authorities, while serving as deputy minister of finance. Canada needed to dispose of its remaining 18.6 per cent shares in Hydro One owned by Ontario Government. Mark was commissioned to get the best deal for this, which he did. The shares were eventually sold at C\$64.50 per share; bringing in extra C\$5.0 per share. The UK authorities engaged him as Governor of Bank of

England on July 1, 2011, at the age of 47 years, on account of Central Bank of Canada (CBC)'s crisis-resistant policies under him. Prior to his appointment, newspapers were awash with news that UK had never appointed a foreigner as head of BoE since its inception 318 years ago, he broke the jinx.

In Singapore, the pioneer Prime Minister, Lee Kuan Yew (1959-1990), designed and implemented Singapore's development agenda. There is little literature about the success, or otherwise, of his prior legal practice, however, LKY leveraged Singapore's discipline and equal opportunity disposition to promote governance. LKY's effective use of legal instruments to anchor development of Singapore suggests he was a successful lawyer. As a city-state with virtually no natural resources to fall back to, Singapore's LKY placed emphasis on human resource development. He promoted religious and industrial harmony; minority rights and employment generation. LKY further cemented the fundamental objective of state policy by pushing for a clear vision of goals the nation should aspire to and means of achieving them, (Yong, 2010).

### **Nigeria's Perspective**

Nigeria presents a fundamentally challenging scenario here. It has fault-lines akin to what Singapore had passed through: diversity of religion, prevalence of minorities and dizzying unemployment (Omaji, 2018). Efforts at addressing these ostensible challenges are feeble on account of inappropriate leadership. Although, experiment towards leadership selection process (both for business arena and public sector space), is on-going, the choice is neither predicated on sanctity of success in management of an enterprise, professional practice nor academics. As a result, Nigeria's unparalleled resources remain persistently under-utilized (Abubakar, 2018). Academics and public commentators, including (Omaji, 2018), attributed the development to a number of reasons key among them is lack of appreciation of the role of effective management in leadership preparation. Consistent with the foregone, a ground swell of opinion is being expressed as to whether, or not, leadership selection process should transcend the extant ritualistic orthodoxy by beaming more search lights on track records of managerial success. Holders of this opinion allude to the experience of companies like General Electric (GE) that went through a rigorous process to arrive at an ideal CEO in Jack Welch; Canada's experience to arrive at Mark Carney to drive its financial system or Singapore's efforts at attracting LKY to leadership. Despite its imperative, Nigeria and other developing countries, as well as, some industries, have not deemed it necessary to engage this process.

Dearth of good leaders and the social cost of selecting same, has informed election by certain jurisdictions to extend perpetually, tenures of their office holders who demonstrated significant leadership capacity and proven records of success. This was the case with

Rwanda when it extended President Paul Kagame's tenure a couple of years back; China did same for Xi Jinping recently; Egypt would have loved to do same given the 97.0 per cent second term victory at the poll by General Al-Sisi (rtd) in March 2018. Yet, Nigeria would not take this road due to inherent political risk. In the circumstance, the country is left with a dry choice that ends up with ineffective leadership. To resolve this riddle, the searcher administered structured questionnaire to observe whether or not, there exist a relationship between effective management and leadership, using simple statistical correlation ratio (SCR) in an attempt to ascertain the relationship, if any.

### Hypothesis

The study aims at testing following hypothesis:

$H_1$ , Managerial record of success is an ideal test for effective leadership in any capacity.

$H_0$ , Managerial success is not necessary in the selection process for leadership.

### Research Method

A total of 500 questionnaires were administered across the spectrum of the society involving bankers, politicians, civil servants, students and others. The questionnaires were randomly administered using Abuja, the Federal Capital Territory (FCT), as representation of Nigeria, the latter being the target population. The choice of Abuja as a sample size stems, in the main, from its accessibility in the context of resource constraints.

### Decision Rule

| Correlation ratio | Detailed description    | Rough description |
|-------------------|-------------------------|-------------------|
| 1.0-0.8           | Very strongly related   | Related           |
| 0.8-0.5           | Fairly strongly related |                   |
| 0.5-0.25          | Fairly weakly related   |                   |
| < 0.25            | Very weakly related     | Not related       |

### Data Analysis

Of the 500 respondents, 366 or 73.2 per cent were validated. Analysis of responses was premised on correlation ratio. In the process, respondents were first grouped in five professional fields while questionnaires were structured into three options (Strongly agreed, Agreed & Not agreed) for effective capture of responses, as stated below:

#### Step 1

| Group of respondents | Strongly Agreed | Agreed | Not Agreed | Total       |
|----------------------|-----------------|--------|------------|-------------|
| Bankers              | 23              | 35     | 18         | 76          |
| Politicians          | 13              | 26     | 10         | 49          |
| Civil servants       | 27              | 30     | 18         | 75          |
| Business people      | 33              | 28     | 20         | 81          |
| Students             | -               | 31     | 30         | 61          |
| Others               | -               | -      | 24         | 24          |
| Total                | 96              | 150    | 120        | 366         |
| Average              | 24              | 30     | 20         | 26 (Apprx.) |

#### Step 2

| Group           | (Score -mean) <sup>2</sup> | (x) <sup>2</sup>   | Result |
|-----------------|----------------------------|--------------------|--------|
| Strongly Agreed | (23-24) <sup>2</sup>       | (-1) <sup>2</sup>  | 1      |
|                 | (13-24) <sup>2</sup>       | (-13) <sup>2</sup> | 169    |
|                 | (27-24) <sup>2</sup>       | (3) <sup>2</sup>   | 9      |
|                 | (33-24) <sup>2</sup>       | (9) <sup>2</sup>   | 81     |
|                 | Score                      |                    | 261    |
| Agreed          | (35-30) <sup>2</sup>       | (5) <sup>2</sup>   | 25     |
|                 | (26-30) <sup>2</sup>       | (-4) <sup>2</sup>  | 16     |
|                 | (30-30) <sup>2</sup>       | (0) <sup>2</sup>   | 0      |
|                 | (28-30) <sup>2</sup>       | (-2) <sup>2</sup>  | 4      |
|                 | (31-30) <sup>2</sup>       | (1) <sup>2</sup>   | 1      |
|                 | Score                      |                    | 46     |
| Not agreed      | (18-20) <sup>2</sup>       | (-2) <sup>2</sup>  | 4      |
|                 | (10-20) <sup>2</sup>       | (-10) <sup>2</sup> | 100    |
|                 | (18-20) <sup>2</sup>       | (-2) <sup>2</sup>  | 4      |
|                 | (20-20) <sup>2</sup>       | (0) <sup>2</sup>   | 0      |
|                 | (24-20) <sup>2</sup>       | (4) <sup>2</sup>   | 16     |
|                 | (30-20) <sup>2</sup>       | (10) <sup>2</sup>  | 100    |
|                 | Score                      |                    | 224    |

#### Step 3

| Group           | Score |
|-----------------|-------|
| Strongly agreed | 261   |
| Agreed          | 46    |
| Not agreed      | 224   |
| Total Scores    | 531   |

#### Step 4

$$\begin{aligned}
 & \text{No of Prof. Group (Group mean - Overall mean)}^2 + \\
 & \text{No of Prof. Group (Group mean - Overall mean)}^2 + \\
 & \text{No of Prof. (Group mean - Overall mean)}^2 \\
 & = 4X(24-26)^2 + 5X(30-26)^2 + 6X(20-26)^2 \\
 & = 4X4 + 5X16 + 6X36 \\
 & = 16 + 80 + 216 \\
 & = 312
 \end{aligned}$$

## Step 5

(Result of step 4/steps3+4)

$$=312/(531+312)$$

$$= 312/843$$

$$= 0.370$$

This falls between 0.5-0.25 signifying fairly weakly related synergy; hence  $H_1$  is, hereby, rejected.

## Conclusion

Although, the result of analysis of the case study above does not provide explicit evidence of a very strong relationship between effective management and good leadership under “detailed description”, it provides tacit indication of loose relationship under a “rough description” by scoring (between 0.5-0.25). A final decision may, however, stem from further studies on the subject; hence recommended.

### Questionnaires (Abstract)

- 1.0 Management and leadership are one and the same.
  - a. Strongly agreed
  - b. Agreed
  - c. Not agreed
- 2.0 There are enough institutions in Nigeria to serve as training ground for leadership.
  - a. Strongly agreed
  - b. Agreed
  - c. Not agreed
- 3.0 Leaders should first cut their teeth as managers before aspiring to leadership.
  - a. Strongly agreed
  - b. Agreed
  - c. Not agreed
- 4.0 Good management should serve a precondition for leadership.
  - a. Strongly agreed
  - b. Agreed
  - c. Not agreed
- 5.0 Leaders that by-pass management positions do well.
  - a. Strongly agreed
  - b. Agreed
  - c. Not agreed

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# CORRELATION BETWEEN OCCUPATIONAL STRESS AND ACCIDENTS IN THE COMMERCIAL ROAD TRANSPORT SECTOR

Dr James Chikuni Jerera\*

## Introduction

This study seeks to establish the correlation between occupational stress and accidents in the commercial road transport sector. Road traffic accidents are a growing worldwide problem and occur on a day-to-day basis, claiming lives, injuring people, and damaging vehicles beyond repair. Commercial vehicle accidents account for the majority of accident casualties (Chikoto and Sadiq 2013).

Preliminary reports by the police always show that the majority of road accidents are because of human error. Occupational risk factors like stress and fatigue result in commercial vehicle drivers making mistakes. Nevertheless, statistics for accidents are not detailed and only show the number of accidents, deaths, and injuries.

The high levels of occupational stress seem to be a factor leading to human errors and eventually causing accidents. Commercial vehicle drivers have a high risk of accident involvement. The profession of driving is a challenging one regarding the occupational hazards and health outcomes (Krueger 2007).

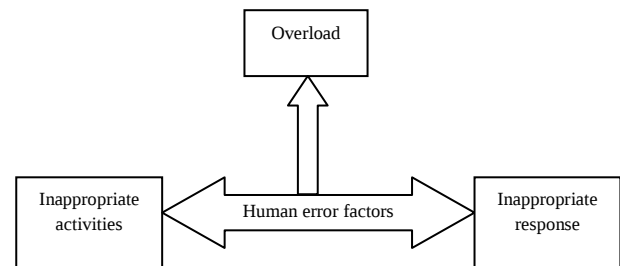
It is important to reduce commercial vehicle accidents because transport is a significant segment of many economies. The sector facilitates both local and international trade and contributes towards employment creation. This study mainly focuses on commercial vehicle drivers and the impact of occupational stress on accidents. The objectives of this study are to:

- examine the causes of occupational stress among commercial road transport drivers
- discuss the major causes of accidents among commercial road transport drivers
- establish the relationship between occupational stress and road accidents
- propose possible options for reducing occupational stress among commercial road transport drivers

## Theoretical framework

This study applies the human factor theory of accident causation. The theory attributes accidents to a chain of events caused by human errors (Kompier 2010). It consists of three factors that lead to human error, which are overload, inappropriate response, and inappropriate activities. Figure 1 shows the three elements.

Figure 1: Factors that cause human errors



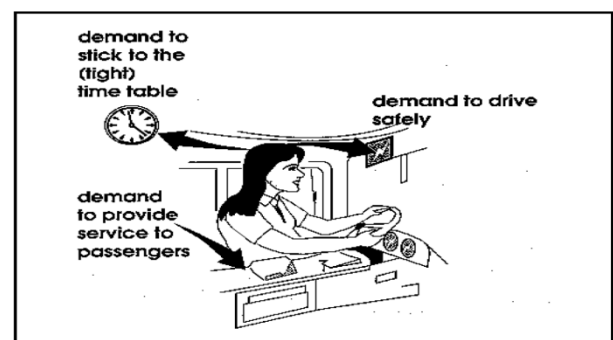
Source: Kompier (2010)

## Causes of occupational stress among bus drivers

Stress refers to an undesirable condition, circumstance, task, or other factors that impinge upon the individual (Gaither et al 2008). Stress is a major influential factor that affects the operator's health, safety, and productivity. Possible sources of stress are job demands, environment and mental demand stressors.

There were numerous studies on the occupational health of bus drivers. Examples are the investigations by Sadri (2002), Krueger (2007), Jafari et al (2010), Karimi et al (2010) and Kompier (2010). The studies indicate the job of being a bus driver is a high-risk occupation, with some conflicting task demands. Figure 2 shows the main causes of occupational stress among bus drivers.

Figure 2: Conflicting task demands



Source: Kompier (2010)

Little autonomy and support from management are other causes of occupational stress among drivers (Ismail et al 2009). It is important to note that a driver cannot resolve the fundamental problem of conflicting job demands. Although bus drivers often characterise themselves as bosses in their buses, this power has

substantial restrictions. To a large extent, drivers work in isolation from colleagues and superiors. A study by Kompier (2010) showed that bus drivers always complain about being unaware of the plans of management and not getting enough information and support from their superiors.

The bus driver's seat and other cabin components usually lack sufficient adjustability. Many drivers complain about a bad layout of the workstation. Most bus drivers report high levels of inadequate illumination, which has a relationship with night driving and unfavourable weather conditions (Cai and Lin 2011).

It is common for transport personnel to have problems with disorderly and troublesome passengers. "Problems often occur when passengers do not possess or do not want to buy fare tickets" ([www.tcmetro.blogspot.com](http://www.tcmetro.blogspot.com)). Sometimes there are cases of robbery and assault.

Physical harm is increasingly becoming an occupational risk for bus drivers, especially in the major cities and during night shifts. "Soccer fans and youngsters returning home late after having visited inner-city nightlife are liable to make threats and be violent" ([www.tcmetro.blogspot.com](http://www.tcmetro.blogspot.com)).

"Being a bus driver means working at times when other employees do not. Irregular working hours are a major inconvenience for many bus drivers" ([www.bvsde.paho.org](http://www.bvsde.paho.org)). Since the demand for commuter service and other journeys vary, many drivers work complicated shift systems (Kompier 2010).

### **Causes of road traffic accidents**

The problem of road traffic accidents, which the World Health Organisation (2015) describes as a cost of modernisation, is becoming an internationally recognised concern. Professional drivers have a higher risk of being involved in a traffic accident because they spend most of their time on the road. They undertake long journeys and often drive during the evening when fatigue and drowsiness are more likely to occur. Driving at night, under adverse weather conditions and in heavy traffic increases the risk (European Agency for Safety and Health at Work 2007).

According to the study on causes of truck accidents in Europe, 85.2% of accidents on the road have a link to human errors (European Commission 2006). Other factors such as weather, infrastructure conditions or technical failures of vehicles played a minor role.

This study categorises the causes of traffic accidents into four groups. These are human factors, vehicle factors, road factors and other reasons.

### **Human errors**

Literature shows that human errors are the leading cause of road traffic accidents (Kharazzi and Thomsen 2008). They include over speeding and ignoring road signals. Further, driver fatigue is a contributing factor in as many as 30% to 40% of all heavy truck accidents. Driving more than eight hours increases the risk of accidents.

### **Mechanical faults**

Vehicle mechanical failures also cause accidents. According to Beaulieu (2005), vehicle mechanical defects reduce a driver's ability to maintain control of a vehicle. Safety products designed for vehicles, such as warning lights that do not work correctly also cause serious accidents.

### **Road conditions**

Bad roads affect a driver's ability to control a vehicle as sometimes the road is too narrow, mountainous, or has sharp curves. In many countries, mountainous terrain poses an additional challenge for professional drivers, particularly on the downhill when trucks and lorries gain momentum and may be difficult to control.

### **Other causes of road traffic accidents**

High traffic volume can cause accidents. There is a connection between traffic volumes and accident occurrence. The increase of vehicles on the road increases the likelihood of traffic accidents (Broughton et al 2007). More traffic leads to more congestion and hence the number of accidents is higher (Chun 2007).

Another cause of accidents is vehicle load. Up to 25% of accidents involving trucks are caused by errors in cargo securing. During sharp braking or crash the risk of cargo falling off the vehicle increases.

The risk of accidents increases when vehicles travel under hazardous conditions (Department for Transport 2005). Rain and snow can cause slippery roads. Torrential rains, snow, and fog limit the visibility for the drivers. Some factors affect visibility for drivers especially fog intensity, but also droplet size, blowing snow, wiper speed, ambient light and splash and spray from other vehicles.

Adverse weather conditions are also to blame for accidents. Collision risk significantly increases during precipitation. Heavy winds and fog are associated with a small proportion of crashes but enhance the danger of a traffic accident, whether acting alone or in combination with precipitation.

Driving in adverse weather conditions requires careful attention and the vehicles have to be properly equipped to operate in those conditions. Specialised training and instruction of drivers are also crucial.

## Relationship between occupational stress and road accidents

According to a study by Jahangiri et al (2012) occupational stress is the leading cause of fatal traffic accidents. The profession of driving is a challenging one regarding the professional risks and health outcomes. The health status of individuals and human error play a significant role in the occurrence of accidents. Stress-free drivers are less likely to make mistakes that lead to accidents because they can concentrate on their jobs without any mental distractions.

The act of operating a vehicle is very susceptible to fatigue, and this occupation involves many of the skills that are affected by tiredness. Driver fatigue is a sole prevalent reason for work-related road traffic crashes resulting in injury or fatality.

When a driver is prone to a combination of personal, environmental and job-related agents, a high level of fatigue may be the result. Most of these agents cause fatigue by diminishing sleeping periods, expanding durations of wakefulness or interrupting the timing of rest and wakefulness.

## Strategies for reducing occupational stress among vehicle drivers

Occupational stress is a growing problem that results in a substantial cost to individual employees and organisations around the globe (Chun 2007). The changing nature of work leads to unprecedented demands and adversely affects the well-being and health of employees.

Improving ergonomics of the bus cabin and not overworking drivers could reduce occupational stress. Ergonomic recommendations include having an adjustable driver's seat, having a user-friendly steering wheel, and easy-to-reach pedals.

“Stress signalling and prevention relate to changing and improving organisations and organisational processes” ([www.bvsde.paho.org](http://www.bvsde.paho.org)). Stress projects in bus companies show that a successful approach aimed at stress prevention is participatory and step-wise (Kompier 2010).

“Participatory because the top and middle management, employees, and trade unions play an active role” ([www.bvsde.paho.org](http://www.bvsde.paho.org)). Step-wise meaning that the team follows a process involving different phases, which are preparation, problem analysis, a choice of measures, implementation, and evaluation (Kompier 2010).

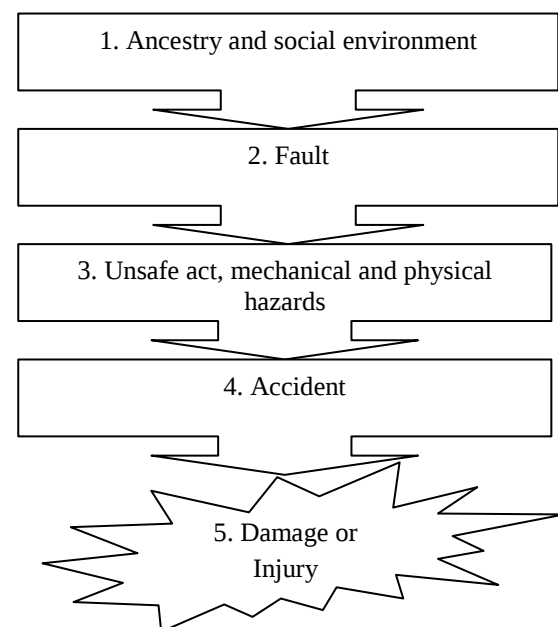
There are primary, secondary and tertiary approaches for preventing stress. “Primary prevention aims at eliminating or reducing the factors that lead to stress” ([www.bvsde.paho.org](http://www.bvsde.paho.org)). Secondary prevention is an approach designed to prevent workers who already

show signs of stress from becoming sick and to increase their coping capacity. Tertiary prevention is treatment directed towards employees who show high-stress reactions and includes rehabilitation after sickness.

Driver training could be instrumental in reducing stress and road traffic accidents. Most countries introduced a specialised training programme for commercial vehicle drivers, which they call defensive driving course, as a way of providing the necessary skills (Ansari et al 2010).

Heinrich (1931) argued that 88.0% of accidents are because of unsafe acts of people, 10.0% of the occurrences are because of dangerous road conditions and 2.0% by natural causes. He identified five factors in the accident sequence. Figure 3 shows the five elements.

**Figure 3: Five-factor accident sequence**



**Source: Heinrich (1931)**

According to Heinrich (1931), the removal of one factor would interrupt the accident sequence and prevent an accident. Understanding and application of the theory could help in the reduction of road traffic accidents. It is not essential to remove only element, but there should be attempts to eliminate as many causes as possible. These factors include occupational stress.

## Conclusions

This research showed that being a bus driver is a high-risk occupation, with conflicting tasks. Hostile relations with stakeholders like police and passengers also cause occupational stress.

A positive correlation between occupational stress and road accidents exists. Most accidents occur because of human error. The pressure of work largely causes human errors. Commercial drivers are prone to stress, which results in a lack of concentration.

Strategies for reducing occupational stress include driver training. A well-trained driver has a high level of understanding.

### Recommendations

This research suggests that there is need to ensure that drivers do not work excessive hours. It is also vital to train drivers, especially in public relation skills so that they can interact with stakeholders effectively.

There is a need to provide resources towards the reduction of occupational stress. Once there is a reduction in occupational stress, accidents also decline.

### Suggestions for further research

Every accident has a human element in it. Accordingly, there is a need for commercial transport companies to implement effective human resources management strategies. Therefore, the researcher recommends further study on how transportation companies should manage human resources.

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*Dr Jerera has remained an advocate of good corporate governance as a principle-centred leader. This was his area of research for his PhD studies.*

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# YOUTH COUNSELING

Lau Hok Wan\*

The complete version of this summarised article is available at:  
<http://www.stclements.edu/Articles/Youth-Counseling.pdf>

*This is an English extract from a book published for the St Clements University Doctor of Letters degree program.*

## The Client of Counseling

In the twenty-first century, adolescents are in a state of confusion and vacancy, and there have been new terms that have not described young people in the past, such as "hidden youth"; social transformation, from financial system to knowledge-based economy, the formation of the collapse of the family organization, the educational reform of the repeated uncertainty, the pursuit of materialism, increased the young people on the road of confusion. On the other hand, adolescents also have a lot of tasks in their growth. Adolescent development and physical changes; academic adaptation and competition; the establishment of self-image, to maintain self-confidence and self-esteem; in the group to seek identity, without loss of self; to maintain communication with their parents and strive for greater autonomy. Learning to make decisions and bear the responsibility. From the external or internal factors, the problems encountered by young people in growth cannot be ignored; how to train young people to help them continue to grow in the church, become an important mission and topic of the church today-young people's counseling work. The need to understand every aspect of the "young people", counseling work, such as to have a good idea about the "personality" and "cognitive" development of the client is good for the treatment. Because of different times, there are different challenges this section describes the various types of "adolescents" in order to make it possible for the reader to know "adolescents". This section describes the various aspects of "adolescents".

## Counseling Practice

The coach is not a unique or new thing, but the author will keep it, will coach the characterization, the coach model to improve and innovate, to create a personal advocate coach mode; if we aware and care about the things around us, then we can easily find the way how people improve their life. The theory of coaching in society, mostly based on the basis of psychology; early theology and psychology stand against each other, although it has been greatly improved, it is difficult to blend the two, the coach theory is based on theology and positive Psychology, the combination of life and faith, learning "life in faith, faith in life". If we find the main point and try to do, this has a chance of success. In the church everyone is trained to become a listener.

The leaders of the teenagers have to listen to them or their ideas. They make use of "looking for information", "factual", "understand feelings" and "future plans" to grow with others. Above all, listening is the most important. Appropriate listening can lead the peer to reach the point of change and even walk into the correct direction of life. Still there should have action for all the breakthrough point of life. When the truth is put into action, people will gain the opportunity to grow and solve the current problem. On the contrary, failed to act, there will be no opportunities. We must have action in life. Less waiting; let God involved in the action of life, also let His will be done. Failed to complete the action could lead to slow improvement; but if there is no action, life is always standing still.

## The Case Study of Life Coaching

One important quality of the coach is that, he must be fully engaged, seeing their world from the perspective of his client. This model attaches great importance to the empathy, respect, listen, sincere, etc. There is a key influence of the coach personality traits, values, beliefs in the counseling process. The coach himself should have enough life experience in order to understand the difficulties faced by his client. Throughout the process of coaching, it is the interaction and reveal of lives. This belief established the work of the coaching process which builds up the relationship between each other. The role of the coach is to fill up the gap between the church and its congregation. Due to the lack of professional training, the pace of life sits still. After being equipped, the coach can serve different lives and help people to understand the love and calling of God, and the acceptance of God. In the following, three examples are quoted to help the readers to understand more about the coach's work, understand how the coach to play positive energy. Helping the reader to have reflection on life. Before starting the work of a coach, we should have correct concept. A coach may easily fall into the "savior affection", if coupled with "coach professional" ideology, that they become "Savior"; it's of no help for the coaching work, but to increase the sense of frustration. The three examples help readers to understand that we should be sincere, to be positive and have expectations. At the same time, the example of the coaching work provides very good information about coaching work. The steps of the coaching work are also very organized, according to different stages and structure, the mode of coaching is clearly provided, each stage are explained in detail, the use of a shallow words, so that readers

can easily understand the content, so that readers can grasp the focus of them; coaching model using a comprehensive combination of different technologies, focusing on interpersonal relationships and problem solving. It is mainly based on 'Client-centered' theory. The work of the coaching is an art, it is also a science. Science can be developed into a structure of the coaching system. Every coach has his personal style. Each one of them has a different point of view. It is being hoped that the coach's work to become a science, while at the same time also become an art, having a context to follow, and yet having personal style.

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# FREE RADICAL POLYMERIZATION IN POLYMER DEVELOPMENT

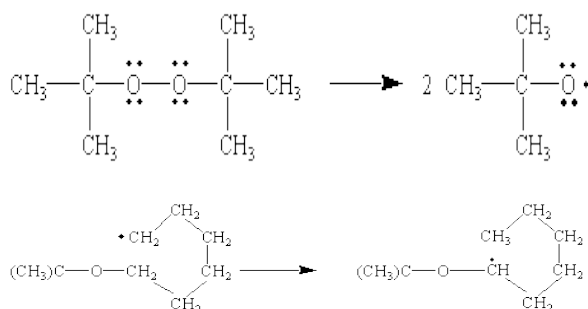
Dr Bertram Barnswell\*

## Introduction

It isn't difficult to form addition polymers from monomers containing C=C double bonds; many of these compounds polymerize spontaneously unless polymerization is actively inhibited. One of the problems with early techniques for refining gasoline, for example, was the polymerization of alkene components when the gasoline was stored. Even with modern gasoline, deposits of "gunk" can form when a car or motorcycle is stored for extended periods of time without draining the carburetors.

The simplest way to catalyze the polymerization reaction that leads to an addition polymer is to add a source of a **free radical** to the monomer. The term *free radical* is used to describe a family of very reactive, short-lived components of a reaction that contain one or more unpaired electrons. In the presence of a free radical, addition polymers form by a chain-reaction mechanism that contains chain-initiation, chain-propagation, and chain-termination steps.

A source of free radicals is needed to initiate the chain reaction. These free radicals are usually produced by decomposing peroxide such as di-*tert*-butyl peroxide or benzoyl peroxide, shown below. In the presence of either heat or light, these peroxides decompose to form a pair of free radicals that contain an unpaired electron.



## Chain Propagation (Figure 1)

The free radical produced in the chain-initiation step adds to an alkene to form a new free radical.

The product of this reaction can then add additional monomers in a chain reaction.

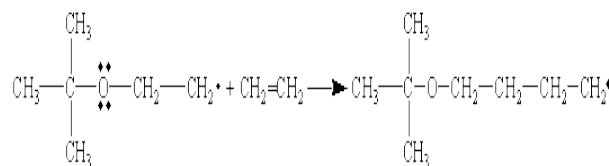


Figure 2: Chain Termination *k*

Whenever pairs of radicals combine to form a covalent bond, the chain reactions carried by these radicals are terminated.

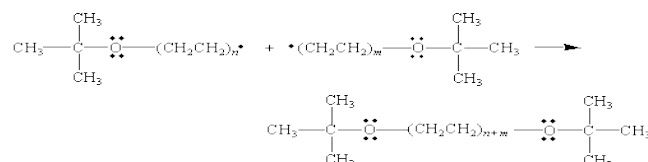


Figure 3: The Formation of Branched Polymers

At first glance we might expect the product of the free-radical polymerization of ethylene to be a straight-chain polymer. As the chain grows, however, it begins to fold back on itself. This allows an *intramolecular* reaction to occur in which the site at which polymerization occurs is transferred from the end of the chain to a carbon atom along the backbone.

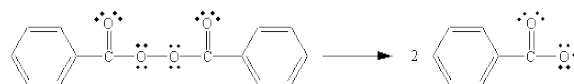


Figure 4

When this happens, branches are introduced onto the polymer chain. Free-radical polymerization of ethylene produces a polymer that contains branches on between 1 and 5% of the carbon atoms. Of these branches, 10% contain two carbon atoms, 50% contain four carbon atoms, and 40% are longer side chains. Fig 5

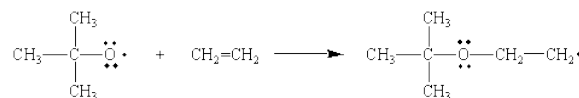


Figure 5

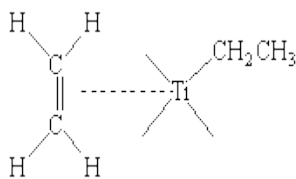
## Coordination Polymerization

In 1963 Karl Ziegler and Giulio Natta received the Nobel Prize in chemistry for their discovery of coordination compound catalysts for addition polymerization reactions. These **Ziegler-Natta catalysts** provide the opportunity to control both the linearity and tacticity of the polymer.

Free-radical polymerization of ethylene produces a low-density, branched polymer with side chains of one to five carbon atoms on up to 3% of the atoms along the polymer chain. Ziegler-Natta catalysts produce a more linear polymer, which is more rigid, with a higher density and a higher tensile strength. Polypropylene produced by free-radical reactions, for example, is a soft, rubbery, atactic polymer with no commercial value. Ziegler-Natta catalysts provide an isotactic polypropylene, which is harder, tougher, and more crystalline.

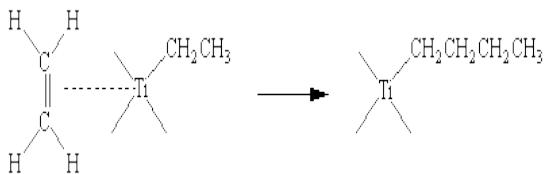
A typical Ziegler-Natta catalyst can be produced by mixing solutions of titanium (IV) chloride ( $\text{TiCl}_4$ ) and triethylaluminum [ $\text{Al}(\text{CH}_2\text{CH}_3)_3$ ] dissolved in a hydrocarbon solvent from which both oxygen and water have been rigorously excluded. The product of this reaction is an insoluble olive-colored complex in which the titanium has been reduced to the Ti(III) oxidation state.

The catalyst formed in this reaction can be described as *coordinationally unsaturated* because there is an open coordination site on the titanium atom. This allows an alkene to act as a Lewis base toward the titanium atom, donating a pair of electrons to form a transition-metal complex.



**Figure 6**

The alkene is then inserted into a  $\text{Ti-CH}_2\text{CH}_3$  bond to form a growing polymer chain and a site at which another alkene can bond.



**Figure 7**

Thus, the titanium atom provides a template on which a linear polymer with carefully controlled stereochemistry can grow.

## The Long and the Short of Acrylate Polymerization

Used in such diverse applications as adhesives, detergents, and super-absorbent disposable diapers, polyacrylates are key polymers, but the mechanisms of their formation are complex and have long been incompletely understood. Understanding how polyacrylates form brings opportunities to better control their molecular structure and hence their properties and recent research has been enlightening. Leading the field is an international group coordinated by Pete Lovell from the University of Manchester, UK.

In a new paper to appear in a *Macromolecular Rapid Communications* special issue devoted to highlights of the recent revolution in acrylate research, this group explains the relationship between the type of reaction used to polymerize the acrylate monomers and the resultant polymer structure.

There are two broad approaches used in the polymerization of acrylate monomers: the traditional free-radical polymerizations and the more recently developed controlled radical polymerizations (CRPs).

The traditional approach allows for little control of skeletal architecture, while the array of newer “controlled” techniques (also called living free-radical polymerizations) facilitates architectural control. What happens at the active end of the growing polymer chain is the main differentiating factor. In the traditional approach when one active chain end encounters another, both are likely to die, killing chain growth. In the controlled techniques, the chain ends are repeatedly activated and deactivated though the growth cycle, resulting in continuous growth with fewer dead chains, a more uniform product, and an ability to extend chains using different monomers.

Pete Lovell and Frank Heatley in Manchester have developed in recent years a very thorough understanding of the free-radical polymerization of n-butyl acrylate (which produces soft, rubbery poly(n-butyl acrylate), known as PBA). They revealed PBA has a significantly branched structure, which influences its end-use properties significantly, and were able to explain the chemistry behind this. When they analyzed PBA prepared using a CRP technique called atom-transfer radical polymerization by Kris Matyjaszewski’s group at Carnegie Mellon University, USA, they discovered it was much less branched. Curious, they then analyzed PBA prepared using other CRP techniques by other specialist groups led by Bert Klumperman (South Africa), Bernadette Charleux (France), and Brian Hawke (Australia), and found branching to be reduced, no matter which CRP technique was used. A generic result - what a boon for scientists!

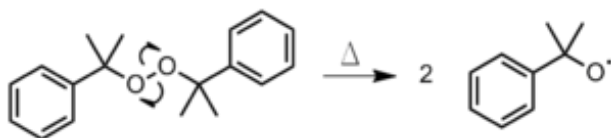
As Pete Lovell explains, “the challenge then was to find a common explanation, which took considerable time through discussions when opportunities arose, mainly at conferences. Many possibilities were considered and eliminated until the effect of differences in the distribution of active chain lengths was seeded by Dominik Konkolewicz in the Australian group.” The key was the role that highly reactive short chains play in CRPs; their presence increases the amount of branching in the final polymer, but in CPRs they are only present early in the reaction.

## Initiation

Initiation is the first step of the polymerization process. During initiation, an active center is created from which a polymer chain is generated. Not all monomers are susceptible to all types of initiators. Radical initiation works best on the carbon-carbon double bond of vinyl monomers and the carbon-oxygen double bond in aldehydes and ketones. Initiation has two steps. In the first step, one or two radicals are created from the initiating molecules. In the second step, radicals are transferred from the initiator molecules to the monomer units present. Several choices are available for these initiators.

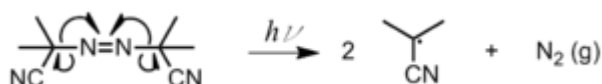
### Types of initiation and the initiators

1. **Thermal decomposition:** The initiator is heated until a bond is homolytically cleaved, producing two radicals. This method is used most often with organic peroxides or azo compounds.



**Figure 8:** Thermal decomposition of dicumyl peroxide.

2. **Photolysis:** Radiation cleaves a bond homolytically, producing two radicals (Figure 9). This method is used most often with metal iodides, metal alkyls, and azo compounds.



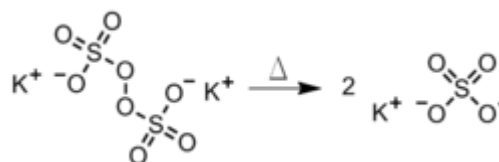
**Figure 9:** Photolysis of azoisobutyronitrile (AIBN).

3. **Redox reactions:** Reduction of hydrogen peroxide or an alkyl hydrogen peroxide by iron (Figure 10). Other reductants such as  $\text{Cr}^{2+}$ ,  $\text{V}^{2+}$ ,  $\text{Ti}^{3+}$ ,  $\text{Co}^{2+}$ , and  $\text{Cu}^+$  can be employed in place of ferrous ion in many instances.



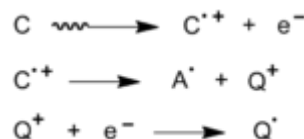
**Figure 10:** Redox reaction of hydrogen peroxide and iron.

4. **Persulfates:** The dissociation of a persulfate in the aqueous phase (Figure 11). This method is useful in emulsion polymerizations in which the radical diffuses into a hydrophobic monomer-containing droplet.



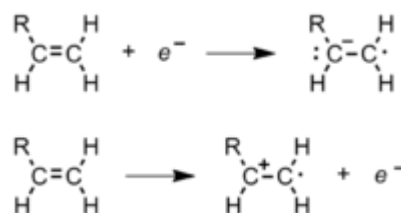
**Figure 11:** Thermal degradation of a persulfate.

5. **Ionizing radiation:**  $\alpha$ -,  $\beta$ -,  $\gamma$ -, or x-rays cause ejection of an electron from the initiating species, followed by dissociation and electron capture to produce a radical (Figure 12).



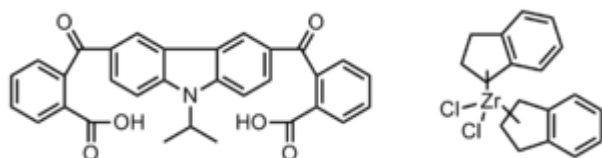
**Figure 12:** The three steps involved in ionizing radiation: ejection, dissociation, and electron-capture.

6. **Electrochemical:** Electrolysis of a solution containing both monomer and electrolyte. A monomer molecule will receive an electron at the cathode to become a radical anion, and a monomer molecule will give up an electron at the anode to form a radical cation (Figure 13). The radical ions then initiate free radical (and/or ionic) polymerization. This type of initiation is especially useful for coating metal surfaces with polymer films.



**Figure 13:** (Top) Formation of radical anion at the cathode; (bottom) formation of radical cation at the anode.

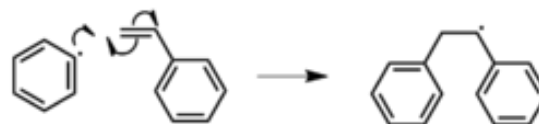
7. **Plasma:** A gaseous monomer is placed in an electric discharge at low pressures under conditions where a plasma (ionized gaseous molecules) is created. In some cases, the system is heated and/or placed in a radiofrequency field to assist in creating the plasma.
8. **Sonication:** High-intensity ultrasound at frequencies beyond the range of human hearing (16 kHz) can be applied to a monomer. Initiation results from the effects of cavitation (the formation and collapse of cavities in the liquid). The collapse of the cavities generates very high local temperatures and pressures. This results in the formation of excited electronic states which in turn lead to bond breakage and radical formation.
9. **Ternary Initiators:** A ternary initiator is the combination of several types of initiators into one initiating system. The types of initiators are chosen based on the properties they are known to induce in the polymers they produce. For example, poly(methyl methacrylate) has been synthesized by the ternary system benzoyl peroxide-3,6-bis(o-carboxybenzoyl)-*N*-isopropylcarbazole-di- $\eta^5$ -indenylzirconium dichloride (Figure 14).



**Figure 14:** benzoyl peroxide-3,6-bis(o-carboxybenzoyl)-*N*-isopropylcarbazole-di- $\eta^5$ -indenylzirconium dichloride

## Propagation

During polymerization, a polymer spends most of its time in increasing its chain length, or propagating. After the radical initiator is formed, it attacks a monomer (Figure 15). In an ethene monomer, one electron pair is held securely between the two carbons in a sigma bond. The other is more loosely held in a pi bond. The free radical uses one electron from the pi bond to form a more stable bond with the carbon atom. The other electron returns to the second carbon atom, turning the whole molecule into another radical. This begins the polymer chain. Figure 15 shows how the orbitals of an ethylene monomer interact with a radical initiator.



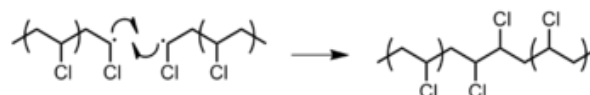
**Figure 15:** Phenyl initiator from benzoyl peroxide (BPO) attacks a styrene molecule to start the polymer chain.

## Termination

Chain termination will occur unless the reaction is completely free of contaminants. In this case, the polymerization is considered to be a living polymerization because propagation can continue if more monomer is added to the reaction. Living polymerizations are most common in ionic polymerization, however, due to the high reactivity of radicals. Termination can occur by several different mechanisms. If longer chains are desired, the initiator concentration should be kept low; otherwise, many shorter chains will result.

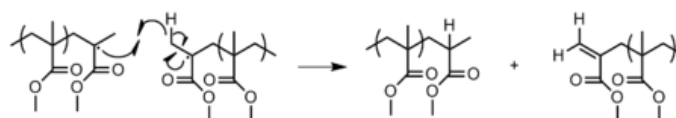
Combination of two active chain ends: one or both of the following processes may occur.

- **Combination:** Two chains end simply couple together to form one long chain (Figure 16). One can determine if this mode of termination is occurring by monitoring the molecular weight of the propagating species: combination will result in doubling of molecular weight. Also, combination will result in a polymer that is  $C_2$  symmetric about the point of the combination.



**Figure 16:** Termination by the combination of two poly(vinyl chloride) (PVC) polymers.

**Radical disproportionation:** a hydrogen atom from one chain end is abstracted to another, producing a polymer with a terminal unsaturated group and a polymer with a terminal saturated group (Figure 17).

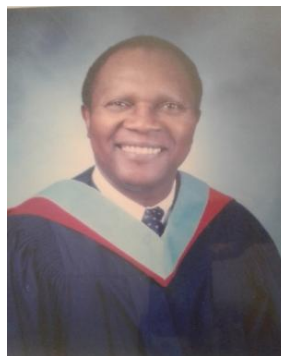


**Figure 17:** Termination by disproportionation of poly (methyl methacrylate).

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# THE REALITY OF AN EVANGELICAL WORLDVIEW

Dr Billy Sichone\*

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When a person becomes a Christian, many things change including their perception, perspectives and response to the world around them. The things that once charmed them suddenly or progressively lose their grip upon them. They instead pick up new habits, tastes and desires. Their longing becomes that of Christ, and him alone where egocentrism had previously been at the centre (Peace 2002).

However, there is an increasing number of people disputing these claims and instead assert that the convert may not necessarily fit into that 'box' or frame described above. This school of thought claims that individual reactions and responses depend on hind orientation, socialization and upbringing. Nothing really changes apart from an intellectual assent, so they say. These (i.e. hind orientation, socialization etc.), they claim, shapes ones' world view which even Religious faith cannot erase or substitute. It may further be said (i.e. so this school of thought states) that the acquired underlying world view explains why people react the way they do in given contexts, say an African setting foot for the first time in the heart of a major global metropolitan mega city or vice versa. Reactions will depend on hind exposure. Other schools of thought dismiss this claim instead pointing to a combination of other factors beyond socialization as being at play. Still others assert that people make the choices of their own volition independent of any external influences or factors. And so, we are at multiple cross roads as to who is right, the scriptures, interpretation, the Natural or the Social Scientist?

In this paper, we do not attempt to do a comparative study or even prove which one of the pundits is right but we pursue one view and make a case for the reality of a given world view. Our interest is whether a Biblical world view<sup>1</sup> actually exists or not. Can we know epistemologically and metaphysically whether such a world view exists? In the process, we occasionally refer to some recent thoughts on this matter from a Biblical point of standpoint. Further, it may be asked, does one's world view matter or affect their attitudes and achievements in life? Though we may not delve deeply in the latter consideration, we make passing comments. Obviously, the matters we are interacting with are Philosophical in nature and origin. Thus, according to and in agreement with Poythress (2014), Ethics, Epistemology and Metaphysics repeatedly interact as a result.

## World View

When we talk about world view, we are basically referring to the foundations and premises that inform, undergird or affect the person's perceptions, desires and reactions. The Dictionary of Philosophy and Religion (n.d), defines 'world view' as being derived from two German words 'Weltan' (world) and 'schauungen' (view) which denotes or carries the idea of perception, framework of reference, beliefs through which an individual interprets or interacts with the world. Thus, it is the sum total of underlying mental structures that dictate or influence the persons' perceptions or attitudes to what they encounter around them. In short, that is their reaction or response to what is. What one considers as good, acceptable correct or allowable arises from what is inherently in them. What has been dubbed as "*normal*" and good will be what one inherently carries around as such, reacting to various events, occurrences or once they encounter something that is unfamiliar or classified as 'incorrect' in their ethnocentric perception, people act consistent with what they know. Basically, the hind programming, baggage, socialization, orientation and exposure is what will be dubbed 'normative'. Furthermore, in due time (especially if they are born and bred in that particular context) when one is in a context that perceives certain practices, customs, rituals or ideas in a particular way, whether positively or not, they eventually tend to adapt those views as normal hardly startling, thereby internalising them as important which then informs values, customs, culture, attitudes and practices. What has just been described is from a Sociological and Psychological perspective that many postmodern minds hold or affirm. Clearly and evidently, this kind of reasoning resonates with the naturalistic, rationalistic and evolutionary approach to life. It may be said that this kind of reasoning explains why no two people are exactly the same, worse if they have been raised in different contexts and cultures. With the advent of Postmodernism, which itself is a strong driver of flexible, fluid thinking, whether in Academia or Public life (Craig 1994), absolutist views are increasingly giving way to relativity. What may be right, correct or true to you may not necessarily be my cup of Tea and you need to give me some space.

But then, there is another view that asserts that while hind orientation is responsible for the formation of our initial world view, perceptions and values, a person that converts to the Christian faith experiences an inward transformation dubbed as 'regeneration'<sup>2</sup> where

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<sup>1</sup> Or 'Evangelical World View'

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<sup>2</sup> Titus 3:5-7; John 3:3-8

the inner being is radically made alive to spiritual realities that they previously may have had casual acquaintance with but without real living connection. This instantaneous transformation is so real and thorough affecting the will, mind and attitude of a person. The subject outwardly essentially remains the same in the faculties of the mind and physical appearance but the inner being<sup>3</sup> has been altered by the Spirit of God. Some Social Scientists may call this a subjective experience that defies testing or verification (and thus untrue) but the subject can attest to a real inward change. The evidences abound including the alteration of tastes, ethical perspectives, values and preferences, in short, metaphysical and epistemological views (Peace 2002). The vices<sup>4</sup> that once appeared trivial and at times 'normal' practice or socially acceptable suddenly begin to be viewed in a new light. The subject begins to ask pertinent questions leading to altered behaviour as people around notice the changes. This obviously generates problems for them in some contexts because the subject seems to be operating by a different rule book. Further, as the person grows, their pulse and heart beat increasingly inclines towards what God would desire. This is the basic foundation of an evangelical world view. The radical changes that take place from the inside out are not from social action or education let alone exposure but by some divine intervention far beyond making several pronouncements or claims.

The views posited above kind of give two broad categories of world views that host several sub-world views including atheism, agnosticism, syncretism, pantheism, animism, materialism among others (Evans, n.d; Dockery & Hornbury, 2002; Blaschke, 2004). This paper does not delve into the specific views but aims to address questions around the reality of an Evangelical or Biblical world view, whether it exists or not, imaginary, imposed or not.

From the outset, it must be stated that everyone, regardless of race, status, creed or learning has some form of world view (Dockery & Hornbury, 2002). This world view is often betrayed when particular moments come to the fore such as crisis moments. In those times, one's core world views come to the fore. If one is an animist for instance, when a tragic event occurs in their lives, they instinctively attribute it to some supernatural ancestral cause. What results are ritualistic activities of ancestral appeasement of some sort (Blaschke, 2004; Welford, 1999). Alternatively, if one is a naturalist, they try to explain away things believing that random events can and do happen to anyone at any time. Still another will attribute everything solely to a deity as the source causing of all things out of human control. Such believe in fate. The point is, all have a

world view of sorts but what differs is what the slant is and what undergirds it.

As for whether an Evangelical world view exists, people are divided (Evans n.d; Geisler N.L. 2008). Some reject the idea of an Evangelical or Biblical world view as explained from the idea that the Biblical Metanarrative<sup>5</sup> should shape the way people think or behave. They argue that God interacts with His people in different ways<sup>6</sup> and thus the situations may not be the same. What happened in the Old Testament times may not have a direct bearing on our lives today because God was dealing with the remote people in a particular context way back in the past in the land of Palestine. Thus, it is absurd to impose ideas from that far flung by gone era. Equally, the same thought runs through the New Testament era. This school of thought argues that what happened in the Hellenistic context cannot be 'cut and pasted' to the present era. For instance, what Paul instructs in Romans 13 about people submitting to civic or political authorities regardless may not hold in the Democratic dispensation of the 21<sup>st</sup> Century. People have a right to choose their leaders unlike in the past and will do so as they freely determine (Brennan & Lomasky, 1997). To remain silent would be to assent to all sorts of injustices passing unchallenged. The religious person then must act as the 'times and existing laws' demand (Evans n.d). This kind of thinking sits well with the post modernistic thought that has now taken centre stage in the world.

### **The Biblical warrant of World view internalization necessity**

But then when one meticulously examines scripture, it suggests that a Christian is a transformed person that needs to continuously grow (Colossians 2:6). They are born again into a spiritual family in regeneration and must now feed on pure spiritual milk so that in time they conform to become more like Christ. Right across scripture, the idea of internalising, memorizing, yea, knowing God's word letting it shape and affect how one thinks or acts is evident. For instance, Joshua<sup>7</sup> is told not only to meticulously read but meditate on and never depart from the word of God. Next, we see in

<sup>5</sup> This is alternatively referred to as the 'Grand narrative' of the Bible by others. It basically refers to the overarching story or story line (in this case about God) in the Scriptures right across from Genesis to Revelation and includes the Creation, Fall Redemption story. This narrative gives context to meaning. In modern times, Jean-François Lyotard in his 1979 book *The Postmodern Condition: A Report on Knowledge*, first brought this idea to prominence though the Bible has always talked about this idea all the while.(knowingthebible.net, gotquestions.org)

<sup>6</sup> In varied historical epochs

<sup>7</sup> Joshua 1:8

<sup>3</sup> Or to use a current computing language term 'software'

<sup>4</sup> Or sinful habits

Deuteronomy 6:1-9, the Israelites are instructed to ponder upon the word, let it soak in and always remember it. In Ezra, 2 Kings 22 and the Psalms, the word of God has such a special place, much sweeter than honey. The child of God is to yearn, pant for and feed upon every word from God. As we transition to the New Testament, Jesus echoes the importance of the scripture as do the Epistles where is mentioned the need for the word of God to dwell in believers richly with its attendant effects-singing, melody, gladness and praise to God. Thus, there is a whole host of scriptures to support the idea that the word of God, the scriptures are to be internalised for a good purpose, so that the convert develops a mindset premised on the word of God.

Further, it may be argued that it is not enough just to have the correct ‘facts’ and know all the technical bits written in the Biblical Metanarrative<sup>8</sup>, this word must lead to some thing. The first is that it should lead to God, nourish the inner being, transform or edify the person leading to an inward disposition that is God like. The person never becomes divine at all but they do begin to view and ‘think the thoughts of God after Him’ as some writers have asserted. Although people may not become completely saturated by God, they will relish God’s word and thus interpret the world in a manner worthy of God. In addition, this word ingestion should lead to information, transformation and supplanting incorrect aspects of an earlier world view if it is not in conformity with God’s word. We need to tread most carefully here lest we are misunderstood to advocate for or suggest brain washing, indoctrination or rejecting ones’ indigenous culture, not at all. What we do mean to say is that the Biblical Metanarrative now begins to inform decision making by asking key questions, and in some cases altering values leading to an evangelical world view. Does this mean that a person needs more than saving faith to become a child of God? Not at all. It means that after regeneration, a person begins to grow in Christ by synergistically growing in their new found faith. A key passage that supports the idea of an evangelical world view is found in Romans 12:1-3. The passage explicitly posits the idea that converted people need to be further transformed in sanctification. They are not to remain the same but make every effort to change God-ward, submitting to His will in hearty obedience and gratitude. Converts are to view the whole of life as worship to God discarding the false dichotomies of the “Spiritual” and “Secular” that often bugs many. They are to view things in the Biblical Metanarrative prism or lenses. This transformed inward disposition has off shoots.

From the foregoing, we can safely assert that when a person is regenerated, an evangelical world view must be adopted. The transformative power of regeneration includes a renovation values from the default to one that is inclined to what God desires. This

transformation does take time but the subject takes responsibility to synergistically apply themselves with the aid and influence of the Holy Spirit. This is important to assert because a renewing of the mind is crucial to correct practice, discernment and maturity. If one does not mature, they remain the same and bound to repeat the same errors. Further, they are likely not to rise above the ordinary mundane things of life that drag or keep people down. For instance, what explains why some Developed nations have materially prospered and transitioned to the level they have, at least historically? Why have some contexts lagged behind? One suggestion could be that they once experienced a large scale deeper transformative power of their world view away from superstition, dread, tyranny and other vices that are ‘normal’ and common to a world view that does not use the evangelical lenses. While we do not agree with wholesome blanket claims that under developed contexts are wholesomely primitive, pagan and therefore devilish or entirely wrong in thinking (Boys, 2018), we think the correct mindset emanating from right perceptions, values, customs, culture among others are essential to all kinds of development. Without this, the contexts keep falling into the same pitfalls such as uncontrolled debt acquisition, wrong ethical practice, corruption, crime or wastage among others. On the flip side, consider contexts where a genuine evangelical world view (and not merely humanistic world-view) has been deeply at work (past or present), despite all its many limitations or faults, true effectual changes in about every fiber of life has been massively observed (Hill, 2002). A thorough, deep and genuine change towards a Biblical Metanarrative premised on the scriptural principles of hard work, obedience, action, justice, inquiry and consistent self-application has lasting positive results. The Developed North (i.e. western world) is presently largely Post-Christian (Hulse 1993) in outlook but it thrives based on the principles laid by their forefathers<sup>9</sup>. We have the Reformation and its effects in mind here. These contexts may have hurled away the theistic world view of the past but retained the sound Evangelical principles that universally apply to all aspects of human endeavor such as hard work, inquiry, innovation, creativity, desire to grow to maturity and intellectual honesty among others. However, where this ‘transformation’ is only “skin deep”, people may major in the non-essentials with attendant defective ethical practice. Where a skin deep adoption has been the norm where the underlying default world view unaffected by God’s word, cosmetic changes have resulted which are easily erased with the winds of time, dynamic culture and the current flux premised on pluralistic, naturalistic, humanistic, evolutionary wheels. That partly explains why some contexts remain underdeveloped despite being highly educated (regardless of the “educated” numbers), exposed or even religious (Welford 1999; Blaschke 2004).

<sup>8</sup> Or ‘Grand theme’ or ‘story line’ of the Bible. We say a bit more on this later.

<sup>9</sup> Sichone (2017), The abiding impact of the Reformation

We have made the case that a correct Evangelical world view is essential to development. James Orr asserts that it is indeed a reality. Without it, not much could be achieved. People will not be as daring, willing or desire to think outside the box. God has given humans His beautiful creation and all things to enjoy. Every aspect of our lives is worship to His and His glory. The person with the correct world view will therefore apply themselves because they have a higher master beyond humans to whom they submit. Those that still harbor the imaginary dichotomy most likely have not grasped the Bible's message of imbibing a Biblical Metanarrative. That changes things in more ways than one. We may further state that if individuals with the instruments of power, buttressed by correct just structures or laws, meaningful development both at the individual and national level will result (Hill, 2002; Lloyd-Jones M, 1989; Shaw 1988). Without this correct noetic/clear thinking structure, it is doubtful meaningful progress will come soon, if at all.

## Conclusion

We have made the case that an evangelical world view is not only essential for development but a reality. Couched in a Biblical Metanarrative and theistic epistemology, contexts that have historically imbibed an evangelical world view have not only witnessed heightened consistent productivity but ethical all-pervasive and long lasting social transformations into the future. A correct world view matters for ethical progress. Where the Evangelical world view has been spurned, rejected or trifled with, vices common to humans remain to bug nations or individuals keeping them trapped in the unjust poverty snare, paupers to the grave.

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## About the Author



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# 21<sup>ST</sup>-CENTURY UNITED KINGDOM UNIVERSITIES - TIME TO CHANGE

Professor Dr Bruce R. Duncan\*

Dr Pathak's article, "Through a Vortex of Doom and Gloom"<sup>1</sup>, despite its unfortunate generalisations, debateable characterisations, and assumptive comments, merits consideration.

Consequently, this essay advocates for the removal of the historical hegemony of British universities by the UK government, questions the marketing ethics of university rankings tables, highlights the disadvantages of the lecturer versus teacher conundrum, and laments the greedy hijacking of education by those who only seek to milk captive cash cows. In so doing, the writer suggests that the concept of the Big Society would radically improve (and benefit) the necessary restoration to democratic ownership of Britain's meaningful "Peoples' Jewel" viz. that higher education that has an equitable balance between *quality* learning and *quantitative* enrolment. Notwithstanding, this article could serve as a stepping stone to further research.

## Higher Education – a synopsis

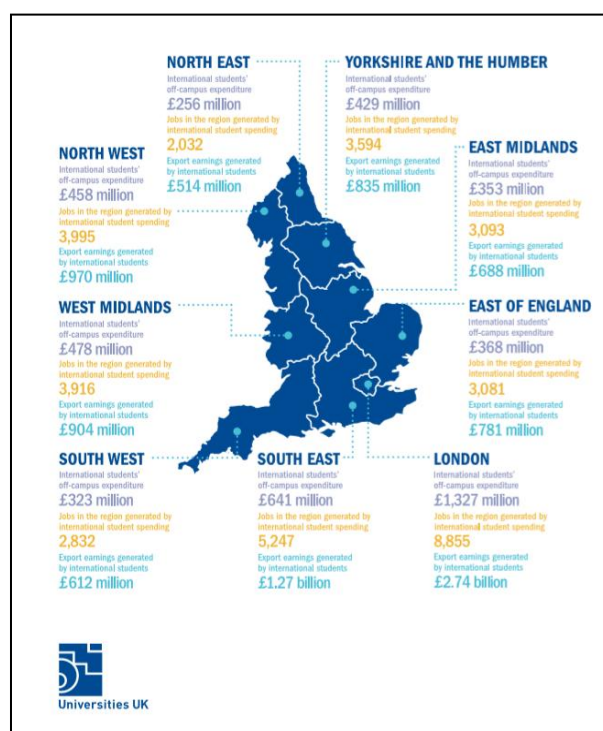
The indigenous oral practice and subsequent Roman diaspora's introduction of formal education into Britain (circa 43-410 CE), pre-dated the first Saxon-established cathedral schools that developed formal education in 597 and 604 (University of Reading, 2017). After that, the sons of the English Upper Class, enveloped by the robes of clerically taught knowledge, began to learn Latin. The subsequent, seminal founding of Oxford University - with evidence of teaching in 1096 (University of Oxford (n.d), was followed by the breakaway group's founding of Cambridge University in 1209<sup>2</sup>. The establishing of St Andrews University in Fife, Scotland followed in 1411 (British Universities Guide, 2018). By 2018, the number of government authorised UK universities<sup>3</sup> reached 162 (UUK, n.d).

## UK universities operate under British statute

The constitutional framework provides a legally structured assurance of state accredited third-party credibility checks, accountability, and operational transparency that formalises the academic and administrative sanctity of the state-approved educational arena. The provisions require:

- The consistency and comparability of arrangements across the whole of the UK
- External quality assessment is proportionate, risk-based and founded on effective institutional assurance arrangements
- That the sector maintains a shared and robust baseline of quality and
- The protection of students against transient, negligent and poor-quality providers

Map 1. UK Regions and the economic impact.



## Non-accredited universities

Understandably, the government's authorisation process feeds the arguments used against non-accredited<sup>4</sup> educational bodies (ibid, Pathak 2018). Arguably, some non-government sanctioned groups do callously prey on the vulnerability of individuals using degree-mill "marketing ploys" that, while receiving "fees", they also add to the cohort of dubiously qualified academic "graduates" (with certificates) under the perceived prestigious brand of "university". Sadly, such charlatan-energised practices discredit other credible non-traditional universities. The latter, in stark contrast, provide academic credibility,

<sup>1</sup> Veritas, March 2018.

<sup>2</sup> By scholars who left the University of Oxford after a dispute with the townspeople.

<sup>3</sup> Unaccredited universities are illegal in the UK.

<sup>4</sup> c.f. Pathak, Veritas, March 2018, page 3

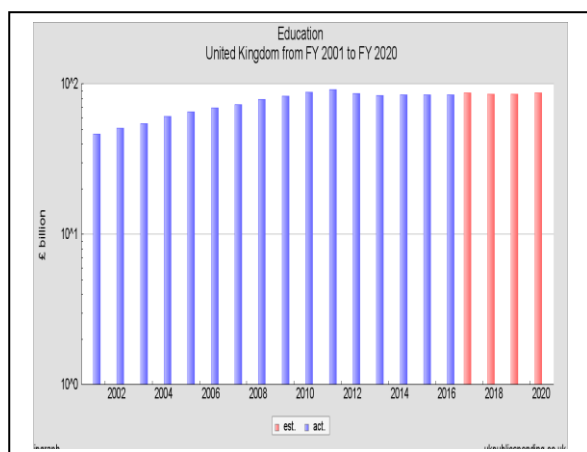
financial integrity, stakeholder accountability and qualitative instruction – however, their lack of external monitoring and their “close to the margin business model”, and lack of audited inspection invite justified suspicion and criticism.

Nevertheless, parliamentary accredited education is a monetised product/service across the United Kingdom, and the EU<sup>5</sup> and non-EU student influx illustrate the importance of Britain’s higher education market to the UK’s national GDP and export earnings.

### Universities – businesses

Importantly, the HE<sup>6</sup> sector operates as a business. It is not a benevolent, charitable and paternalistic benefactor. The income-producing source from the national and internationally sourced student market added to the UK’s cash income (UUK1, n.d.) by £34.7 billion (2015 – 2016). A strong brand justifiably commands a comparable price, but are the fees commensurate with the product?

Graph 2. Government Education Spending



#### Income for tuition fees and education contracts

- 2015/2016 = £16,811 millions
- 2016/2017 = £17,742 millions

#### Income for funding body grants

- 2015/2016 = £5,167 millions
- 2016/2017 = £5,106 millions

#### Income for research grants and contracts

- 2015/2016 = £5.886 millions
- 2016/2017 = £5.916 millions

#### Other income

- 2015/2016 = £6,045 millions
- 2016/2017 = £6,067 millions

#### Investment income

- 2015/2016 = £261 millions
- 2016/2017 = £254 millions

#### Donations and endowments income

- 2015/2016 = £578 millions
- 2016/2017 = £586 millions

In contrast to income, the **expenditure** for UK education **rose** across five areas.

\*Staffing costs: 2015/2016 = £18,406 millions

\*Staffing costs: 2016/2017 = £18,871 millions

\*\*Other operating expenses 2015/2016 = £12,125 millions

\*\*Other operating expenses 2016/2017 = £12,538 millions

\*\*\*Depreciation 2015/2016 = £2,074 millions

\*\*\*Depreciation 2016/2017 = £2,298 millions

\*\*\*\*Interest and other finance costs 2015/2016 = £749 millions

\*\*\*\*Interest and other finance costs, = £709 millions

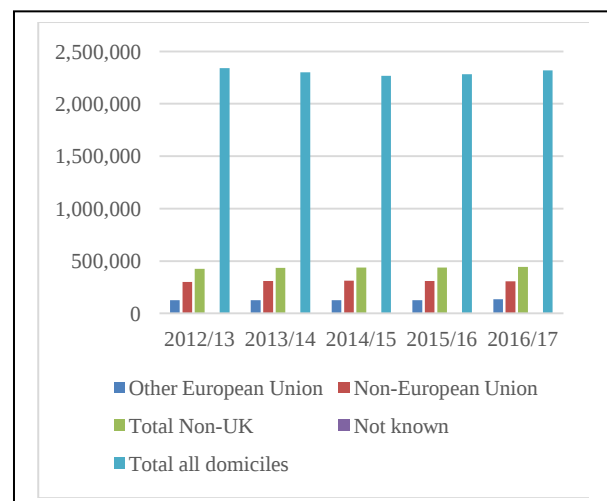
\*\*\*\*\*Fundamental restructuring costs = £61 millions

\*\*\*\*\*Fundamental restructuring costs = £79 millions

(Source: HESA, n.d)

### International Recruitment from Overseas

Graph 3. Non-UK Domicile (HESA1, 2018)

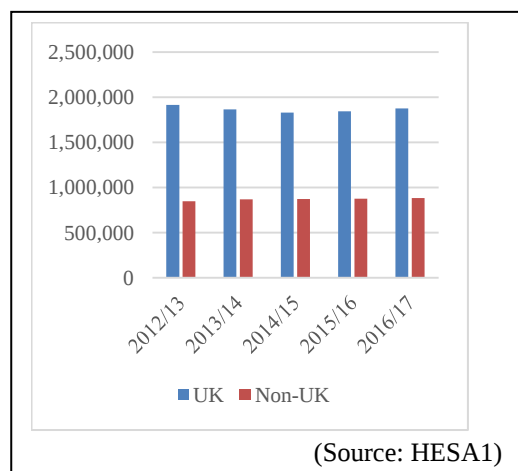


A comparison of UK against non-UK student admissions reveals interesting statistics for 2012 – 2017 (c.f. Graph 4). Ceteris paribus, international admissions remained fairly consistent despite stricter visa conditions. Consequently, the British Government must ensure the sustainability of its partly tax-payer funded Higher Education bodies. Notwithstanding, British Universities, despite the marketing hype, struggle because of its Achilles Heel impediment viz. its historic government hegemony of political tribalism that arguably skews educational objectivity.

<sup>5</sup> European Union

<sup>6</sup> Higher Education

Graph 4. Comparative Student Intake



### ***The Big Society – not government control***

While the writer agrees with both David Cameron and Angela Merkel that the multicultural enigma is an unworkable disaster (Euractive, 2018), the UK nevertheless has to bolster higher education within the humanistic confines of human rights to respect an evolving cultural shift. The Big Society concept could be a hallmark of a 21<sup>st</sup>-Century move away from the arthritic government control of HE. Community-led governance could provide culturally diverse inputs from the growing number of national traditions.

According to Scott (2010), the Big Society eschews much of Thatcherite individualism that denied the existence of “society” and created the phrase “civil society” that would allow community involvement in social enterprise only when the state failed in its duty. Well, sadly, the UK government has failed, and the revolving door input from vote-dependent, biased politicians is crippling higher education’s evolution. Similarly, Mettler (2014) draws attention to higher education in American and posits that the system is failing students because of polarising politics and plutocracy. Mann and Ornstein (2012), of the Brookings Institution, supportively comment on Mettler’s research noting that:

... severely dysfunctional politics has undermined one of the foundational pillars of the American Dream

However, David Cameron’s residence in Downing Street gave birth to his “adjustment” to Margaret Thatcher’s interpretative take on “society” - his Big Society and the re-emergence of community development viz. Equality and Anti-discrimination, Social Justice, Collective Action, Community Empowerment and Working and Learning Together (Jordan, Henry, McKerracher et al., 2012).

Nonetheless, Cameron’s dream was just that, and while the UK’s political demi-gods warm the Green Benches, and doze in the House of Lords, the control of HE

echoes the refrain, “as it was, in the beginning, is now and forever shall be”. Nonetheless, HE is a crucial part of community responsibility – not the capricious, whims and misfortunes of political chicanery.

Contrasting the current parliamentary control, the Big Society concept could have ownership of HE, could it not. Would non-partisan, federally structured community-representative bodies fairly meet the educational needs of the British social ethos (also fed from immigration, globalisation and internationalism) thereby assure the sustainability of the UK’s HE brand?

### ***Community empowerment and university rankings***

So, what could happen if the UK’s higher education bodies were part of a community empowered, federally structured, and reform-motivated collective? One reform could, for example, address university snobbery and the obsessive jostling for the best rankings – to focus on and serve a community. Readers may ask, “why worry about rankings?” Alarming facts loom in the dusty pages of research.

For example, Aziz (2017), draws attention to the notorious ranking tables and argues that gradings are inherently biased. Inevitably, “everything that can be ranked might bias the way we perceive certain things” (Ibid, Aziz, 2017). Perhaps, the greatest problem with rankings is that “each covers different areas and approaches, which, perhaps means there is no [single] authoritative source of information (Ibid, Aziz, 2017). Where does the reliability and truth about rankings fit in?

The writer noted, with concern, the following anomalies (Aziz, 2017):

- Malaysia compares universities in four areas — research, teaching, employability and international outlook assessed against six indicators:
- Academic reputation based on a global survey of academics (40 percent)
- Employer reputation based on a global survey of graduate employers (10 percent)
- Faculty/student ratio (20 percent)
- Citations per faculty (20 percent)
- International student ratio (5 percent)
- International staff ratio (5 percent)

Contrastingly, Reuters focuses its key criterion:

- On universities that have an outsized impact on global research and development, compiled with data from the Intellectual Property & Science division of Thomson Reuters
- On academic papers that indicate basic research performed in universities and their interests in patent filings to protect and commercialise their discoveries

Alarmingly, however, do the women and men outside the traditionally garlanded walls of academia have evidence that the cited statistics are an accurate reflection of the process that led to the results? For example, the not uncommon practice of grade inflation<sup>7</sup> ripples across to that desired reputation sweetener that, like a bee to pollen, draws consumer enquiries resulting from [skewed?] rankings.

Do rankings illustrate creative advertising? Well, they fail to compare apples with apples, do they not! We might resurrect and de-contextualise the cynical comment of Ebenezer Scrooge, “Bah!” said Scrooge, “Humbug!” (Dickens, 1838).

So, why not endorse a Big Society business model that addresses the educational needs of students *outside* the arguably protected, cloistered, archaic link to “as it was in the beginning ...”?

The Universities Product Life Cycle graph is in decline. Fresh blood needs to flow through the veins of tertiary education viz: the innovative management of community-owned, modern, transforming community-owned management that will speed up, for example relevant online studies and offer value-based education that our unsettled British society needs? “We often ask what role Universities should play in the future? I think a better question is: What unique value do we see them providing in this new era ...” (Benjamin, 2018).

### ***Dumbing down, rankings and credibility***

In 2009, before “whistleblowers” apparently felt relatively safe, to tell the truth, Leeds University faced a grilling by MPs into allegations of “dumbing down in higher education”. While an external examiner had concluded that “the university's degree classification system was “perverse”, the information was never passed on to the Quality Assurance Agency (QAA). Did this place its rankings under the misleading advertising category?

The QAA only sees what management puts in front of it,” he told MPs as he gave evidence on behalf of the University and College Union on 6 May.

(Source: Newman, 2009)

### ***Academic responsibility and human greed***

In fairness, however, the chameleon-like arm of politics is not confined to the political entrepreneurs swirling around in British politics. For example, in 2017, the Canadian Ethics Commissioner’s criticism caused the country’s Education Minister, Gordon Dirks, to apologise that he had used his political clout to authorise modular classrooms for a school in his constituency – but had ignored others (Bennet, 2017).

Wardrop and Prince (2018) reported that Nick Clegg, the ex-Liberal Democrat Deputy Prime Minister (2010-2015) had seemingly used his office to win votes by promising to scrap university tuition fees, but had ...

... “not been able to deliver the policy that we held in opposition” after abandoning a pledge to scrap university fees altogether ... to allow institutions to charge up to £9,000 a year. Mr Clegg made his admission as student protesters outside Parliament waved placards accusing him of “conning” voters.

So, what if ... politicians stopped using education as a means to advance political objectives at the expense of student-voter trust? Why not let communities provide a more objective approach?

Notwithstanding, let us turn our attention to human needs.

### ***The bottom line, community, and performance management***

Recently, the unbridled pecuniary greed of some decision-makers shocked many stakeholders. The University and College Union discovered that 22 UK universities paid more than 100 staff over £100,000 per annum. A cited example of gravy train indulgence was that of the Bath University’s Chancellor who had earned almost £500,000 each year in salary and perks<sup>8</sup> before her timely resignation (Harding, 2017).

It is no surprise, therefore, that university education is costing more. So, what about cutting some fixed costs, managing variable expenses, paying salaries commensurate with the *quality* delivery of lectures by individuals who continue to grow in experience and academic prowess. Let the people innovate to save the People’s Jewel - a new way forward!

For example, would it not be educationally advantageous to demand that all teachers:

- Hold *updated* teaching qualifications
- Answer to quarterly peer and student assessments that include subject delivery and academic rigour
- Work on a business basis, where students (as fee payers) have the right to expect equitable service from those paid to teach (customer service)
- Function within a code of strict guidelines that define behaviour and penalties for crossing the line
- Is the Teaching Excellence Framework (TEF) - quality teaching allows a university to charge higher fees – flawed? (Addison, 2018)

<sup>7</sup> See Grade Inflation, page 4.

<sup>8</sup> Including First Class airfares.

Consider, for example, that the undergraduates at Coventry University, “evaluate their lecturers’ performance mid-module, with staff given five days to produce an action plan showing how they intend to respond to the published results”. This innovative practice undoubtedly rankles some – pride is familiar to most of us (but hubris needs curbing!). So, as a business, educationalists must be monitored (UCU, 2014). Why not let the community management supervise performance?

Performance management is the activity and set of processes that aim to maintain and improve employee performance in line with an organisation's objectives. It is strategic as well as operational, as it aims to ensure that employees contribute positively to business objectives.

(CIPD, 2018)

The practice of Performance Management will ensure that teaching is not just another commercial transaction - students are not customers corralled into an academic institution as expendable cash cows – they are learners who must reflect “a desire to work hard”<sup>9</sup> (Williams, n.d).

Interestingly, Plymouth University “now require student input when a new member of academic staff is to be employed” (Ibid Williams n.d).

The experienced and skilled teacher who continues to learn the ropes can always cure the ignorance of a committed learner with a few good books.

(Adapted from Vikrant Parsai)

Sadly, the Universities Minister, Jo Johnson (2018) had to warn universities that the practice of grade inflation evidenced slipping standards and the incentives behind the method “does not spur students on to work hard, or institutions to focus on offering high quality [teaching and education]”.

Worryingly, the reasons behind the practice suggest that *quantitative* recruitment and league table data have a knock-on effect on grade inflation as Ray (n.d) writes:

The observed upward drift in ‘good’ degree classifications may have been due to changes in the methods of assessment and the result of modularisation of degree programmes (Yorke, 2002; Elton, 1998). If grade inflation is associated with lenient marking, then it is possible that there may be a conscious effort by UK universities to lower the ‘hedonistic’ price by lowering standards to attract fee-paying students in recent times. Moreover, our finding may suggest that employers’ concern over using UK degree classifications as

signals of graduate ability and current government efforts to review or replace the current system of degree classification may not be misplaced.

## Conclusion

We, the people, must now remove narcissism and the inherited power bases that bedevil higher education.

Could the Big Society Model where tertiary education providers (accredited and non-traditional) share their strengths, humbly address their weaknesses and become community empowered education providers that change the face of education? If, yes, let the process begin. If not, let researchers sharpen their pens and provide answers to save the extinction of the Peoples’ Jewel – higher education.

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# LIFE CHANCES VERSUS SELF DETERMINATION: WHICH INFLUENCES ACADEMIC PERFORMANCE?

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## 1.0 Introduction

The study is set to investigate on the dichotomy between life chances and self determination, and which of the two effects more positively on child's success in school and in all endeavors. Over the years many scholars found that life chances of a child is linked with the child's socio economic status, most research findings advocates that, life chances have greater impact on child's academic achievements, they claimed that it pave ways for those that came from affluent homes to have access to school materials, good healthcare, good nutrition, live in a ore clement environment, put simply, they emphasized that such children have access to better life than the disadvantaged mates.

Based on these increasing notions stated above, the writer intends to investigate if actually, life chances of a child determines his or her academic success and success in all endeavor or if a child success is determined by the levels of self determination which is characterized by being focus, being motivated intrinsically, building up internal zeal and knowing what you want in life.

## 1.1 Statement of problem

One of the major problems that motivated the researcher to writer on this topic is that in Arica and in particular in The Gambia, there has been increasing emphasis from the populace over the years that the poor kept getting poorer while the rich, kept getting richer, this indicates that there is a general belief that a child's life chances determines his/her success in life. Based on this the writer intends to conduct a research to either prove or disprove this general conception that life chances determines success in life.

**1.2 The purpose of the study;** is to ascertain the following:

If life chances determines a child's academic success.

If self determination determines a child's success.

To enable meaningful recommendations that will promote child's success in school.

## 1.3 Significance of the study

The study will be useful to all the different socio economic classes, parents, children, teachers and the society at large, hence the research findings will be useful to them and for future researchers.

## 1.4 Scope of study

The study however delimits the life chances versus self determination and their effects on child's success in school. Researcher will make use of grade 12 students from four schools from The Gambia, two from the capital territory and two from Brikama axis.

## 1.5 Research questions

What is the relationship between life chances and academic performance?

Does self determination influence academic performance?

## 1.6 Hypothesis

There is no significant difference between life chances and academic performance.

The level of students self determination is not significantly related to academic performance.

## 1.7 Definitions of concepts

**Life chances:** are the opportunities each individual has to improve their quality of life. The concept was introduced by German sociologist, Max Weber. It is a probabilistic concept, describing how likely it is, given certain factors that an individual life will turn out a certain way (Hughes, 2003).life chances are positively correlated with one's social situation, Cocker ham (2005, p.12).

**Self determination:** it implies being intrinsically consistent in what you value and control. Is a set of principles that enable one to live and direct his or her own life through the choices he/she makes. It is the combination of skills, knowledge and beliefs that enable a person to engage in goal directed self-regulated autonomous behavior.

**Socio status:** the term refers to the social position of persons in a group. The position which he does hold is occasioned by the economic position and finds oneself in a given society or community. The economic position will directly affect their chances of obtaining those things defined as desirable in their society, for example access to higher education and good quality housing.

**Social class:** there are two major perspectives on the concept of social class. These are the Marxist and the non Marxist theorist. The Marxist defines social class as class position of an individual within given society, and is determined by the place he occupies in a given economic system of production. A class is seen as a

group of people who have common relations to the means of production in a given mode of production. The non Marxist school who is led by max Weber adopts a pluralist conception of class. He defines social class not as economic category but a collectivity of individuals that occupy the same position in relation to the market. Based on the foregoing explanations and definitions of the concept of social class and he prevailing situation in the contemporary Gambia society and for the purpose of this research: the researcher will adopt the Marxian approach to the definition of social class based on ownership of property, a middle class based on the possession of educational or technical qualification and the lower class., that do not have a stable source of income and thus do not possess power, wealth and prestige.

**Educational opportunities:** opportunity means the extent to which individuals have access to important societal resources such as food, clothing, shelter, education and healthcare. These two terms holds a key position in this research and for a better harmonization of the work, the researcher shall explain it as the chance or opportunity available to an individual, which enables him (a child) to acquire higher intellectual training, which subsequently acts as an important instrument of change in modern societies. The individual can also rise towards valued position and rewards in society.

**Academic performance:** is the process to which an individual is able to effect or adhere to educational teachings. The extent of an individual performance- simply put, scholastic achievement.

## 2.0 Literature review

This will have two phases; the first phase will review the concept of life chances (SES) and academic performance, while the second phase will review the concept of self determination and academic performance.

### Life chances (SES) and academic performance

Sameen (2015),found that much of the child's education starts from the home, before he actually starts the formal education, to them the middle class homes are always able to provide the necessary prerequisites success, the can offer good environment, motivation and financial needs of a child.

Ojo and Yilma (2010) said that the socio economic status of a student is capable of affecting the academic and aspirations of children, he emphasized that high economic status often have more success in preparing their children for school because they have typically access to wide range of providing their children with high quality child- care,. The relationship between poverty and low achievement in school is part of a wider cycle in which family discourage is passed on from generation. Socio economic circumstances of students which results in low qualifications, help

transmit poverty across generations. Dills, (2006) had a similar view, when she found that students from the bottom quartile consistently perform below students from the top quartile of socio economic status.

A key cause of child poverty is a lack of opportunities among parents with low skills and low qualification. Such parents are likely to work, and if they do work they are more likely to have low earnings. To devote adequate time for children is much harder for people in low socio economic background. It becomes therefore very difficult to give children good life chances. Research has shown that children from poor homes are disadvantaged and are less likely to get good educational qualification. The relationship between poverty and low achievement in school is part of a wider cycle in which family discourage is passed on from generation to the next. Barry (2005) noted also that higher achievers belong to high socio economic status and low achievers belong to low socio economic status. Ewijk and Slegers (2010) stated that socio economic status is an important determinant of academic achievement.

### Self determination and academic performance

Reeve, Hamm, and Nix, (2003) self determination is the ability of students to choose and control over what and how they want to learn. An advantage of self determination is that students are given the freedom to determine their academic tasks; they are more likely to benefit from them. In a study conducted by Black and Deci (2000), the result obtained supported the idea that self determination leads to improvements in students learning. They contend that students with a high zeal of participate in learning is significantly correlated with perceived competence, interest/ enjoyment of learning with low anxiety.

## 3.0 Research Methodology summary

Here the researcher presents the basic steps that were used in conducting the research. Such steps include research design, Area of study, population of study, sample and sampling technique, and instruments for data collection.

**3.1 Research Design:** The design of the study was both descriptive and inferential. It was a simple survey research that makes use of the selected number of respondents through random sampling to determine what happens in a larger population. Area of study will be in the state capital Banjul and in the west coast region of The Gambia. The population comprises of three schools from the capital territory and three schools from the west coast region and in each school one classes of grade twelve students will be used and 50 students each will be administered questionnaire items from each school making the total population of 300 to be used. The major instrument for data collection will be questionnaire, and the respondents will tick their choice.

#### 4.0 Data Analysis

Research question one: what is the relationship between life chances (SES) and Academic performance?

4.1. Table showing the mean and percentage scores of students.

| SES/ life chances | MAXIMUM SCORE | AVERAGE SCORE | PERCENTAGE SCORE |
|-------------------|---------------|---------------|------------------|
| High              | 40            | 23.9          | 60%              |
| Middle            | 40            | 22.5          | 56%              |
| Low               | 40            | 20.9          | 52%              |

From the table above the higher economic background scored higher, with an average score of 23.9 and a percentage score of 60%, the middle socio economic class scored 22.5 in average and 56%, while the lower class had 20.9 in average and 52%. This result proves that life chances (SES) influences students success in school. This is in line with Jacquelynne, Eccles and Pamela (2005), affirms that the socio economic status of parent goes a long way to mould a child's personality both morally, academically, economically, socially, spiritually or otherwise.

Research question 2: Does self determination influence academic performance? The Pearson  $r$  product moment correlation co-efficient method was used to determine the relationship between self determination and academic performance.

4.2. Table of correlation of Academic performance and self determination.

| variables            | Number of respondent | Mean score | Correlation co-efficient |
|----------------------|----------------------|------------|--------------------------|
| Self determination   | 300                  | 22         |                          |
| Academic performance | 300                  | 24         | 8.11                     |

The result shows that the correlation co-efficient between students academic performance and self determination is positive, this means that the student's academic performance is always high and are influenced with an increasing levels of self determination. This result is in line with what the interactionist stated in sociology themes and perspectives that man, actively constructs himself and social reality. His actions are not shaped by social forces and pressures of social stratification system' but by his actions and values.

Moula, (2010), tries to investigate the relationship between academic performance achievements and parental home environments. He defined home environment by five factors that is parental encouragement, parental occupation, parental education, family size, learning facilities at home. The findings showed that all the factors affects and influence child's performance except the parental encouragement that showed low correlation with academic motivation.

1. There is no significant difference between life chances (SES) and academic performance.

2. The level of students self determination is not significantly related to academic performance.

Table 4.3 will analyze both hypothesis I and 2 using chi-square table of differences.

| variables                               | NO OF SCORES | df | Level of significant | X <sup>2</sup> value tabulated | Calculated | Decision |
|-----------------------------------------|--------------|----|----------------------|--------------------------------|------------|----------|
| SES/Academic Performance                | 300          | 4  | 0.05                 | 9.488                          | 11.5       | REJECT   |
| Self determination/academic performance | 300          | 4  | 0.05                 | 9.488                          | 10.5       | REJECT   |

From the table the  $H_{01}$  calculated is greater than the one tabulated, therefore null hypothesis is rejected and the conclusion remains that, there is a significant difference between life chances and academic performance. This indicates and confirms that the family background a child came from is known to have impact in his academic performance. Put simply, a child from affluent home do better in school than a child from the disadvantaged home, hence the higher or middle class can provide the necessary financial materials needed to support a child in school unlike the other.

$H_{02}$ , the null hypothesis is also rejected owing to the fact that the calculated is bigger than the tabulated. The results prove that the level of self determination is significantly related to academic performance. This implies thus; self determination is a tool to achieve goals, objectives, and it means that when a student is focused, determined he /she must do wonderfully well because the best type of motivation remains intrinsic motivation, motivation that comes without any pressure.

In conclusion, this empirical evidence clearly indicated that though life chances (SES) is influential in child's academic performance, it can foster learning and better education no doubt. Self determination also promotes academic performance, from this study it could be seen that in as much as the socio economic background affects academic performance, still if student will be self determined no matter your family status you can still achieve better. Put simply both variables life chances (SES) and self determinations are keys to academic success which implies that combination of both will yield productively.

### Recommendations

For the benefit of academic excellence, I recommend the following:

1. Every student irrespective of family class levels need to be well focused in life.
2. Government should make provisions for the less privileged students, free education should be encouraged.
3. Students should build the habit of learning for career prospect and academic growth, those from low socio economic background should be encouraged to be going to the library to read at all times, especially those materials their parents cannot afford. Students should be mindful of the types of friends the keep, because peer influence do affect, in most cases negatively in academic performance.
4. The government should use all measures to encourage parents to control more closely all angles of their children's up bringing that can harm both the children and society at large.

5. Government should make sure that every school has a professional counselor that will help encourage and build self esteem on children.

Finally, I suggest further thus: that there could be more research work on factors that could help students to build self determination in them hence it is a key to success.

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# TRIGGERING INNOVATIVE OPPORTUNITIES IN ELIXIR: IGNITING ENTREPRENEURSHIP IN RURAL TRANSFORMATION THROUGH A2 MILK BASED INTEGRATED DAIRY FARMING

Dr Kailash Chandra Sharma\*

## Abstract:

*In the era of globalization, identifying opportunities nearby and nurturing these into rural entrepreneurship is a challenge. In India 68.84% people live in rural areas, constantly suffer from unemployment and poor infrastructure. To eradicate, just need a timely spark. Today most of the Start-ups are at cross roads to identify right opportunity, despite large unutilised reservoirs available. Farming especially the Dairy farming has been key occupation, particularly with Small and Marginal Farmers (SMF) which contribute to 75% to 80% of total milk production.*

*Majority of cow milk is A1 from HF/Jersey breed. A1 Milk has Beta-Casein Protein (or BCM-7 for short) which digests differently than A2 milk of Desi breeds like Gir, Kankarej, Sahiwal and others. **A1 milk damages the pancreas, resulting in type-1 diabetes and is much more harmful than tobacco. A1 milk is largely consumed by children in India, thus ruining the lives of next generations unknowingly.** Indian A2 Desi Bulls are now global heroes in Brazil.*

*A2 milk farming has many untapped opportunities in waiting, coupled with challenges. This paper is an attempt to focus on the innovative opportunities on Desi cow farming in the context of Rural Transformation.*

**Key words:** Rural Entrepreneurship, Dairy Farming, A1 and A2 milk, Desi cows.

## 1. Introduction:

India is the world's **highest milk producer** from the **largest cattle population** having one of the **lowest productivity yet per capita availability of milk of 310 ml per day**, the highest in the world. What a sweet contrast. **A2 milk (because of its numerous benefits) from Desi breeds has many untapped wealth creation opportunities in the waiting, yet coupled with various challenges. Some of these are like present low yields from Desi cows, unorganised micro dairy farms, unhygienic work culture, inadequate feeding, and absence of breed improvement culture and total neglect of marketing efforts for the product benefits.**

Recent controversy on A1 & A2 milk has created a sort of stir post publication of the book in 2007 "Devil in the Milk: Illness, Health and Politics - A1 and A2 Milk" written by Mr Keith Woodford, an Agriculture Scientist from New Zealand.

It is a monumental study, convincingly laid out, and one that demands our immediate attention. Dairy products in Raw forms or when properly produced and treated, have nourished generations of the healthiest humans. If we can convert our cows to A2 cows, then use the principles of properly fed, properly prepared dairy, we will do much to **reduce the disease burden in our country and find our way to the robust health that is our birth right**, says Dr Thomas Cowan in his forward to the book.

## 2. Literature Review:

### 2.1 India: Milk fact sheet

As per White Paper on Sustainable Farm Structure in India, published by Suruchi Consultants. India is 7th largest economy at nominal (2.3 Trillion US\$) and 3rd largest at PPP (8 Trillion US\$) in the world in 2015. Towards Economy, agriculture contributes just 17% while industry and services contribute 26% and 57% respectively. The labour force distribution is around 50% for agriculture and rest in manufacturing and services. India ranks second in farm output and first in milk production with estimated production levels of around 143 Million Metric ton in 2014-15 at a moderate growth rate of around 4 %. At current levels the per capita availability of milk is **at 310 ml per day** which is far above WHO required levels. India also has the largest cattle livestock population in the world at 512 million as per 2012 data. Out of this the population of indigenous cows, cross bred cows and buffaloes are 151.00 million, 39.71 million and 108.70 million respectively. The population of milch animals is 48 million cows (growth rate 0.17%), 19.5 million cross bred cows (growth rate 35%) and 51.0 million buffaloes (growth rate 5%). The bovine genetic resource of India is **represented by 37 well recognized indigenous breeds of cattle** and 13 breeds of buffaloes. Indigenous bovines are robust and resilient and are particularly suited to the climate and environment of their respective breeding tracts.

The total population of milch cattle is divided in 3 segments namely buffalo (46%), Indigenous cows (39%) and Cross bred cows (15%). Around 55% of the milk produced is from buffaloes. This milk has better acceptability in India markets due to higher fat (which is synonym to health in major parts of the country) and whiteness of the product being made out of it. India's pricing strategy is also based on fat, so buffalo milk fetches better prices at both institutional (B2B) and consumer (B2C) levels. The respective average yields of these animals are just 2.36 litres per day for indigenous cows (growing @ 2.3% per annum), 4.8 litres per day for buffaloes (growing @ 1.7% per annum) and for cross bred cows 7 litres per day (growing at 1.6% per annum).

This data reflects the challenges and built in opportunities.

## 2.2 Challenges and Opportunities

- i) Agriculture contributes to just **17% in the economy employing 50% of labour force.**
- ii) India is the largest milk producer in the world with 143 mill MT of production, Largest livestock population of **512 mill but milch animals are just 118.5 mill.** Also the largest in **per capita consumption at 310 ml per day** (well above WHO standards).
- iii) The growth rate of Indigenous cows is just **0.17%** as against cross breed is 35% and Buffaloes 5%. The respective yield in lpd from these **animals are meagre 2.36, 7.0 and 4.8.**
- iv) Around 55% of milk production is from buffaloes, and very little from Desi cows and hence lower productivity can't be totally blamed on the Desi breeds.
- v) There is **no separate marketing of A2 Cow Milk at present**, however stray efforts are being made. Indian cows are **low yielding** but produce the **best quality milk in terms of nutritional properties.**

## 2.3 Escalating diseases from A1 milk, Usefulness of A2 milk and genesis thereof

Professor Keith Woodford delivers that why problems persist when some patients ingest milk. There is a protein called beta-casein in the milk-solid part of cow's milk. The type of beta-casein varies in cows according to their genetic makeup, but the most common types are known as A1beta-casein and A2 beta-casein. A1 beta-casein, common in American and European cows, is the exact culprit in the myriad of symptoms seen all these years. These symptoms include joint and muscle pains, fatigue, digestive disturbances, and headaches. A1 beta-casein refers to the type of beta-casein that has histidine instead of proline at position 67 of the protein chain. To simplify this, the cows themselves are either called A1 or A2 cows, depending on which beta-casein variant they have.

Scientific Studies suggests that A1 Beta-Casein is responsible for many diseases including **Type-1 Diabetes, autism and heart diseases.** Diabetes may not be a disease in itself but an open invitation to many diseases, India is now soon becoming the Diabetes Capital of the World. A1 Beta-Casein Protein (also known as BETA-CASO-MORPHINE-7 or BCM-7) digests differently than A2. A1 Beta-Casein Protein and damages the pancreas resulting in type-1 diabetes. BCM-7 is more harmful than tobacco. Tobacco is consumed by adults whereas milk is largely consumed by children; hence we are ruining the lives of our next generations unknowingly because of our poor knowledge about damages by A1 milk and absence of awareness of benefits of A2 milk.

## 3. India's: "Mass production is production by masses"

The milk production in India is highly fragmented and majority of milk is produced and collected through household farms at small and marginal levels. The average animal holding is around 2 with milk production per animal at 2-3 litres. As against the average animal holding in Poland and USA is around 6 times and 35 times respectively, whereas the milk production per animal in Poland and USA is 4.5 times and 8 times than that of India respectively.

## 4. A2 and A1 milk: Global response to the crisis

**4.1** A2 Corporation in New Zealand was the first company to take initiative to market this type of milk. New Zealand has taken the task of reforming the breed on a war footing. Australia is also doing the breed improvisation. Europe and USA started late but now are catching up fast.

**4.2** In many countries A2 Milk is now sold separately and commands premium. Conversion of breed has already started but may take anywhere between 15 to 25 years depending on the level of contamination in cross breed animals.

## 5. Indian scenario: Critical analysis, various challenges and building up opportunities.

**5.1** Although situation in India is very grim and pathetic, more than 85 to 90% cows are HF, Jersey or cross breed cows, only 10 to 15% are pure Desi cows.

**5.2** All Indian cow breeds are of A2. India inherited one of the best Cow Breeds but ignored them. Consumer Awareness will force the Dairy Industry to respond quickly.

**5.3** The Government of India has realised the importance of A2 Milk and launched "Rashtriya Gokul Mission" for development of Desi breeds and are also allowed to source and import technology for

**sexed semen** to address sentimental issues by reducing male calf population.

**5.4** Import of semen and embryo of Gir breed from Brazil has been permitted as India doesn't have enough high quality domestic bulls.

**5.5** Most of SMF farmers have indifferent attitudes towards Desi cows thinking that it is unproductive.

**5.6** Indian Desi cows have extremely low yield per animal and are reared in most unhygienic conditions. Absence of pragmatism, orthodox thought processes and unorganised small herd sizes are one the root cause of this situation.

**5.7** Consumers are also little aware about the A1 culprit and benefits of A2 milk. Even the most learned sections of society including the media are unaware of its vast benefits.

**5.8** There are around 37 well established cow breeds in India; most of them are low yielding. It will be of great interest to note that lower the yield of certain breeds, higher is the nutritional and medicinal value of its milk.

**5.9** Today India is importing semen from Brazil, which explains the sorry state of affairs of Desi cow breeds.

**5.10** Amul in Ahmedabad, have taken the lead in marketing A2 milk separately.

**5.11** UP Government have initiated efforts to promote dairy farming on war footing. Many more State Governments are proactively looking at.

**5.12** There are many success stories all over the country. Even with the challenges, silver lining is that A2 milk still commands a premium.

**5.13** Brazil imported Gir Cows and Bulls from India about 40 years ago improved the breed.

## **6. Why Only Desi Cow Milk? Why not Buffalo, Goat and other milks:**

The cow milk melting point (not any other animal) is lower than the normal human body temperature hence provides **the essential nutrients without deposition of fats**. It works like lubricant for frictionless healthy life. **It has very high nutritional properties and is easy to digest**. Hindu scriptures as well as recent studies suggest that Desi cow milk has traces of gold also, hence yellow in colour. Even cow urine has traces of gold as per research conducted by Jamnagar University.

## **7. Dissecting Strengths and Weaknesses of the A2 dairy industry reveals the following:**

### **Strengths**

a) India's Desi breeds producing A2 milk are immune to diseases, indifferent to heat stress, accustomed to the weather conditions.

b) Desi breeds are lower in maintenance and rearing cost.

c) Desi cows are supported emotionally, sentimentally by social and regulatory environment.

d) Indian cows have long productive life cycle as compared to any other animals.

e) They are self-sustainable even when unproductive.

f) A2 cows produce best in class manures which can be converted into insecticides prevention for agriculture.

g) Cow urine and dung are having great medicinal value.

h) These breeds have large collateral benefits to the farmers in the form of organic farming.

i) More efficient in feed conversion ratios than their A1 counterparts,

### **Weaknesses**

a) A1 cows have very Low Yields, just 2 to 3 litres per day per animal.

b) Most of the Gaushalas are Charity based and are not for profit ventures, have been unproductive for a long, thus pushing the dairy farming to unviable position.

c) Unorganised set up with small herd size, faces credibility issues about quality and hygiene.

d) Large deficiencies in Talent and Management are the biggest challenge resulting in poor productivity of the dairies.

e) Farms are mostly dependent on Erratic Monsoons, makes it difficult and costly to the feed low yielding cows.

f) Scalability becomes an issue due to non-availability of pure A2 livestock.

g) Low credibility of suppliers, adherence of QA QC norms is a difficult task to handle and therefore adulteration goes unchecked.

h) Emotive issues like utility of unproductive males or aged cows.

**8. Plethora of opportunities, challenges and building up projects opportunities based on them await Rural Entrepreneurs: Needs a spark with a Project Feasibility study and competent Guides.**

A2 Milk based dairy farming will be a fertile potential ground for Rural Entrepreneurs to venture into areas from Farm to Family delivery of milk. But, these entrepreneurs are suffering with various problems. **Among these most potent is what to venture in, for fear of risk, lack of finance, illiteracy, and competition from the urban entrepreneurs.**

**8.1 In genetics and breed improvisation:** Finding out ways and means to **increase the milk production per animal.**

**8.2 In Farm management:** Implementation of **better management practices by increasing the herd size** per dairy and resource management.

**8.3 In strategic marketing:** **Strong focussed approach towards marketing strategy for A2 milk** and building up an effective supply chain network.

Some of these venturing areas are briefly clustered below:

- a) Genetics Breed Improvisation.
- b) Soil and Forage management.
- c) Feeding and Nutrition management, Animal Health, Young stock management.
- d) MIS system management of the records.
- e) Consolidation and Scale Creation, Hub and Spoke model for milk harvesting and products' value addition.
- f) Manure management and Renewable energy generation & distribution.
- g) Skill Development and training centres for Dairy and Agro services.
- h) Support Infrastructure.

**9. Conclusion:**

*In India the rural population, constantly suffer with unemployment and poor infrastructure facilities which is main cause of migration towards cities cascading numerous problems and unrest. Identifying opportunities nearby and nurturing these into rural entrepreneurship is a great challenge. To eradicate even partly, needs a spark with a dedicated right efforts, to grab the right identified opportunity and percolated to the masses through Rural Entrepreneurs.*

*Today most of the Start-ups are at cross roads to identify right opportunity, despite large unutilised resources available with them but unknown. These rural entrepreneurs increase the standard of living and purchasing power of the people by offering employment opportunity to the people in villages.*

*Dairy farming in India has been key occupation since beginning, particularly with Small and Marginal Farmers (SMF) which contribute to 75% to 80% of total milk production. Majority of cow milk in India is of A1 type produced from HF/Jersey cows which are imported from New Zealand and Australia. A1 Milk has Beta-Casein which digests differently than A2 milk which is produced from Desi breeds.*

***A1 milk damages the pancreas, resulting in type-1 diabetes and is much more harmful than tobacco. A1 milk is largely consumed by children in India, thus ruining the lives of next generations unknowingly.***

*Brazil imported Indian Gir breeds about 40 years ago and improved the productivity from 2 to 40 plus liters per day through right feed, good upkeep and scientific breeding techniques with our Desi Bulls making **Indian Desi Bulls** as global heroes in Brazil.*

A2 milk from Desi breeds with inbuilt numerous benefits has many untapped wealth creation opportunities, at the same time are coupled with various challenges. **Indian scriptures are full of benefits of Desi Cow Milk**, but in absence of scientific evidences and studies they have not got any attention.

India inherited one of the best Cow Breeds but ignored them. Consumer awareness about A2 milk will force the Dairy Industry to respond but push up is slow.

Some of these challenges are like present low yields from Desi cows, unorganised micro dairy farms; unhygienic work culture, inadequate feeding, and absence of breed improvement culture and total neglect of marketing efforts for the product benefits.

These challenges bring a great potential for Entrepreneurs to choose the Projects and act upon. An attempt is made here to describe some major Project opportunities which can be taken up by SMF, mid or large size corporates also. This is just a beginning in untouched A2 milk area for rural transformation, and inclusive growth for Rural Youth and Moms which is bound to accelerate the Reverse migration and enhance Rural economy.

This research study opens up Major opportunities in Marketing also (of Milk and Milk bi-products and downstream innovative products like Punch Gavya, Bio fertilizers, Bio pesticide besides conventional value added products) Logistics and supply chain management (for distribution of Inputs fodders, and finished products), Dairy operations and management (In cow rearing, upkeep, hygienic treatment of the herd and products) and Breed improvement.

A2 milk production and marketing in India is in its nascent stage, it is suggested that someone with a Project based mind can develop detailed business plans and conduct Feasibility studies in areas mentioned above at 8.3, to help the Start-ups and removes the limitations of this study.

With the dedicated efforts, community and Government support, many opportunities exist in this Elixir which is called A2 milk is bound to bring back India to the level as it was in the past.

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A2 Corporation [www.a2corporation.com](http://www.a2corporation.com). The scientific reviews on this website are notable for their comprehensive literature bibliographies, and contain additional references not listed in this book.

A2 Milk Australia [www.a2australia.com.au](http://www.a2australia.com.au). This company markets A2 milk in Australia.

Autism Network for Dietary Intervention [www.autismndi.com](http://www.autismndi.com). This website is a good entry point for information related to diet and autism. It contains a mix of scientific information and anecdote.

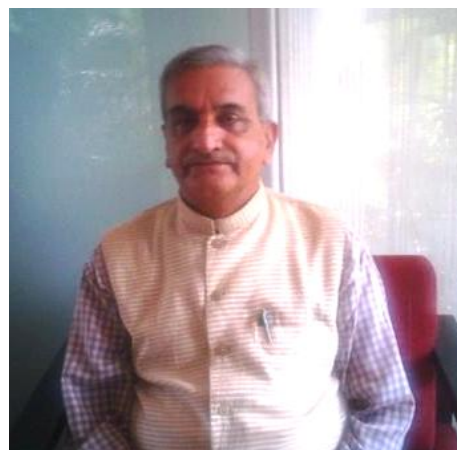
Direct-MS [www.direct-ms.com](http://www.direct-ms.com). This website is a good entry point for information on nutrition and multiple sclerosis. It does not address the specific issue of A2 milk.

Harvard School of Public Health [www.hsph.harvard.edu/nutritionsource/](http://www.hsph.harvard.edu/nutritionsource/). This web-site is a good place to get an overview on issues about milk and human nutrition.

Keith Woodford's page on the Lincoln University website [www.lincoln.ac.nz/story1057.html](http://www.lincoln.ac.nz/story1057.html). This contains information on A2 milk and many other agribusiness topics written professionally.

About further developments relating to A1 beta-casein, A2 milk and BCM7 may be visited at <http://keithwoodford.wordpress.com>

### ***About the Author***



**Dr Kailash Chandra Sharma\*** is a Technocrat by profession and holds B.E. in Electrical Engineering, PG Advance diploma in Management besides a Doctorate in Management. Widely travelled in India and overseas and authored many feasibility studies and Business Plans. Has long over 45 years of long and varied experience in Projects Management from concept to commissioning in Telecommunication, Infrastructure, Mining and Agriculture. Presently Chairman and Managing Director. He is a consultant in turnkey projects focused now on Dairy farming and Agriculture Projects. He can be reached at: [kailash03@gmail.com](mailto:kailash03@gmail.com)

# PROBLEMS FACED BY PEOPLE WITH DISABILITIES IN MALAWI

Sydney Adam Ndembe\*

*This is a summary from the paper written for the St Clements University Doctor of Letters degree program.*

We have been looking at the problems faced by people with various disabilities in Malawi and more especially in the various Regions of the country. We have looked at the problems which were there before the British colonized the country, then the problems faced during the colonial era and the problems faced after independence.

In summary, we can say there have been problems throughout these phases of Malawi life. Pre-colonial days have however been the worst period for people with disabilities. During this period being born with a disability was already a death sentence. Hospitals in the country were very few and were available in the main city Centre's which were very far out of reach for anybody. Medical services were therefore inaccessible. The roads infrastructure was very poor and therefore no public transport was available to enable people to get to hospitals. People were however still getting pregnant and giving birth. As they could not get to hospitals then, they had to rely on traditional birth attendants whose knowledge of the human anatomy was nonexistent. Whenever a mother gave birth to a child with a disability, the birth attendant would automatically kill the baby and tell the mother that she had given birth to a monster. The mother was not shown the child and neither were relations. The word of the birth attendant was final. Being born with a disability therefore meant death to the child.

The next problem was that giving birth to a child with a disability was a disaster for the parents. It was believed that they had committed something wrong and that they were being punished for that by being given a disabled child. For this reason therefore the child, if it survived at all, was hidden away and kept under lock and key. If they came out at all they were called accursed, possessed and unlucky children. The disabled child had to face solitude and even food was very hard for them to get as they were neglected. They could not be sent to school as they were considered to be not worth the fees that would go to the school. There was also the question of how would they get to school. They were therefore doomed in those days.

With the coming of civilization, with the western Government and colonization, things changed dramatically for disabled children. Killing of disabled children was criminalized and any one known to do

that was imprisoned. More hospitals started to come in and therefore expectant mothers had no reason to go to traditional birth attendants as they were encouraged to go to go to health Centre's where a nurse would attend to them. Children with disabilities therefore started to be kept alive but the belief that the parents were cursed and that was the reason for them having a disabled child remained and the children were still being kept out of sight. A lot of sensitization and civic education on the part of communities worked to break this myth and people started to know that the birth of a disabled child was not a curse at all. With the coming of the European government, several things improved. Roads were improved, although few, the Europeans brought bicycles which could be bought by those could afford them. This eased movement for most people, those who had the mind therefore started thinking of the education of their disabled children. By bicycle therefore they could transport the disabled child to and from school.

As life started to improve for the disabled children, 1964 brought independence for Malawi. With independence, many foreign countries were interested in Malawi and started to invest in it. The roads network started to grow, the number of hospitals increased dramatically and the number of nurses in the country grew very quickly when the government of Malawi introduced nursing schools and colleges. Missionaries also introduced nursing schools and colleges. The hospitals were no longer in isolated places, as was the case before, but were brought nearer to people. With the improved roads the public transport sector developed and therefore there were buses in most parts of the country. Children were now being born under very good care.

Then came an organization called Parents of Disabled Children in Malawi (PODCAM). This organization took it upon itself to teach parents of disabled children ways of looking after their disabled children. This organization did not only try to improve the lives of the children but it also provided a forum for the parents to share experiences and also release the pressure of looking after their disabled children knowing that that they are not alone.

Then came organizations like the Malawi Red Cross Society whose staff started to treat children with disabilities as normal children and gave them the care required through that they educated their mothers on how they should look after their disabled child. Even with these improving conditions, the road for a

disabled person was still very bumpy. The ugly face of stigma never left them but hung around them wherever they went.

With the coming of independence came the organizations looking after the welfare of people with disabilities. There was The Royal Commonwealth Society for the Blind, Christoffel Blinden Mission, CEBEMO and a few others looking into the welfare of the blind. Then came sight savers to try and see if some of those without sight could be assisted to regain their sight. Then the Catholic missionaries brought the Montfort School for the deaf where sign language is taught and the hearing impaired are able to learn how to read and write.

The first sheltered workshop for the disabled came into being in 1976 and a vocational rehabilitation training centre was established for craft training of people with disabilities. A medical rehabilitation centre was established and a medical rehabilitation technicians college was established to train personnel in the treatment of people with disabilities. In fact, opportunities opened for the people with disabilities.

Even with the mushrooming opportunities, people with disabilities continue to face problems, in segregation where employment is concerned, they were given what the employer thought they could do without consulting them. Then came the structural barriers which dictate where they could go and not go. As if that was not sufficient for people with disabilities having the problem of finding a partner. Most men do not want to marry a disabled girl unless they are after something from the girl. Either her parents are very rich or she has climbed the ladder in society and is an influential member of the society. Otherwise no it is hard for the disabled girl to find a husband. Even coming to the disabled men, it is very hard to find a lady who will accept to marry a disabled man unless he is very wealthy or he is a cabinet minister or company executive or he has something glittering around him, but really can we all afford to be what the women want? The result is that a blind man marries a blind woman, a deaf man marries a deaf woman and a physically disabled man marries a physically disabled woman which should not be the case at all.

In our examination of the problems facing people with disabilities we noted the myths that came with the HIV AIDS. There is a belief that if a person is HIV positive or has AIDS, he will be healed if he has sexual intercourse with a disabled woman. This has put women with physical disabilities in danger of being raped by HIV positive men. But fortunately rape of any kind is being treated as such and people who rape women face stiff punishment and end up in prison for a very long time. So one looks at the option of a very long time in prison or live freely taking the AR Therapy which is now able to prolong life of people suffering from the HIV AIDS scourge.

Then on the problems facing people with disabilities, we saw the Disability Act which was designed to address the problems facing people with disabilities but has too many weaknesses and loopholes that need to be taken back to the drawing board for re framing and be looked into before it can effectively help in reducing the problems facing people with disabilities. Otherwise as it stands it is not helping the people it was intended for and because it is there people will think that problems of people with disabilities have already been taken care of and addressed when in actual fact they have not.

The last problem people with disabilities face is lack of confidence in them and looking down upon themselves with the feeling that I am disabled, I deserve to be helped in all the functions of life. I have emphasized in my write up the importance of building self confidence in the disabled people from the start so that they can believe in themselves. I have also put in the importance of media involvement in sensitizing the world on the fact that disability does not in any way mean inability. The importance of involving educational institutions in building up the profiles of people with disabilities cannot be overlooked as it will remove the feeling of desolation from among the people with disabilities and those without disabilities will also learn to accept disability as a part of life that can occur at any time.

#### About the Author



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# ISOLATION OF ANTIABORTIFACIENT COMPOUNDS FROM THE LEAVES EXTRACT OF DIODIA SCANSENS SW

Jude Chime\*, Sabastine Sab-Udeh, John Ijoli, Mabel Akpuaka

The complete version of this summarised article is available at:

<http://stclements.edu/articles/Isolation.pdf>

## Abstract

Thin layer chromatography extracts of *Diodia Scansens* Sw was assayed for its phytochemicals and compounds present using spectroscopic instruments: IR, NMR and UV spectrometers. Phytochemical analysis showed the presence of steroids, glycoside, alkaloids, saponins in n-hexane crude extract; steroid and saponin in the crude ethylacetate extract of the leaves and steroid, saponin, alkaloid, tannins in crude methanol leaves extract. Three compounds were identified by spectroscopic analysis. CHDS<sub>14</sub> chromatographic oil extract was identified as  $\beta$  - sitosterol and stigmasterol, and CHDS<sub>17</sub> chromatographic extract was identified as Pheophytin a. The presence of these compounds justified the use of this plant for treating arthritis rheumatism, cutaneous and subcutaneous parasitic infection, diarrhea dysentery and antiabortifacients. To the best of our knowledge, I and my co-authors, this is the first time these compounds are isolated from this plant.

**Keywords:** *Diodia scandens* Sw; Phytochemical; Spectroscopy; traditional medicine; plants; chromatography

## 1. Introduction

*Diodia scandens* Sw (Rubiaceae) is an evergreen perennial herb, which has an alternate leaf arrangement. It is a straggling herb, which has been in use in the western Africa system of medicine. It has enormous usefulness and importance; whole parts of the plants are useful in curing various ailments (Essiette *et al.*, 2009). Studies carried out by Mavis and co-workers (2016), Ogu and Owoeye (2012) and Ogu and co-workers (2011), have revealed the medicinal capability of *Diodia scandens* as Antihypertensive, Control of Anthracnose Disease of Cowpea and Anti-fungal against dermatophytes respectively. These studies have confirmed the medicinal value of *Diodia scandens* SW.

## 2. Methods

*Diodia scandens* Sw was collected at St. Mary's Pro-Cathedral Parish Udi, Enugu State. The work followed the sample preparatory steps outlined by Akpuaka, (2009). Pulverised sample (200g) was macerated in 500 cm<sup>3</sup> of three solvents: n-hexane, ethylacetate and methanol respectively, stirred vigorously for some time and was left for 48 hours.

It was filtered and the filtrate was allowed to dry at room temperature under a fan. Following the methods employed by Akpuaka (2009) and Sofowora, (1993), phytochemical analysis was conducted to test for Steroid (Salkowski, Lieberman-Buchard and Formaldehyde test), Saponins (Fothing and Emulsion test), Alkaloids (Maquis, Meyer, and Dragendorff test), Tannins (FeCl<sub>2</sub>, KOH test), Phlobatanin, Anthraquinone, Flavanoids (H<sub>2</sub>SO<sub>4</sub>, NaOH, HCL) on the sample filtrates and having different analytes containing methanol, ethylacetate and n-hexane solvent (35.60g, 7.15g, 3.18g respectively). Thin Layer Chromatography was then applied on the analyte containing n-hexane to yield different oil fractions. CHDS<sub>14</sub> and CHDS<sub>17</sub> oil fractions from the thin layer Chromatography was then analysed using H<sup>1</sup>NMR, IR and UV spectrometers to identify the compound present.

## 3. Results and Discussion

### 3.1. Mass and percentage yield of crude extracts

Methanol had the highest mass yield of the crude extract, 35.60g (17.80%), followed by ethylacetate with a mass yield of 7.15g (3.58%) and n-hexane having mass yield of 3.18g (1.59%). Thus, as shown in Table 3.1, polar solvents are better extraction solvent than non-polar solvents.

### 3.2. Phytochemical analysis of the crude extracts of *D. scandens* Sw

In Table 3.2, the phytochemical analysis of n-Hexane crude extract showed that glycoside, steroid, saponin and alkaloid were present. In the ethylacetate crude extract, steroid and saponin were present and methanol crude extract showed the presence of steroid, saponin, alkaloid, tannin and flavonoid. The results obtained in this study thus suggest that the identified phytochemical compounds could be the, or part of the, bioactive constituents in the herbal plant.

**Table 3.1: Mass and Percentage Yield of Extracts from the Solvents**

| Extracting solvents | Mass of crude extract (gram) | Percentage yield |
|---------------------|------------------------------|------------------|
| Ds methanol         | 35.60                        | 17.80            |
| Ds ethylacetate     | 7.15                         | 3.58             |
| Ds n-hexane         | 3.18                         | 1.59             |

**TABLE 3.2: Phytochemical analysis of the crude extracts of *D. scandens* Sw**

| Extracting solvents                                   | Ds n-Hexane | Ds ethylacetate | Ds methanol |
|-------------------------------------------------------|-------------|-----------------|-------------|
| <b>Glycoside</b>                                      | +           | –               | –           |
| <b>Steroid</b>                                        |             |                 |             |
| Salkowski test                                        | +           | +               | +           |
| Lieberman-Buchard test                                | +           | +               | +           |
| Formaldehyde test                                     | +           | +               | +           |
| <b>Saponin</b>                                        |             |                 |             |
| Emulsion test                                         | +           | +               | +           |
| Frothing test                                         | –           | +               | +           |
| <b>Alkaloids</b>                                      |             |                 |             |
| Maquis test                                           | +           | –               | +           |
| Meyer's test                                          | +           | –               | +           |
| Draggendorff's test                                   | –           | –               | +           |
| <b>Tannins</b>                                        |             |                 |             |
| Test with 5% FeCl <sub>2</sub>                        | –           | –               | +           |
| Test with 10% KOH                                     | –           | –               | +           |
| Phlobatanin test                                      | –           | –               | –           |
| Anthraquinone test                                    | –           | –               | –           |
| <b>Flavanoids</b>                                     |             |                 |             |
| Test with concentrated H <sub>2</sub> SO <sub>4</sub> | –           | –               | +           |
| Test with 10% NaOH                                    | –           | –               | +           |
| Test with Mg – HCl                                    | –           | –               | –           |

### 3.3. Solvent mixture and the number of vial collected

The fractions from the column were collected using vials. In each vial, 10cm<sup>3</sup> of the fraction was collected. The solvent mixture n-hexane : ethylacetate were varied into seven different mixtures, and a total of 154 vial were collected. In n-hexane : ethylacetate (95% : 5%), 27 vials of the fraction were collected. In n-hexane : ethylacetate (90% : 10%), 21 vials of the fraction were collected. In n-hexane : ethylacetate (80% : 20%), 38 vials of the fraction were collected. In n-hexane : ethylacetate (70% : 30%), 22 vials of the fraction were collected. In n-hexane : ethylacetate

(60% : 40%), 22 vials of the fraction were collected. In n-hexane : ethylacetate (50% : 50%), 24 vials of the fraction were collected, ethylacetate was used to elute the mixture and 100cm<sup>3</sup> of the fraction was collected.

### 3.4. Combined Fractions Based on Retardation Factor

Thin layer chromatography of the separated fractions was carried out using a solvent mixture of n – Hexane/Ethyl acetate in the ratio of 4:1. The fractions were combined based on their TLC retardation factors (R<sub>f</sub>). The results are shown in Table 3.3.

**Table 3.3 Combined fractions based on retardation factor.**

| Fractions | Vials number | R <sub>f</sub> | Colour     |
|-----------|--------------|----------------|------------|
| CH DS10   | 3 – 5        | 0.91           | Red        |
| CH DS11   | 6 – 9        | 0.76           | Wine red   |
| CH DS12   | 12 – 16      | 0.68           | Orange     |
| CH DS13   | 26 – 28      | 0.35           | Brownish   |
| CH DS14   | 33 – 36      | 0.18           | Brownish   |
| CH DS15   | 39 – 58      | 0.85           | Dark green |

|          |           |      |            |
|----------|-----------|------|------------|
| CH DS17  | 104 – 141 | 0.44 | Dark       |
| CH DS18  | 142 – 150 | 0.5  | Dark green |
| CH DS 19 | 85 – 103  | –    | Dark       |

3.5. <sup>1</sup>H NMR spectrum of CHDS<sub>14</sub> as β-sitosterol and stigmasterol in CDCl<sub>3</sub> compared to literature.

CHDS<sub>14</sub> was obtained from vial 33-36 from column chromatography of n-hexane extract of *Diodia scandens* Sw. It was brownish oil and gave an R<sub>f</sub> value of 0.18. The <sup>1</sup>H NMR spectrum of compound CHDS<sub>14</sub> varied between 0.70 to 5.37 ppm. This spectrum showed the presence of 6 high intensity peaks indicating the presence of six methyl groups at 0.70, 0.72, 0.83, 0.88, 1.03 and 1.54. The proton corresponding to the CH – 3 of a sterol moiety appeared as a triplet to doublet at 3.55 ppm. Values at 5.06ppm and 5.37ppm correspond to a peak in the form of a multiplet in the region of the ethylene protons

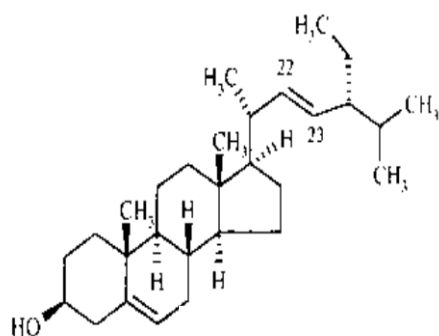


Figure 3.1: Stigmasterol (CHDS<sub>14</sub>)

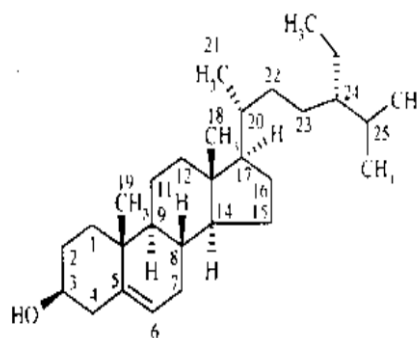


Figure 3.2: β-Sitosterol (CHDS<sub>14</sub>)

Table 3.5 Experimental chemical shift and multiplicity of CHDS<sub>14</sub> compared to literature.

| Proton                  | Experimental Chemical shift δ and multiplicity | Anatoli <i>et al.</i> literature | Luhate <i>et al.</i> Literature |
|-------------------------|------------------------------------------------|----------------------------------|---------------------------------|
| Stigmasterol CH – 22    | 5.37 (m)                                       | 5.14 (dd)                        | 5.378                           |
| CH-23                   | 5.06 (m)                                       | 5.02 (dd)                        | 5.197                           |
| CH(OH) – 3              | 3.55 (m)                                       | 3.43                             | 3.529                           |
| CH <sub>2</sub> – 4     | 2.37 (t)                                       | 2.24                             | –                               |
| CH- 20,24               | 2.05 (d)                                       | 2.04,1.52                        | –                               |
| CH <sub>2</sub> – 2,1   | 1.54 (m)                                       | 1.38,1.49,1.06                   | 1.534                           |
| CH – 25                 | 1.03 (s)                                       | 1.01                             | 1.20                            |
| CH <sub>3</sub> – 21,28 | 0.72 (s)                                       | 0.81,1.17                        | 0.843                           |
| CH <sub>3</sub> – 18    | 0.70 (s)                                       | 0.70 (s)                         | 0.736                           |
| β-Sitosterol CH(OH) – 3 | 3.55 (m)                                       | 3.43                             | 3.529                           |
| CH <sub>2</sub> -4      | 2.37 (t)                                       | 2.24                             | –                               |
| CH <sub>2</sub> – 2,1   | 1.54 (m)                                       | 1.83,1.49,1.06                   | 1.534                           |
| CH <sub>3</sub> – 18    | 0.70                                           | 0.68                             | 0.736                           |

3.6. <sup>1</sup>H NMR spectrum of CHDS<sub>17</sub> as pheophytin a in CDCl<sub>3</sub> compared to literature

CHDS<sub>17</sub> was obtained from vials 76-141 from column chromatography of n-hexane extract of *Diodia scandens* Sw. It was dark green oil and gave an R<sub>f</sub> value of 0.44. The chemical shifts of the CHDS<sub>17</sub> spectrum: 8.57, 9.36 and 9.50 correspond to the

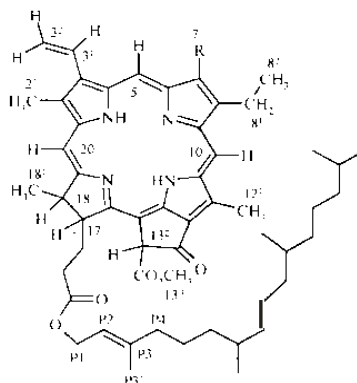
suggesting the presence of three protons.

These compounds stigmasterol and β-sitosterol may be useful in prevention of certain cancers, including ovarian, prostate and breast, and colon cancers. Studies have also indicated that a diet high in phytosterols may inhibit the absorption of cholesterol and lower serum cholesterol levels by competing for intestinal absorption (Panda et al, 2009). The structures of β-sitosterol and stigmasterol are shown in Figure 3.1 and Figure 3.2 respectively. Table 3.5 shows the Experimental chemical shift and multiplicity of CHDS<sub>14</sub> compared to other literature and helped in the confirmation of the compounds.

olefinic protons of pheophytin a. The vinyl group at position 3 was assigned 7.98. The chemical shifts of 3.22, 3.40, 3.68 and 3.87 indicate four methyl groups of pheophytin a. The peak at 1.62 indicates proton of – NH – suggesting the presence of one proton. The chemical shifts correspond to that of pheophytin a, which is a moiety related to chlorophyll without central magnesium. The UV spectrum shows

absorption at 400nm (4.363 absorbance) and 654nm (1.133 absorbance). The IR spectrum reveals the presence of NH at 3373.5 Br and CH bond at 2926.0cm<sup>-1</sup>, the presence of carbonyl bond at 1733.2cm<sup>-1</sup> and 1692.2cm<sup>-1</sup>, these peaks reveals the functional groups in pheophytin a and the structure depicted in Figure 3.3. The compound Pheophytin a, a

chlorophyll-related compound, is an important component of green tea. It has anti-inflammatory, antioxidant, and anti-chemotactic properties in human polymorphonuclear neutrophils, and anti-hepatitis C activity and functions in anti-tumor promotion (Chun *et al.*, 2014). Table 3.6 shows the experimental chemical shift and multiplicity of CHDS<sub>17</sub> compared to literature.



**Figure 3.3: pheophytin a (CHDS<sub>17</sub>)**

**Table 3.6 Experimental chemical shift and multiplicity of CHDS<sub>17</sub> compared to literature**

| Proton                             | Experimental Chemical shift $\delta$ and multiplicity | Anatoli <i>et al.</i> literature | Luhate <i>et al.</i> Literature |
|------------------------------------|-------------------------------------------------------|----------------------------------|---------------------------------|
| CH – 10                            | 9.50 (s)                                              | 9.44 (s)                         | 9.52                            |
| CH– 5                              | 9.36 (s)                                              | 9.26 (s)                         | 9.39                            |
| CH – 20                            | 8.57 (s)                                              | 8.62 (s)                         | 8.57                            |
| CH – 3 <sup>1</sup>                | 7.98 (m)                                              | 7.96 (dd)                        | 8.00                            |
| CH-3 <sup>21</sup>                 | 6.28 (m)                                              | 6.28 (dd)                        | 6.28                            |
| CH-3 <sup>2</sup>                  | 6.18 (m)                                              | 6.19 (dd)                        | 6.19                            |
| CH – 18                            | 5.03 (q)                                              | 4.49                             | 5.16                            |
| CH – 17                            | 4.96 (m)                                              | 4.12                             | 4.48                            |
| OCH <sub>3</sub> – 13 <sup>4</sup> | 3.87(s)                                               | 3.91 (s)                         | 3.88                            |
| CH <sub>3</sub> – 12 <sup>1</sup>  | 3.68 (s)                                              | 3.64 (s)                         | 3.72                            |
| CH <sub>3</sub> – 2 <sup>1</sup>   | 3.40 (s)                                              | 3.39(dd)                         | 3.54                            |
| CH <sub>2</sub> – 7 <sup>1</sup>   | 3.22 (s)                                              | 3.14 (s)                         | 3.22,3.42                       |
| CH – P2                            | -                                                     | 4.91 (tq)                        | -                               |
| CH– P1                             | –                                                     | 4.39,4.22                        | -                               |
| CH <sub>2</sub> – 8 <sup>1</sup>   | -                                                     | 3.61 (s)                         | -                               |
| CH <sub>3</sub> – 18 <sup>1</sup>  | –                                                     | 1.83 (d)                         | -                               |
| CH <sub>3</sub> – 8 <sup>2</sup>   | –                                                     | 1.66                             | -                               |
| CH– P3 <sup>1</sup>                | –                                                     | 1.48                             | -                               |
| NH –                               | 1.62 (s)                                              | 1.61                             | 1.62                            |

#### 4. Conclusion

The phytochemical analysis carried out showed the presence of steroids, glycosides, alkaloids, saponins, in n-hexane leaves crude extract, steroids, and saponins in the crude ethylacetate extract and steroids, saponins, alkaloids, flavonoids and tannins in crude methanol extract. The n-hexane crude extract was fractionated and four pure samples were obtained and were labeled CHDS<sub>14</sub> and CHDS<sub>17</sub>. The H<sup>1</sup>NMR spectral revealed

that the sample labeled CHDS<sub>14</sub> contained stigmasterol and sitosterol and CHDS<sub>17</sub> contained pheophytin a. The presence of pheophytin a,  $\beta$ -sitosterol and stigmasterol and essential oil have shown that the traditional use of *Diodia scandens* Sw for treating different diseases such as arthritis, rheumatism, cutaneous and subcutaneous parasitic infection, diarrhoea, dysentery and antiabortifacient could be correct.

## 5. Recommendation

Further research should be conducted with the root of *D. scandens* Sw to discover the compounds in the plants for treating other diseases which includes its use as antidotes, painkiller, treatment of venereal diseases and cutaneous and subcutaneous fungal infections, arthritis, rheumatism, cutaneous and subcutaneous parasitic infection, diarrhea dysentery, dropsy, swellings, oedema, and gout, lactation stimulants;

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infections, paralysis, epilepsy, convulsions, spasm and pulmonary troubles. The pure samples of CHDS<sub>14</sub> and CHDS<sub>17</sub> should be subjected to clinical trial in order to ascertain the particular ailment they can be used to treat. It is advised that the plantation of this plant and other medicinal plants should be encouraged in Nigeria.

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