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The Mediating Effect of Knowledge Management Processes on the Relationship between the Dimensions of Organizational Culture and Knowledge Management Performance

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Abstract

The purpose of this study is to investigate the mediating effect of knowledge management (KM) processes on the relationship between organizational culture and KM performance. The results of the study revealed that the relationship between bureaucratic and supportive cultures and KM performance is fully mediated by KM processes while the relationship between innovative culture and KM performance is only partially mediated. Furthermore, supportive culture has been found to be the most influential factor affecting knowledge sharing and distribution whereas innovative culture has been found to be a better predictor of knowledge generation and development compared to other dimensions of organizational culture.

Keywords: Knowledge management, knowledge management processes, knowledge management performance, and organizational culture

1. Introduction

In the world economy, where wealth is increasingly the product of knowledge, rather than the physical resources, the success of companies to a great extent depends on their success in knowledge management (KM). The quality of knowledge generated in organizations and the way the knowledge is managed is becoming increasingly critical to competitiveness. Organizations are now realizing that they will not survive unless they change and respond to this reality through effective KM initiatives.

In today's knowledge era, the importance of KM and preparing for such a knowledge-intensive world is becoming highly critical. Therefore, KM has become one of the most highly debated issues in the corporate and academic world. In today's competitive environment, the importance of KM is continuously increasing, and organizations are making huge investments on KM in order to survive and increase their competitiveness in the marketplace. However, research results revealed that before making significant investments on KM, it is important to understand the dynamics between the key organizational determinants of KM, KM processes, and KM performance as this understanding can make crucial differences for organizational competitiveness. Otherwise, investments made can fall far behind from meeting the expectations.

Therefore, many studies were conducted to identify the factors contributing to KM performance. The primary determinants of KM performance are found to be the employees, organizational structure, organizational culture, and information technologies support. Research into KM showed that higher KM performance can be obtained when the organization has an appropriate culture for KM implementation. Nevertheless, in the literature, there are very few studies investigating the reason for this relationship. Therefore, the aim of this study is to explore whether the relationship between organizational culture and KM performance exist and whether it is through the processes of knowledge generation and development (KG&D), knowledge codification and storage storing (KC&S), knowledge sharing and distribution (KS&D) and knowledge use and evaluation (KU&E).

2. Literature Review

As the problem addressed by this study concerns whether organizational culture has a relationship with the resulting performance of KM, and whether it is through the knowledge management processes of generating, storing, sharing and utilizing knowledge, we briefly review the literature regarding organizational culture, KM processes, and KM performance.

2.1 Organizational Culture (OC)

Organizations do not run in a social vacuum, but they are significantly affected from their social environments (Hofstede, 2001). Therefore, organizational culture is considered as one of the most important preconditions for managing any organizational change and renewal (Pettigrew, 1990), and seen as a very critical form of organizational capital (Camerer & Versalainen, 1988) that can determine the competitiveness of an organization. According to Denison (1990), organizational culture can be defined as the underlying beliefs, values, and assumptions shared, exemplified and reinforced by the members of an organization over the years. Hofstede (1994) has described culture as "deeply-rooted values or shared norms, moral or aesthetic principles" (p.68). Blake and Mouton (1985) defined organizational culture as routinized ways of getting things done

in an organization. The literature indicates that culture is a complex system of norms and values that is shaped over time and affects the types and variance of organizational processes and behaviors (Barney, 1986). Research regarding the knowledge management reveals that an excessive focus on technical issues rather than social aspects, results in poor knowledge management practices or an ultimate failure (Saeed, et al., 2010). While a healthy organizational culture may facilitate the KM processes, an unhealthy one can stand as a barrier for the smooth functioning of KM processes. In the light of above discussions, organizational culture can be considered as one of the most critical antecedents to an effective KM.

2.2 Knowledge Management Processes

KM processes existing in the literature differ considerably in the terms of numbers and labeling of the processes rather than its underlying meaning (Alavi & Leidner, 2001). Generally, KM specialists define four basic knowledge management processes: knowledge generation, knowledge storage, knowledge sharing, and knowledge application. The following section below illustrates the four processes of KM briefly.

2.2.1 Knowledge Generation & Development (KG&D)

Knowledge generation and development is generally considered as the major focus of KM. Knowledge generation encompasses all the activities and processes that intend to create new and helpful solutions for the benefit of whole organization (Abou-Zeid, 2002). According to Davenport & Prusak (1998), knowledge generation can be described as the deliberate creation of knowledge under systematic organizational processes for the use of organization. On the other hand, knowledge development can be seen as all the activities that turn innovative and creative ideas into useful solutions for a higher customer value (Shani, Sena, & Olin, 2003).

2.2.2 Knowledge Codification & Storage (KC&S)

The second main KM process identified through the literature is knowledge codification and storage. Knowledge codification and classification can be defined as the process of capturing and storing knowledge for the re-use of the employees and organization (Davenport & Prusak, 1998). "Organizational knowledge is dispersed and scattered throughout the organization" (Zaim, 2006, p. 56), and as pointed out by Bhatt (2001), it can be found in numerous places: in the minds of people, in organizational processes, in organizational culture, in written documents, or digital storage devices. Davenport & Prusak (1998) claims that finding out, codifying, classifying and storing the knowledge without losing its distinctive features which makes it valuable for the organization is very critical for organizations to compete in the marketplace. Because of the aging workforce and the increased worker mobility in industries, the need to retain "organizational memory" which is the knowledge stored within the organization (Stein & Zwass, 1995) has become more important than ever (Lesser & Storck, 2001). Research has shown that codified and classified knowledge enables employees to "get wired" into the organizational memory, and makes the knowledge available to the organization whenever needed (Nemati & Barko, 2002; Zaim, 2006). Without knowledge codification and storage, organization may get lost in the information heap or totally lose the information once they have acquired (Darr et al., 1995); this is a very high cost for organizations to incur. Therefore, it is highly critical for organizations to find effective ways to store and organize their knowledge-databases (Grant, 2005).

2.2.3 Knowledge Sharing and Distribution (KS&D)

Knowledge sharing and distribution is another important KM process which has been discussed extensively in the literature. One of the most important aims of KM is to bring together intellectual resources of an organization and make them available to whole organization (Zaim, 2006). Many researchers note that knowledge sharing requires a high level of co-operation (Goh, 2002; Syed-Ikhsan & Rowland, 2004). Cross and Sproull (2004) highlight the fact that knowledge sharing is the result of information search and problem solving in situations where people must solve complicated problems within a shortage of time. Advantages of knowledge sharing are that (1) knowledge sharing reduces uncertainty (Gulati & Gargiulo, 1999, Tywoniak, 2007), (2) it ensures that the knowledge owned by the organization rather than the individual (Nemati, 2002; Nonaka & Konno, 1998), (3) it prevents repeating the same mistakes and reduce redundancies (Bender & Fish, 2000) and (4) it ensures that all the employees in the organization have a common understanding (Nickerson & Zenger, 2004). However, individuals generally tend to resist knowledge sharing because being generous in knowledge sharing may sometimes put people at disadvantage (Ciganek et al., 2008). When people feel that their value depends largely on the knowledge they possess, giving up the control of the knowledge they alone had previously may seem risky (Stenmark, 2000), leading people avoid knowledge sharing.

2.2.4 Knowledge Use and Evaluation (KU&E)

The last of the four main KM processes identified through the literature is knowledge use and evaluation. Creating value from the organization's knowledge repositories and transforming it into the fields of application is considered as one of the main priorities of KM (Ordaz et al., 2004). It has been largely argued that sustainable competitive advantage is only possible if the knowledge held by the organization can be converted into use (Alavi & Leidner, 2001; Grant, 1996). Therefore, KM activities should focus on creating changes in behavior, practices, and policies that make the transfer of knowledge possible into the fields of application (Bender & Fish, 2000). It is the only way that an organization can gain a competitive advantage through its KM initiatives. To sum up, the success of KM activities relies to a great extent on the ability of organizations to transform their knowledge base into action in the marketplace (Wilhelmij & Schmidt, 2000).

While the other three KM management processes, namely the knowledge generation, sharing and storage do not necessarily create an increase in the performance of organizations, knowledge use and evaluation does because the performance of companies generally relies on the ability of organizations to utilize its intellectual resources rather than the mere knowledge that they possess (Alavi & Leidner, 2001).

2.3 KM Performance

According to Toften and Olsen (2003), KM performance evaluation is one of the most important stages of a KM initiative as it has a considerable amount of potential to create an added value for the organization and enhance organizational performance. It is highly expected that without KM performance evaluation a KM initiative would fail easily to meet its objectives. However, how to measure KM performance is also one of the biggest challenges of the overall KM efforts. While some researchers prefer to measure some KM outcomes like knowledge satisfaction (Becerra-Fernandez & Sabherwal, 2001) or organizational creativity (Choi, 2002), others adopts more traditional

measures like ROA (Simonin, 1997) or organizational effectiveness (Gold et al., 2001) to measure KM performance. Moreover, while some studies recognized KM performance as the independent variable which predicts the organizational performance, other studies consider the KM performance as same as the organizational performance.

In this research, KM performance is considered as the output of knowledge processes that improves various aspects of KM (Lesser & Storck, 2001). As it is pointed out by Tarim (2003), performance improves only through evaluation. Therefore, it is logical to claim that measuring the KM performance is critical to ensure the continuity, adaptability, efficiency, and success of KM efforts (Tarim, 2003; Toften & Olsen, 2003; Zaim et al, 2007). Without finding appropriate ways to measure KM performance, it is not possible for the organization to legitimize its investments on KM and to keep its employees motivated to be involved in KM efforts (O'Dell & Grayson, 1998). It should be noted that KM performance evaluation is also very critical as it is the only way to measure to what extent organization's knowledge resources are transformed into useful actions (Firer & Williams, 2003; Marr et al., 2003).

KM performance can be measured in terms of realizing the successful outcomes of KM processes, including generating, storing, sharing, and applying knowledge (Gupta, & Govindarajan, 2000, Lesser & Storck, 2001). In this study, it is measured based on the four immediate KM outcomes as identified by Lesser & Storck (2001): (1) decreased learning curve of new employees, (2) reduced rework and prevention of "re-invention of the wheel", (3) more rapid response to customer needs and inquiries, and (4) spawning of new ideas for new products and services.

1) Decreased learning curve of new employees: One of the most important problems faced by the organizations is to rapidly increase the productivity level of new employees (Lesser & Storck, 2001). Particularly, as the workforce mobility continues to increase all around the world, the ability to quickly assimilate new members into the organizational routines, procedures, and processes becomes highly critical to organizational competitiveness. Time is precious, and the quicker the employees learn and adapt to the ways of doing things in the organization the more productive the whole organization becomes, and more valuable the employees become to the company.

2) Reduced rework and prevention of "re-invention of the wheel": Second, according to Arora (2002), perhaps one of the most important objectives of KM efforts is the prevention of "re-invention of the wheel" in organizations and the reduction of knowledge-based activities by utilizing the already accumulated knowledge in the organization. Likewise, Lesser and Storck (2001) argues that it is a waste of time and money when employees try to solve a problem that has already been solved once by somebody else. As pointed out by Robertson (2002), when the knowledge transfer or sharing is weak or not practiced at all, organizations end up wasting their time, resources and money by repeating the same work or even the same mistakes over and over again as the organizational members are unaware of each others' work and experience.

3) More rapid response to customer needs and inquiries: Third, in the era of hyper-competition as we are experiencing today, responding more quickly to customer needs and inquiries is getting more and more important. Business

have all realized that if they fail to respond customers' needs and wants timely, they will eventually lose them, let alone acquiring new ones. Lesser & Storck (2001) advocate that KM is highly critical to addressing customer issues timely as it facilitates the quick transfer of the knowledge to the right people in the organization. If every employee knows from whom and where they can find knowledge, they can be much quicker in responding customer needs and wants.

4) Spawning of new ideas for new products and services: Forth, one of the primary reasons that KM is seen as vital to innovating is its ability to create an atmosphere where people can freely share their ideas without fear of being ridiculous. Such an environment is especially necessary when the progress needs some challenge or when people have ideas that are not fully "baked" but need to be heard, fed and shielded until they can be thrown into ways that are useful by the help of many others. The more the individuals share their innovative thoughts with other members in the organization and tap their expertise to refine and develop their not fully "baked" ideas, the higher the number of innovation will be in the organizations (Meijden, 2009).

3. Research Model

The objective of this study is to examine the natural influence of organizational culture on KM performance through the KM processes of knowledge generation and development; knowledge codification and storage; knowledge transfer and sharing; and knowledge use and evaluation. The research model is shown in Figure 1.
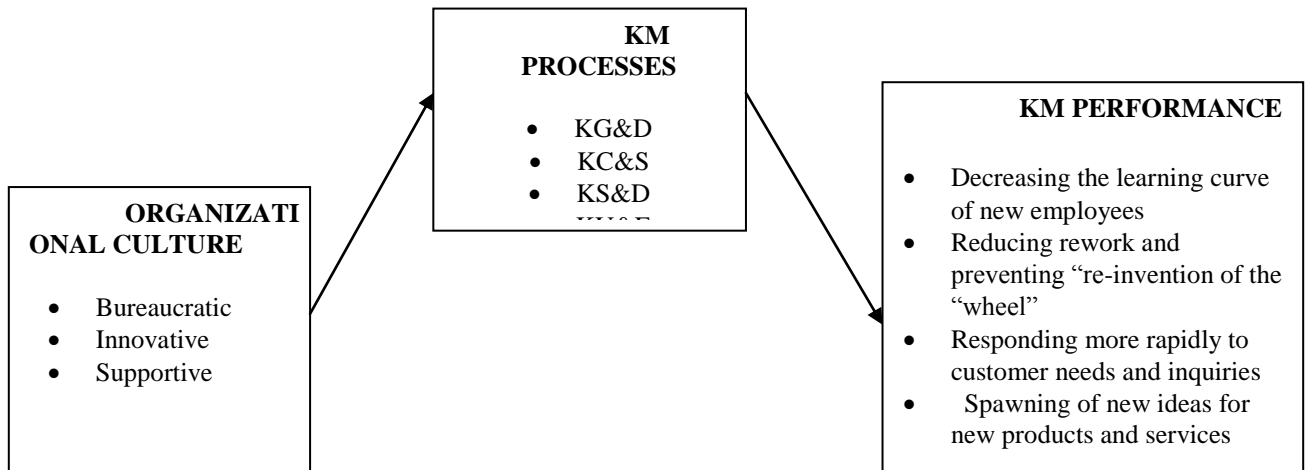

Figure 1. Research model

3.1. Hypothesis

One common thing found in the literature is that KM processes are highly influenced from their social settings (Alavi, Kayworth & Leidner, 2006). As pointed out by Ndlela & Toit (2001), and Choi (2002), KM has to be an integrated element of how things get done in an organization. As the culture affects how an organization accepts and continues its KM efforts, creating knowledge friendly culture can be considered as the backbone of a successful KM implementation (Davenport et al., 1998; Demarest, 1997). Therefore, it can be hypothesized that:

H1: There is a significant relationship between the concepts of organizational culture and KM processes

In an environment where newcomers and outsiders can easily blend in (Hofstede et al., 1990), and where people trust to one another, knowledge sharing will be less problematic. On the other hand, in reserved and secretive organizational cultures where distrust is prevalent, people can hardly share their knowledge (Ciganek et al., 2010; De Long & Fahey, 2000; Hofstede et al., 1990), and even if they do so, they might be tempted to hide or hoard their knowledge (Jarvenpaa & Staples, 2000), as they may think that their value depends largely on the knowledge they possess (Stenmark, 2000).

H1A: The sub-dimensions of trust, collaboration, and openness (supportive culture dimensions) are going to explain the majority of the variance in KS&D

As pointed out Miller & Friesen (1982), organizations having conservative attitudes toward innovation and its associated risks engage in innovation only when they are seriously challenged by their competitors or when their customers seriously demand something different. In contrast, organizations which are risk-oriented, fostering a stimulating and challenging environment (Hofstede et al., 1990) actively support KG & D for the sustainability and prosperity of the organization (Ciganek et al., 2010). Hence, it can be hypothesized that:

H1B: The sub-dimensions of risk-taking, stimulating and challenging climate properties (innovative culture dimensions) will be the most significantly contributing conceptual dimensions that explain a higher level of variance in KG & D.

KM processes, and specifically the knowledge sharing, is essential in order to reduce re-work and avoid 're-invention of the wheel'. One of the most valuable contributions that knowledge sharing can make to an organization is that since the knowledge sharing makes other people's and departments' knowledge and experience accessible to anyone who may need it, it helps the re-use of existing intellectual work and prevents all types of re-work (Bender & Fish, 2000). Without effective knowledge sharing, organizations will be likely to lose huge amount of time and money because they will repeat the same mistakes and replicate the similar works over and over again (Robertson, 2002). Likewise, organizational memory which is codified and stored helps organizations avoid the waste of its resources by making them available throughout the organization and diminish the loss of knowledge (Simon, 1991).

KM processes also help new employees "fit in" the organization quickly, and learn the ways of doing work, and respond to customer needs and inquiries more rapidly and effectively. Moreover, KM processes are considered as one of the most critical pre-conditions and an important premise for organizational innovation (Leal et al., 2006; Xing et al., 2007) because of its capacity for bringing together diverse ideas that leads to fresh outlooks. Therefore, it can be hypothesized that:

H2: There is a significant positive relationship between KM processes and KM performance.

Research has shown that activated KM processes are positively related to KM performance (Lesser & Storck, 2001; Bender & Fish, 2000, Robertson, 2002, Simon, 1991, Zaim et al, 2007) and organizational culture (Alavi et al., 2006; Davenport et al., 1998; Demarest, 1997; Gold et al., 2001; Gray & Densten, 2005, Lee & Lee, 2007). However, it also remains unclear in the literature that whether KM processes serve as a mediator in the relationship between organizational culture and KM performance. The additional hypotheses of this research are therefore formalized as follows:

H3A: The relationship between bureaucratic organizational culture and KM performance is mediated by KM processes

H3B: The relationship between innovative organizational culture and KM performance is mediated by KM processes

H3C: The relationship between supportive organizational culture and KM performance is mediated by KM processes

4. Research Methodology

4.1 Sample and Data Collection Procedure

The population of this study consists of employees who are working in companies that adopted KM. Number of total participants in the study was 210 from 9 different organizations operating in Turkey. The necessary condition for inclusion in the dataset was "working in the organization for more than 1 year".

Both a hard and a soft copy of the survey were distributed. A total of 110 soft copy of the survey were e-mailed to respondents, while a total of 330 hard copies have been distributed in person. 40 responses were received from respondents who have been

reached via email, and 184 responses were received in hard copy resulting in % 50.9 of return rate. However, 14 data had to be left out due to inappropriate survey filling. In total, 210 data were obtained which have all answers completed to each questions in the study. Table 1 summarizes the respondent characteristics in terms of gender, age, education, sector, job title, work experience at the current company, and total work experience.

Table 1
Respondent characteristics

	Frequency	Percent		Frequency	Percent
Gender			Education		
Male	136	64.8	Bachelor's degree	164	78.1
Female	74	35.2	Master/PhD degree	46	21.9
Age			Work experience at the current company		
<25	7	3.3	1-2 year	24	11.4
25-30	82	39	3-5 year	67	31.9
36-45	101	48.1	6-9 year	82	39
>45	20	9.5	>10 year	37	17.6
Sector			Total work experience		
Information Technologies	41	19.5	1-2 year	11	5.2
Service	67	31.9	3-5 year	42	20
Production	81	38.6	6-9 year	69	32.9
Finance	21	10	>10 year	88	41.9

4.2 Measures

For the measurement of each construct used in the study, respondents were asked to indicate how much they agree with the formulated statements based on a five-point Likert-type scale ranging from '1=strongly disagree' to '5=strongly agree'. 12 items that were used for the measurement of KM performance were developed based on the four dimensions identified by Lesser & Storck (2001) and devised through an intensive dialog with practitioners and academicians in the field. They checked the items for appropriateness, comprehensiveness and readability thereby ensuring the content validity of the instrument. Following refinement of the items, the scale was pilot tested on a set of experienced managers in KM applications. Through the confirmatory factor analysis, construct validity is verified, and a reliability analysis using Cronbach's alpha is found to be high for all four factors. As it was theorized the scale presented a four-factor structure: (1) decreased learning curve of new employees, (2) reduced rework and prevention of "re-invention of the wheel", (3) more rapid response to customer needs and inquiries, and (4) spawning of new ideas for new products and services.

The content validity of the other instruments used in the study is established by using the scales adapted from prior studies. Organizational Culture Index which was originally developed by Wallach (1983) was used to create the cultural profile of an organization based on the perceptions of its members. The scale presents three

organizational culture profiles (bureaucratic, innovative and supportive) which were measured by 24 items. After the factor analysis 4 items had to be eliminated from the study since their factor loading values were lower than .50. KM processes, on the other hand, were assessed by using 30 items, which was originally developed and validated by Zaim et al (2007). One item with a factor loading value less than .50 was eliminated from the study after the factor analysis. The scale presented a four-factor structure: knowledge generation and development; knowledge codification and storage; knowledge transfer and sharing; and knowledge generation and utilization.

The reliabilities of the constructs were assessed by Cronbach's alpha, and found to be high (over .70) for each one. The construct validity was obtained by convergent and discriminant validity. The item-to-total correlation was calculated to see whether the items within the same construct correlate highly among themselves (Choi, 2008). For convergent validity, items whose item-to-total correlations score were lower than 0.40 were eliminated from further analysis. Factor analysis with varimax method was utilized for discriminant validity to see whether believed different constructs are indeed unrelated. Items with factor loading values lower than 0.50 also were eliminated. The number of items and the results of the reliability and validity tests for the constructs can be found in Appendix A.

5. Empirical Analysis & Results

In order to test the aforementioned hypotheses, a series of multiple regression analyses were undertaken.

To understand the relationship between the types of organizational culture and knowledge management processes, a regression analysis is conducted.

Table 2
Multiple regression of the organizational culture factors on KM processes

Independent Variable: Organizational Culture	Dependent Variable: KM Processes		
Factors	r	ß	t
Innovative	.811	.508	7.003**
Supportive	.744	.302	4.422**
Bureaucratic	-.431	-.151	-3.362**

R^2 = .701 (Adjusted R^2 = .697)
** significant at .01

As can be seen in Table 2, regression analysis results show that there is a significant and positive relation (β= .302; p< .01) and (β= .508; p< .01) between supportive and innovative type of organizational culture and KM processes respectively whereas there is a significant and negative relationship (β= - .151; p<. 01) between bureaucratic type of organizational culture and KM processes. Furthermore, all three factors of organizational culture are found to explain 70. 1% of variance in KM processes. Thus, H1 is accepted.

A regression test is done between innovative, supportive, and bureaucratic types of organizational culture and KS&D to see which of these factors are more effective to predict the dependent variable KS&D.

Table 3

Multiple regression of the organizational culture factors on KS&D

Independent Variable: Organizational Culture	Dependent Variable: KS&D			
Factors	r	Δ R²	ß	t
Supportive	.771	.509	.509	7.166**
Innovative	.755	.060	.270	3.573**
Bureaucratic	-.425	.023	-.191	-4.097**

** significant at .01

As can be seen above, supportive, innovative, and bureaucratic type of organizational cultures have significant correlations with KS&D meaning that they all are suitable to predict the dependent variable KS&D and they all make significant contributions to the model. Pearson correlation coefficients indicate that supportive and innovative organizational cultures have a strong and positive correlation ($r = .771$; $p < .01$) and ($r = .755$; $p < .01$) with KS&D while bureaucratic organizational culture has a negative and somewhat moderate relationship ($r = -.425$, $p < .01$) with the dependent variable KS&D.

Supportive organizational culture accounts for 50.9 % of variance in KS&D when included in the model alone. When bureaucratic type of organizational culture are taken to the model, it accounts for an extra 6 %, and when innovative organizational culture is added to the model it accounts for extra 2.30 % of the variance in KS&D. So, supportive organizational culture is found to have a higher explanation power than other organizational cultures in explaining KS&D. ß values also show that supportive organizational culture explains the majority of variance in KS&D. Thus, H1A is accepted.

The procedure followed for H1A is also followed for the H1B by taking KG&D as the dependent variable.

Table 4

Multiple regression of the organizational culture factors on KG&D

Independent Variable: Organizational Culture	Dependent Variable: Knowledge Generation & Development			
Factors	r	ΔR²	ß	t
Innovative	.710	.505	.497	5.588**
Bureaucratic	-.468	.038	-.228	-4.143**
Supportive	.603	.001	.150	1.791

** significant at .01

As can be seen in Table 4, regression results indicate that supportive organizational culture is not suitable to predict the dependent variable KG&D ($p > .01$). Innovative type of organizational culture accounts for 50.5 % of variance in KG&D when included in the model alone. When the bureaucratic type of organizational culture is taken to the model, it accounts for an extra 3.8 % of the variance in KG&D which is considered to be low (Sipahi, Yurtkoru, Çinko, 2006). So, innovative organizational culture is found to have a higher explanation power than the bureaucratic type of organizational culture on KG&D. The other findings also support this result. ß values also

show that innovative type of organizational culture is a better predictor than bureaucratic type of organizational culture. Thus, based on all these findings, H1B is accepted.

In order to test H2, another regression analysis is conducted. Regression analysis results show that there is a significant, positive, and strong relation (β=.759; p=. 00) between KM processes and KM performance and the total explained variance is found to be 57.6 %, which is considered to be high. Thus, H2 is supported.

Baron and Kenny's (1986) mediation analysis was employed in order to test the mediating effect of KM processes on the relationship between the dimensions of organizational culture and KM performance.

Table 5 below shows the results of three step regression analysis in order to test H3A. Step one investigates the relationship between bureaucratic organizational culture and KM processes. As can be seen in the Table 5, bureaucratic organizational culture can explain 17. 9 % variance in KM processes. They have a negative, significant, and somewhat moderate relationship (ß= - .423, p< .01). Second step examines the relationship between bureaucratic organizational culture and KM performance. It shows that bureaucratic organizational culture also has a negative and significant relationship with KM performance (ß= - . 412, p< .01). The last step analyzes the relationship between bureaucratic organizational culture and KM performance while controlling KM processes.

Table 5

Regression results to test the mediating role of KM processes on the relationship between bureaucratic culture and KM performance

	D.V.	I.V.	ß	t	p	R²
1	KM Processes	Bureaucratic culture				.179
	Bureaucratic culture		-.423	-6.332	.000	
2	KM Performance	Bureaucratic culture				.170
	Bureaucratic culture		-.412	-6.139	.000	
3	KM Performance	Bureaucratic culture & KM Processes				.586
	Bureaucratic culture		-.111	-2.118	.056	
	KM Processes		.712	13.571	.000	

Based on the multiple regression analysis results, when KM performance was regressed both on bureaucratic organizational culture and KM processes, the beta coefficient of bureaucratic organizational culture decreases from ß= -.412 to ß= -.111 in the third regression analysis compared to the second (see Figure 2). Furthermore, it became insignificant. Therefore, the necessary conditions for supporting the full mediation were adequately met. KM processes has a full mediating role on the relationship between bureaucratic organizational culture and KM performance. Thus, H3A is supported.
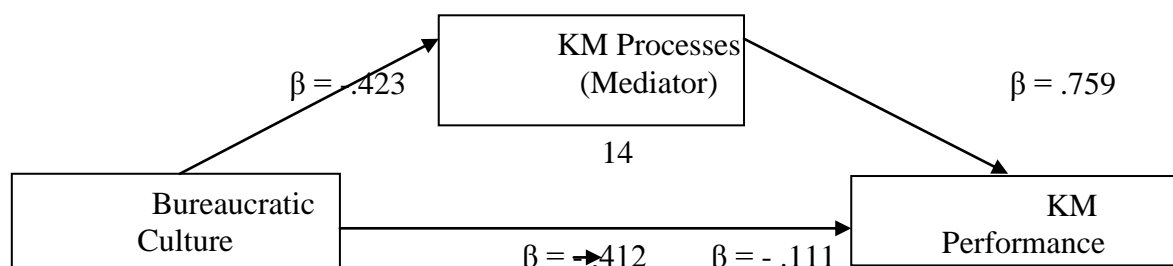
Figure 2. The mediating effect of KM Processes on the relation on the relationship between "Bureaucratic Culture" and "KM Performance"

Table 6 below shows the results of the multiple regression tests between innovative organizational culture and KM performance relationship as mediated by KM processes.

Table 6

Regression results to test the mediating role of "KM Processes" on the relationship between "Innovative Culture" and "KM Performance"

	Dependent Variable	Independent Variable	ß	t	p	R²
1	KM Processes	Innovative culture				.641
	Innovative culture		.801	18.129	.000	
2	KM Performance	Innovative culture				.543
	Innovative culture		.737	14.790	.000	
3	KM Performance	Innovative culture & KM Processes				.623
	Innovative culture		.360	4.750	.000	
	KM Processes		.471	6.212	.000	

As can be seen in the table 6, innovative organizational culture can explain 64.1 % of KM processes. They have a positive, significant, and strong relationship (ß=.801, p< .01). Innovative organizational culture also has a positive and significant relationship with KM performance (ß=.737, p< .01). When KM performance was regressed on both innovative organizational culture and KM processes, the beta coefficient of innovative organizational culture went down from .737 to .360 in the third regression analysis compared to the second (See Figure 3). However, it was still significant. This illustrates that KM processes has a partial mediating role on the relationship between innovative organizational culture and KM performance. Therefore, H3B is accepted.
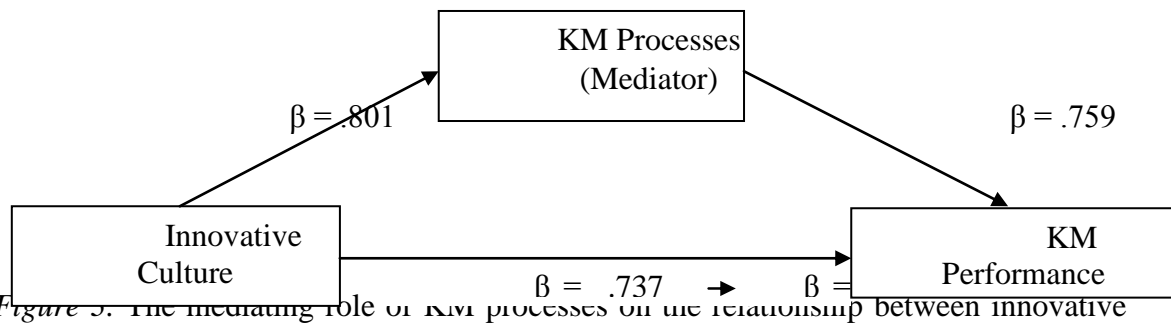
Figure 3. The mediating role of KM processes on the relationship between innovative culture and KM performance

Table 7 below shows the results of three step regression analyses in order to test whether KM processes mediates the relationship between supportive culture and KM performance.

Table 7

Regression results to test the mediating role of KM processes on the relationship between supportive culture and KM performance

	Dependent Variable	Independent Variable	ß	t	p	R^2
1	KM Processes	Supportive culture				.468
	Supportive culture		.684	13.535	.000	
2	KM Performance	Supportive culture				.296
	Supportive culture		.544	9.352	.000	
3	KM Performance	Supportive culture & KM Processes				.577
	Supportive culture		.046	.746	.456	
	KM Processes		.727	11.739	.000	

Step one investigates the relationship between supportive culture and KM processes. As can be seen in the Table 7, supportive organizational culture can explain 46. 8 % of KM processes and it is significantly and positively related to KM processes (ß=. 684, p< .01).

Second step examines the relationship between supportive culture and KM Performance. It shows that supportive organizational culture also has a positive and significant relationship with

KM performance (ß= .544, p< 0.01). The last step analyzes the relationship between supportive culture and KM performance, while controlling KM Processes. When KM performance was regressed on both on supportive organizational culture and KM processes, the beta coefficient of supportive organizational culture decreases from ß= .544 to ß= .046 in the third regression analysis compared to the second (see Figure 4). Furthermore, it became insignificant. This illustrates that KM processes has a full mediating role on the relationship between supportive organizational culture and KM performance. Therefore, H3C is accepted.
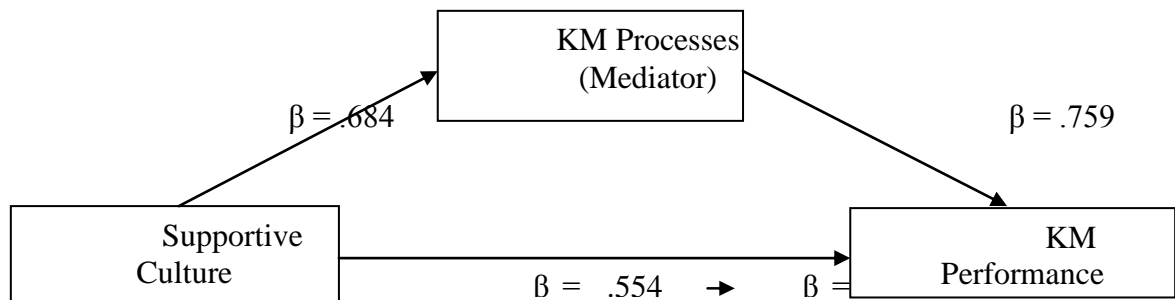
Figure 4. The mediating role of KM processes on the relationship between supportive culture and KM Performance

6. Discussion

In order to understand the factors that affect KM performance, many studies have been conducted since it has a great impact on organizational competitiveness. Among those factors, organizational culture has emerged as one of the most important factors affecting the KM performance. However, the role of KM processes as the explanatory variable between organizational culture and KM performance was not investigated so far. Therefore, the present study helps extend the previous research by demonstrating the role of KM processes on the relationship between the dimensions of organizational culture and KM performance. The findings also make a contribution to the literature by showing the varying influence of KM processes on KM performance based on the different dimensions of organizational culture. Among the three dimensions of organizational culture, only the relationship between innovative organizational culture and KM performance was partially mediated whereas the relationship between other dimensions of organizational culture, namely supportive and bureaucratic organizational culture, were fully mediated by KM processes. In other words, innovative organizational culture was directly related to KM performance, and KM processes partially mediate this relationship while supportive and bureaucratic types of organizational culture were only indirectly related to KM performance through the KM processes. According to these results, KM processes serves as a critical explanatory variable in the relationship between organizational culture and KM performance.

Specifically, bureaucratic and supportive organizational cultures do not have a direct effect on KM performance when KM processes were controlled. While employees working in bureaucratic organizational cultures were less likely to engage in KM processes, which in turn results in lower KM performance, employees working in supportive organizational cultures were more likely to produce more activated KM processes, which in turn results in higher KM performance. Thus, the employees who perceive their environments as structured, procedural, hierarchical, ordered, regulated, established, cautious, and power oriented were less willing and more reluctant to engage in acquiring, generating, sharing and utilizing knowledge, which in turn decrease the KM performance of the organization. Whereas employees working in harmonious, open, friendly, collaborative, encouraging, social atmosphere were more prone to engage in KM processes which in turn increases the KM performance of the whole organization.

On the other hand, properties of innovative organizational culture such as results-oriented, pressurized, risk taking, stimulating, challenging, enterprising, creative, and driving were found to directly affect KM performance, and KM processes are only found to partially mediate this relationship. Thus, KM processes were not the only explanatory

variables between the innovative organizational culture and KM performance, indicating that there might be many other factors affecting this relation. For example, one factor that might mediate the relationship between innovative organizational culture and KM performance can be the "individual accountability" as it is linked to both innovative organizational culture and KM performance. It can be assumed that in innovative organizational cultures, when members feel that they are individually responsible for the consequences, it is more likely that employees will strive to do their best in order to avoid the consequences of being held accountable for the poor work. They will be much more careful not to repeat the same mistakes, more alert to learn from their own and other's mistakes, more innovative, and more responsive to customer needs and wants. Furthermore, the new employees will try to learn much faster when they feel personally accountable for the task in interest. All of these, in turn, will result in better KM performance. Future research can examine those variables which may have an impact on the relationship between innovative organizational culture and KM processes. Furthermore, since this is a cross-sectional research which presents only a snapshot, a longitudinal study can be conducted to provide deeper understanding of the dynamic features of knowledge management. Also, the study should be repeated for other samples to generalize the results.

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Appendix A
Reliability and validity test results for measures

Measure	Item	Cronbach's Alpha	Convergent Validity	Discriminant Validity
Organizational Culture				
Innovative	6	.931	.801; .757; .771; .603; .508; .498	.841; .784; .775; .659; .636; .528
Supportive	8	.941	.802; .720; .714; .756; .683; .698; .702; .658	.850; .816; .813; .773; .770; .757; .740; .694
Bureaucratic	6	.924	.809; .827; .797; .736; .798; .658	.885; .881; .876; .838; .779; .777
KM Processes				
KC&D	8	.957	.720; .714; .715; .633; .644; .609; .683; .582	.756; .750; .742; .725; .721; .667; .653; .577
KG&D	8	.964	.753; .758; .773; .685; .632; .658; .598; .645	.763; .751; .750; .717; .703; .702; .693; .588
KU&E	8	.962	.742; .716; .756; .663; .672; .654; .548; .592	.758; .742; .726; .693; .676; .662; .571; .550
KS&D	5	.962	.801; .798; .705; .630; .628	.806; .784; .761; .693; .676
KM Performance				
More rapid response to customer needs & inquiries	3	.938	.856; .841; .795	.913; .874; .848
Decreased learning curve of new employees	3	.908	.878; .869; .758	.907; .879; .777
Spawning of new ideas for products & services	3	.855	.897; .828; .829	.906; .887; .845
Reduced re-work & prevention of 're-invention of the wheel'	3	.865	.899; .789; .702	.908; .883; .711

Institutional Responsibilities of Social Housing Provision in Nigeria

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Abstract

This paper reveals the institutional arrangement in the provision of public housing in the three tiers of government in Nigeria. The process of urbanization, which is fuelled by the ever changing socio-political and economic instability of the country has put so much pressure on urban housing provision. This pressure has engendered inter-institutional conflict to the extent that government sometimes does not know which institution to channel certain funds for housing projects. This paper therefore, exposes areas of conflict among the different institutions at all levels of government and various policy reforms in making housing available to Nigerians. It also reveals other factors militating against housing provision in the country and best practices in the provision of public housing

Keywords: Inflation, Housing Policy, Urbanisation, Overlaps, Institutions

Introduction

Shelter is one of man's second most important essential human needs, after food. Housing is more than just a shelter to lay one's head, it includes comfort, security, aesthetics and dignity. With galloping inflation and primate increase especially in urban centers, housing problems in Nigeria are enormous and complex; exhibiting marked regional and geographical differences and the severity is more in the Urban than the rural areas. While according to the National Population Commission, (2002) the average occupancy in the urban areas is 4.6 in the south, it is less than 3.0 in the rural areas and increases towards the western part of the country. Housing problem in Nigeria is not restricted to quantity, but to quality and poor environment. In the rural areas, the problem is not quantity but the quality. Most houses in the rural areas lack the basic essentials of a house like toilets, water and electricity.

Policy activities on housing provision have always been lopsided, government always plan for a sector of the population. For example during the colonial period, the housing activities and policies of government focused essentially on the provision of quarters for expatriate staff and for selected indigenous staff in government parastatals. No specialized policy was enacted for people outside government employment. This situation continued after independence in 1960. During the National Development plan period between 1960-1979 the housing sector suffered from near complete neglect especially during the first two National development plans from 1960-1964 and 1964-1970 respectively (Guyse, 1984). However in 1971 Government established the National Council on housing which marked the first attempt by government to intervene in the deteriorating housing conditions in Nigeria. (National housing policy, 1985) Other interventions include:

- National housing Programme 1972, with mandate to construct houses in all the state capitals.
- Staff Housing Board decree 1972- With a mandate to grant loans to civil servants
- Federal Housing Authority decree 40 of 1973- With a mandate to coordinate a nation wide Housing Programme
- Federal Ministry of Housing, Urban Development and environment 1975 was created and charged with the responsibility of initiating and coordinating policies in housing related areas
- Committee on standardization of house types and policies 1975- This was the first attempt by the Federal Government in recognition of housing problems of low income group
- The inflation Task Force 1976-Among other of its activities to examine the effects of the economy on the housing sector
- Rent panel 1976- To review the structure and level of rent in the country. Their recommendation resulted in the establishment of state rent tribunals
- The land use panel 1977- To examine land tenure and ownership system in Nigeria
- National Housing Programme 1979-1983- With a target of providing housing for the low income owners. This marked a second attempt at providing housing for the low income after the 1975 policy

- Despite all these and the various housing Programmes embarked upon by various state government and the Federal government housing provision for majority of Nigerians still remains a mirage.

This paper examines housing policy in Nigeria and institutional responsibilities at different levels with a view of highlighting various attempts made by Government at providing social housing. It also compares institutional overlaps and suggest best practices for sustainable development.

Institutional Responsibilities

While the aim of Nigeria's National Housing policy is to ensure that all Nigerians have access to decent Housing and accommodation at affordable cost, its implementation however, has always been fraught with hiccups.

An institutional responsibility should begin at the initial stage of policy development, but seems to lag behind during implementation. This paper examines these responsibilities vis a vis the roles of the Federal Government, Federal Housing Authority, Urban Development Bank, State Government, Local Government and the private sector

Responsibilities of the Federal Government

The Federal Government which is the central Government in Nigeria has the role to initiate, define and coordinate the policy options and instruments for achieving the aim of the national policy on housing. It is saddled with the following responsibilities:

- Provide funding for site development, social housing and research into housing issues.
- Research into building techniques, materials and method of construction.
- Promote the establishment of building societies and the establishment of building material industry.
- Assist the state and local Governments to prepare master plans.
- Facilitate the establishment of infrastructure development fund to finance the provision of infrastructure facilities.
- Review the various Town planning surveys and land laws to make them more responsive to the requirement of housing industry.

Federal Housing Authority

The Federal Housing Authority was set up by decree 40 of 1973 with the following responsibilities:

- Preparation of proposals for National housing Programme
- Making recommendations to Government on such aspects of urban and regional planning, transportation, communication, electricity, sewage and water supply development.
- Execution of approved housing Programmes
- Development and manage real estates on commercial and profitable basis in all the states of the federation
- Provide sites and services for all income group in the major capital cities in the country

Urban Development Bank

With the transmutation of the Federal Mortgage Bank into a full fletched commercial, merchant and Mortgage Bank, its role in housing provision becomes diminished. Federal Government in 1989 established the urban Development Bank and liberalized the Mortgage finance sector of the industry for other players to participate. However, the urban Development Bank has part of its responsibilities to encourage flow of funds from capital market to the housing industry with mortgage financing system. The bank too is saddled with the responsibility of financing urban support infrastructures like sewage, water, electricity, roads, schools etc.

Functions of the State

Each state within the Federation has the responsibility of formulating its own policies with respect to the following:

- Establish an appropriate agency to execute public housing Programme
- Provide social housing
- Promote and facilitate the development of site and service scheme
- Provide the environment for the promotion of local building materials, to ensure availability of cheap building materials
- Prepare regional and urban master plans
- Carry out slum renewal schemes
- Promote the formation of housing cooperatives and building societies

Functions of Local Government

- Provide residential layouts for low income housing through planning authorities
- Implement rural housing Programme
- Provide infrastructures
- Maintain urban and Regional infrastructures and environmental sanitation
- Determine housing needs of the rural population
- Upgrade existing residential areas in collaboration with state Government

Private sector participation

Private sector participation in Housing delivery especially social housing is high. The sectors contribution in primary mortgage institutions is still fraught with low financing, which has made building developers in the industry to construct sub standard houses and fix cut throat prices outside the reach of low income earners. The housing policy provides that the private sector shall establish primary mortgage institutions or building societies financed by companies, individual and housing Co-operatives. The policy stipulates that necessary incentives shall be given to private developers to develop suitable accommodation either on rental or sale to the low income earners and by extension to middle and high income earners

Institutional Overlaps

Federal and State Government

One major area of conflict is the clash between the Federal and the State Government in ownership and control of certain lands in the country. While the land use decree of 1978 of the Federal Republic of Nigeria vests all land comprised in the territory

to the military Governor of that state and to hold it in trust for the citizens, the decree specifically stipulates that all lands in the urban areas shall be under the direct control of the Military Governor while other lands shall be controlled by the Local Government. The conflict arises when the federal Government uses its might to acquire land forcefully from the state Government due to military rule. With civilian rule in place the conflict usually degenerates to long and bitter court cases. The same scenario is repeated in the states when the state and Local Government council argue over rights of who is to collect certain levies from activities on certain lands in the state. The problem has to do with poor understanding of the land use decree, which has specified the functions of each arm of Government vis a vis Land ownership and control.

Factors Militating against low income housing provision in Nigeria

Low income group can be defined as all wage earners and self employed people whose monthly income is N7, 500 as minimum wage set by the Federal government this translates to N90, 000 per annum. According to the revised Housing Policy (1985) governments past efforts at providing houses for this group (low income group) was a failure; the various loan schemes did not adequately cater for the needs of the low income group; the machinery for the implementation of housing programmes was insufficient; the conception of housing need was narrow; the motive behind some of the targets set was questionable; the rural people were not considered and the various housing Programme were implemented without any base line information as to the needs of the people . The following are other factors responsible for its continuous failure;

- Finance- Inability to afford the necessary down payments
  -Low earning power
  - Inability to provide reliable guarantors
  -High interest rates
- Inflation
- Rapid urbanization
- Inadequate infrastructure facilities
- Limited access to land and difficulties in obtaining certificate of occupancy

Best practice strategies for Social Housing provision
- Eliminate problems associated with the low income group access to finances through the proper utilization of work place mortgage financing of staff housing needs
- Implement the concept of site and services to facilitate the access of the low income group to serviced plots (i.e. plots with laid down basic urban support amenities) at affordable cost.
- Government can work out schemes whereby Mortgage institutions should grant small loans at very low interest to low income groups to refurbish their house for those who have already
- States can encourage the establishment of local co operatives for direct construction and distribution of building materials. Such cooperatives societies shall have access to the funds of the Urban Development Bank and state owned Mortgage Banks
- Government (Both state and Federal) should extend the amortization periods for the low income workers

- The united Nations housing Programme on shelter for the homeless which aims primarily to provide shelter for but with particular emphasis on the low income earners should be revisited and activities should be set in motion at Federal, state and Local Government Level to implement it.
- Rural housing scheme should be revisited the Federal and state Governments should through her agencies liaise with Local Governments owned mortgage institutions to make soft loans available to local people who have formed cooperatives to help them acquire building material.
- The World Bank concept of Nigerian States Urban Development (NSUDP) that has been rested for long should be re enacted and modified extend the idea to every state Government for action
- The reduction and abolition in certain cases, of import and exercise duties on building materials
- Government housing monetization scheme should take immediate effect and adequate directives should be given to firms and companies to start the monetization process without delay.

Data Analysis

The Objective of the Government and Private Housing Scheme is to provide for the growing housing needs of the Nation but this is truncated by the cost of the house as shown in Table 2. The average income of the Nigeria worker is so low that it is very difficult to acquire any of the government houses. See the consolidated Public Service Salary Structure in Table 1.

Table 1: Public Service Salary Structure

CONSOLIDATED PUBLIC SERVICE SALARY STRUCTURE (CONPSS)
(EFFECTIVE FROM 1ST JULY 2010)

CONPSS	1 N	2 N	3 N	4 N	5 N	6 N	7 N	8 N	9 N	10 N	11 N	12 N	13 N	14 N	15 N
01	204878	209347	213816	218285	222755	227224	231693	236162	240631	245101	249570	254039	258508	262977	267447
02	208206	214049	219893	225736	231579	237423	243266	249110	254953	260796	266640	272483	278327	284170	290013
03	211048	218230	225412	232595	239777	246959	254142	261324	268506	275689	282871	290053	297236	304418	311600
04	221072	229701	238329	246958	255587	264215	272844	281472	290101	298729	307358	315987	324615	333244	341872
05	250498	260522	270546	280570	290595	300619	310643	320668	330692	340716	350740	360765	370789	380813	390837
06	305429	317648	329867	342086	354305	366524	378743	390962	403181	415400	427619	439838	452057	464276	476495
07	507165	525918	544671	563423	582176	600928	619681	638433	657186	675938	694691	713443	732196	750949	769701
08	655384	677704	700024	722344	744663	766983	789303	811623	833943	856263	878583	900903	923223	945543	967863
09	769856	796430	823005	849579	876154	902728	929303	955877	982451	1009026	1035600	1062175	1088749	1115324	1141898
10	903711	932934	962157	991381	1020604	1049827	1079050	1108273	1137496	1166719	1195942	1225166	1254389	1283612	1312835
12	1042408	1087737	1133065	1178394	1223722	1269051	1314379	1369708	1405036	1450365	1495693				
13	1163433	1211355	1259277	1307199	1355121	1403043	1450965	1498887	1546809	1594731	1642653				
14	1285018	1336609	1388199	1439790	1491381	1542971	1594562	1646152	1697743	1749334	1800924				
15	1767816	1840882	1913947	1987013	2060078	2133144	2206209	2279275	2352340						
16	2186877	2274689	2362501	2450313	2538125	2625937	2713749	2801561	2889373						
17	4172800	4331367	4489934	4648501	4807068	4965635	5124202	5282769	5441336						

Source:NBS (2010).

Let us consider the low income earner: Level 1 step 15, the earning is ₦267,447 per annum and to pay for one bedroom flat, in the states like Bauchi State , which has the minimum cost (see Table 2) and the amount is ₦3.5 million per room. The total cost for

building one bedroom is ₦7million   and the individual is expected to pay back in 10years that is ₦ 0.7 million per annum. How feasible is this social housing?

The highest paid public servant is on Level 17 step 9 and the individual collects ₦5,441,336 per annum. This Level of worker is assumed to be the highest income earner that a 3 bedroom Unit is built for at an average cost of ₦14million. The individual is expected to pay ₦1.4million annually. This is convenient for workers in this category to cope with but how many Nigerians get to this category before they retire from the service? The social housing scheme was, therefore, designed for workers in this highest category in Bauchi and Gongola States where the average cost is ₦13millin for 3 bedroom flat. In other states such as Benue, Kaduna, Oyo, Sokoto, etc. where 3 bedroom flat was over ₦50million, it was impossible for any civil servant to have a 3 bedroom flat.

In Nigeria, funds for housing loan are never available. The conditionalities for accessing this loan are so stringent that most people do not regard them as operational at all. For example, National Housing Fund only gave out N155million as loan out of 4.5billion collected through mandatory savings between 1992 -2001. It is obvious that this is not lack of funds but conditionalities

Table 2: Financial Allocation and Housing Units Constructed by State

State	Amount allocated to state (Million)	Housing Units Constructed by Type			Total Units	Average Unit Cost in the states (Millions)	
		1 bedroom	2 bedroom	3 bedroom			
FCT	-	1,706	24	178	1,908		
Anambra	36,000	1,594	626	180	2,400	15	
Bauchi	24,000	1,810	806	200	2,816	8.5	LOWEST
Bendel	30,000	940	282	200	1,422	21.1	
Benue	55,000	1,800	-	180	1,980	27.8	
Borno	75,120	1,800	808	200	2,808	26.8	
Cross-River	56,000	1,848	46	364	2,258	24.8	
Gongola	26,000	1,794	1,044	200	3,038	8.6	
Imo	42,500	1,796	762	200	2,758	15.4	
Kaduna	104,670	1,650	914	152	2,716	38.5	
Kano	21,000	1,750	-	200	1,950	10.8	
Kwara	45,000	1,764	538	160	2,462	18.3	
Lagos	64,000	1,862	608	200	2,670	24.0	
Niger	45,100	1,800	748	144	2,692	16.8	
Ogun	720,050	1,724	252	184	2,160	333.4	HIGHEST
Ondo	32,160	1,796	934	200	2,930	11.0	
Oyo	80,000	1,736	202	190	2,128	37.6	
Plateau	23,750	1,794	552	200	2,546	9.3	
River	131,200	1,380	-	200	1,580	83.0	
Sokoto	70,000	1,886	228	200	2,314	30.3	
Total	1,033,552	34,194	9,374	3,932	47,500	21.8	
	1,681,550	34,230	9,374	3,932	47,536	35.4	Average cost

Source: Onibokun, 1990 and Musari, 1993.
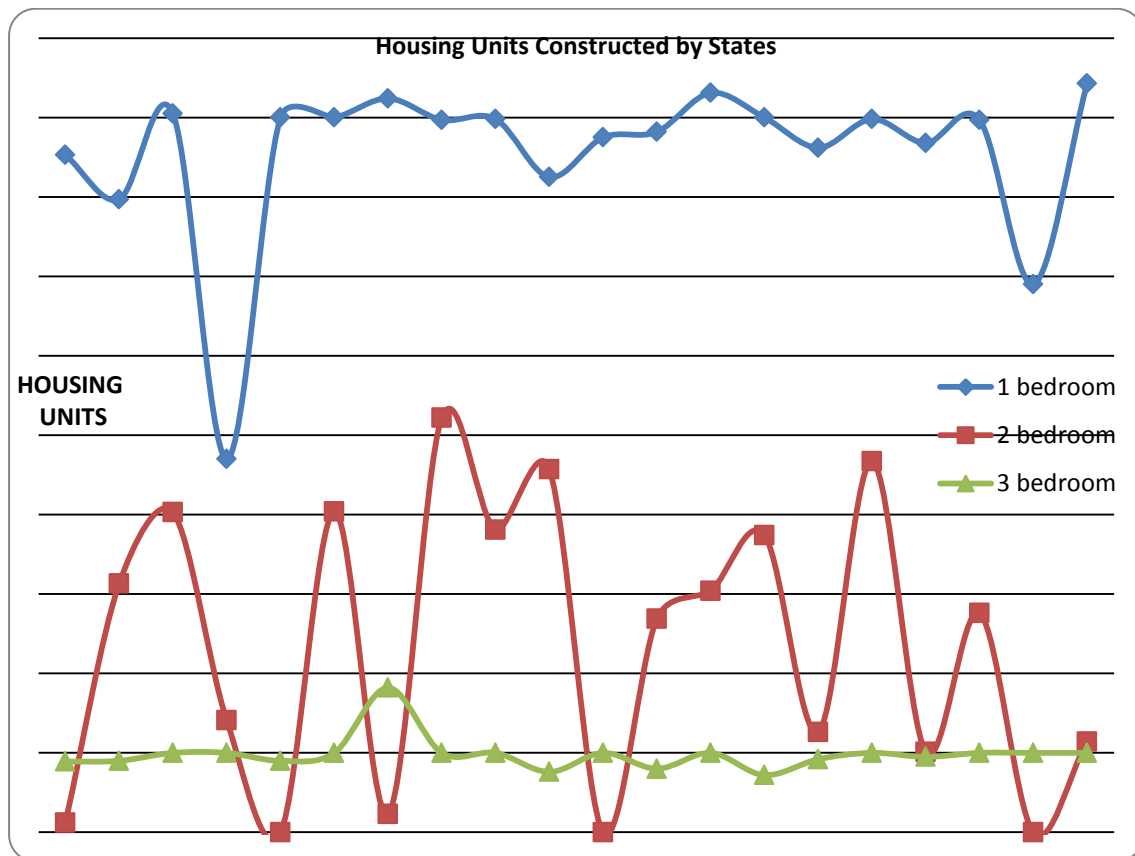
Fig. 1: different units of housing constructed by the States

Table 3: Number of Rooms in Flats

State	Amount allocated to state (Million)	1 bedroom	2 bedroom	3 bedroom	Total Rooms	UNIT COST PER ROOM
FCT	-	3412	72	712	4196	
Anambra	36,000	3188	1878	720	5786	6.221914967
Bauchi	24,000	3620	2418	800	6838	3.509798187
Bendel	30,000	1880	846	800	3526	8.508224617
Benue	55,000	3600	-	720	4320	12.73148148
Borno	75,120	3600	2424	800	6824	11.00820633
Cross-River	56,000	3696	138	1456	5290	10.58601134
Gongola	26,000	3588	3132	800	7520	3.457446809
Imo	42,500	3592	2286	800	6678	6.364180892
Kaduna	104,670	3300	2742	608	6650	15.73984962
Kano	21,000	3500	-	800	4300	4.88372093
Kwara	45,000	3528	1614	640	5782	7.782774127

Lagos	64,000	3724	1824	800	6348	10.08191556
Niger	45,100	3600	2244	576	6420	7.024922118
Ogun	720,050	3448	756	736	4940	145.7591093
Ondo	32,160	3592	2802	800	7194	4.470391993
Oyo	80,000	3472	606	760	4838	16.53575858
Plateau	23,750	3588	1656	800	6044	3.929516876
River	131,200	2760	-	800	3560	36.85393258
Sokoto	70,000	3772	684	800	5256	13.31811263

Source: Generated from Table 2

Table 4: Analysis of Cost Per Bed Room

	1 bedroom	2 bedroom	3 bedroom
FCT			
Anambra	12.44383	18.66574	24.88766
Bauchi	7.019596	10.52939	14.03919
Bendel	17.01645	25.52467	34.0329
Benue	25.46296	38.19444	50.92593
Borno	22.01641	33.02462	44.03283
Cross-River	21.17202	31.75803	42.34405
Gongola	6.914894	10.37234	13.82979
Imo	12.72836	19.09254	25.45672
Kaduna	31.4797	47.21955	62.9594
Kano	9.767442	14.65116	19.53488
Kwara	15.56555	23.34832	31.1311
Lagos	20.16383	30.24575	40.32766
Niger	14.04984	21.07477	28.09969
Ogun	291.5182	437.2773	583.0364
Ondo	8.940784	13.41118	17.88157
Oyo	33.07152	49.60728	66.14303
Plateau	7.859034	11.78855	15.71807
River	73.70787	110.5618	147.4157
Sokoto	26.63623	39.95434	53.27245

A room is defined as a space in a housing unit or other living quarters enclosed by walls reaching from the floor to the ceiling or roof covering, or at least to a height of 2 meters, of a size large enough to hold a bed for an adult, that is, at least 4 square meters. Rooms, therefore, may include bedrooms, dining rooms, living rooms, studies, habitable attics, servants' rooms, kitchens, rooms used for professional or business purposes and other separate spaces used or intended for dwelling purposes, so long as they meet the criteria of walls and floor space. Passageways, verandas, lobbies, bathrooms and toilet rooms are not expected to be counted as rooms, even if they meet the criteria.

Looking at table 3 above we will see that the numbers of rooms in aggregate compared with the population in the states are nothing to write home about. Lagos as a point of reference in table 3 and table 4, one can see that the cost of a house is high compared to income.

Lagos is the second most populous city in Africa after Cairo in Egypt. United Nations estimated that, Lagos is the seventh fastest growing city in the world with population increase of about 600,000 persons per annum, ten times faster than Los Angeles and New York with grave implication for urban sustainability and housing delivery. By the year 2015 Logos will be the third largest mega city in the world after Tokyo in Japan and Bombay in India.

Housing occupancy ratio in Metropolitan Lagos is 8-10 persons per room with 72.5% of households occupying one – room apartment [Lagos State Ministry of Housing, 2010]. Table 5 shows the increasing trend of Lagos from 1871 to 2006, though, this was a projection by 1990; it was not far from what Lagos State government got after the national census which was controversial. The national population commission came out with a lower figure in 2006.

Table 5: Population Trend in Lagos from 1871 to 2006

Year	Population
1871	28, 518
1931	126,108
1963	1.4 million
1975	3.5 million
1978	3.8 million
1979	4.13 million
1985	5.8 million
1990	7.7 million
1995	10.28 million
2000	13.42 million
2006	17,553,924 million

Source: Field work projection, 1990.

Recommendations for Best practice strategies for Social Housing provision

- Government should eliminate problems associated with the low income group access to finances through the proper utilization of work place mortgage financing of staff housing needs
- Government should implement the concept of site and services to facilitate the access of the low income group to serviced plots (i.e. plots with laid down basic urban support amenities) at affordable cost.
- Government can work out schemes where by Mortgage institutions should grant small loans at very low interest to low income groups to refurbish their house for those who have already
- States can encourage the establishment of local co-operatives for direct construction and distribution of building materials. Such cooperatives societies shall have access to the funds of the Urban Development Bank and state owned Mortgage Banks
- Government (Both State and Federal) should extend the amortization periods for the low income workers
- The United Nations Housing Programme on shelter for the homeless which aims primarily to provide shelter for but with particular emphasis on the low income earners should be revisited and activities should be set in motion at Federal, state and Local Government Level to implement it.

- Rural housing scheme should be revisited the Federal and state Governments should through her agencies liaise with Local Governments owned mortgage institutions to make soft loans available to local people who have formed cooperatives to help them acquire building material.
- The World Bank concept of Nigerian States Urban Development Programme (NSUDP) that has been rested for long should be re-enacted and modified extend the idea to every state Government for action
- The reduction and abolition in certain cases, of import and exercise duties on building materials
- Government housing monetization scheme should take immediate effect and adequate directives should be given to firms and companies to start the monetization process without delay.

Conclusion

Social housing must be encouraged through the use of local building materials to reduce the cost per housing unit. There are two major options for solving social housing needs:

Buying an already constructed houses either from government or Private builders and buying a land and building the house by the individual owners is the most popular and yet did not provide sufficient housing unit for the social housing needs.

The cost of building a house is always beyond the reach of many families. Cooperative housing, which is very popular in Asian, Scandinavian countries and in Italy, has helped them to develop housing sector of their economy. The low interest rate and agreed loan ceiling based on individual savings, would remove the bottleneck of collateral which most low income people do not have (Nubi, 2001 and 2003).

Site and service schemes can also enhance social housing in a developing economy such as Nigeria. The principal actor in the sites-and-services schemes is the implementing agency. In most cases, this is a government department or similar body, like the Housing Boards. Operating from a city-wide scale and for all income groups, such agencies initiate sites-and-services schemes both for the provision of housing of low-income families as well as removing "eyesores" that squatter settlements depict. This scheme should therefore aim to provide an economically accessible framework to a specific low-income population for their shelters and employment related needs.

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Ain Skhouna's (Algeria) Wet Ecosystems Ecological Characters And Zoonotic Cutaneous Leishmaniasis (L.C.Z) Reservoir Dynamic

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Summary:

The phytosociological, pedological and edaphologic approach associated with the techniques of the diachronic analysis of the landscapes showed its relevance as regards research on the ecology of the zoonotic cutaneous leishmaniose (L.C.Z) in wet areas.

This interdisciplinary approach has shown its superiority over the conventional methods of ecological science in the diagnosis of certain environmental factors which have favored the development of L.C.Z. Through this approach, we managed to disentangle the complex hanks of the relation between the physical and biological components of the ecosystem, landscapes and the expansion of the reservoir of the zoonotic cutaneous leishmaniose in Ain Skhouna.Two environmental factors explain the reservoir expansion, in the first place the wetland shrinkage related with the inconsiderate drawing of the albien waters combined with the climate change has promoted the steppes development in *Amaranthaceae* and *Planbaginacea* constituting the jerboas' trophic regime.In second place, this shrinking combined with the demographic growth has deeply modified the grounds and the landscapes in favor of the jerboas' demo-ecological installation and expansion.

keywords: Ain Skhouna, Algeria, L.C.Z, wetland, pedology, phytosociology, landscapes Analysis, Multivariate analysis.

Historic and Importance of Cutaneous Leishmaniasis in Algeria:

The leishmaniasis occupies, in Algeria, two distinct bioclimatic zones:

In the south, on the arid floor, prevails the endemic - epidemic form due to major Leishmaniasis whose main reservoirs are *Psammomys obesus* and *Meriones shawi* and the vector insect is *Phlebotomus Papatasi*.(Izri et all,1992).

In North, prevails in the wet floor and subhumid an endemic form whose the pathogenic agent is *Infantum Leishmaniasis* variable enzymatic (Belazzoug, 1985) responsible of the visceral Leishmaniasis (v. l) where the dog is the reservoir.

Historically, confined to households in Biskra East and Abadla West arid climate and semi-arid climate zones, the Zoonotic Cutaneous Leishmaniasis (L.C.Z) has progressed towards the highland wetlands, the steppes and overflows on the western and eastern wet coastal tape.

These last years, Algeria knew two majors Leishmaniasis peaks. in 2004, 16 828 lesions cases were recorded and 30 227 cases in 2005 (El Watan 10.08.2006).

In spite of a light retreat, the disease continues to rage and to extend other regions. in 2010, more than 10,000 cutaneous lesions cases were listed in the state of M'sila in Chott el Hodna border and 196 cases in Ain Skhouna, in Northern border Chott ech Chergui in the state of Saida (El Watan of the 06.02.2011). in 2012, the disease has declined in Ain Skhouna where only six cases (06) were identified, and then we are witnessing the explosion in Naama state, located at the western north of the Chott ech Chergui where 829 cases were recorded in 2011 and 350 cases in the first half year of 2012 (El Watan may 2nd 2012).

Problem:

Since 1980, the L.C.Z is increasing around the chotts, sebkhas and the irrigated perimeters. Almost all the neighboring towns of Chott ech Chergui, vast stretch of salt water, brackish and fresh water of 40,000 km² and the Chott el Hodna 26,000 km² are affected by this disease. Some authors including Z. Harrat and all (2005), J.A. Roux (2010) reported that the spread ot this disease is submitted to environmental influences which in particular the nearby houses and sheepfold with the proliferation of illegal dumps near the agglomerations.

This is quoted by Charles Nicolle Dedet J.P (2007) who the first one "had shown that pathogenic agents circulating in the nature from one host to another some of these hosts being tanks, the others vectors". Continuing this thought, Max Sarre (1923, 1943), invents and defines the concept of "pathogenic complex." He defined as "an association of living beings linked by an infection and whose activity results in a disease". Within the meaning M. Sarre, the core of the pathogenic complex LCZ raging in Ain Skhouna would be constitued by Leishmania major, the causative agent, *Psammomys obesus* reservoir and the vector *Phlebotomus papatasi*. The originality of this thinking was to incorporate the compound nucleus by the pathogen, the reservoir and the vector to the surrounding ecosystem.

G. Blanc and M. Baltazard about them in the kernel of the pathogenic complex environmental factors that affect the behavior of populations of hosts and vectors. In this regard, they make the main environmental factors responsible for the endemic diseases and their possible épidémisation.

The Epidemiologist E. N Pavloskii quoted Dedet JP (2007) says the infectious disease evolves within the limits of the fact that he called his natural home infection that is his geographical area defined by the parameters orographic bioclimatic edaphologic (soil and nature), fauna and flora.

Within the meaning of Pavloskii arid and semi-arid steppes of North Africa would gather all the conditions of endemic natural home LCZ and therefore the area of Ain Skhouna in part.

To support this thesis and be convinced of the scientific validity we recorded our research in the characterization of the ecology of each member of the pathogenic complex reservoir and vector ecology and the global environment into how the complex pathogenic changes in wetland of Ain Skhouna.

J. Barnoin (2010) notes in the emergences introduction environmental factors that, "the environment is a very important factor of plant, animal or human emergence, while being favorable to him or in "being a brake to its expansion."

Not much informed on the L.C.Z ecology, essential condition to install prevention and alarm system, this study aims to fill this hiatus in this field and to describe the environmental elements which can have an impact on the Ain skhouna city reservoir.

Geographical Location of the Study Zone:

Geographically the study zone is circumscribed in the Chott ech Chergui alluvial basin, in Ain skhouna county town borders. It occupies a total surface of 2000 ha.

Materials and Methods:

Two ecosystem components, the vegetation for its role in the reservoir food chain and the soils which at the same time support the vegetation and used as habitat place for the vector and the reservoir will be described.

A landscapes diachronic analysis will complete this study.

On this subject J. Barnouin (2010) said that "the environment acts in particular through the landscapes, the climate, the soil, the activities and the man's decisions, like one modulating the ecological relations between the species (wild, cultivated and/or raised) and the flora dependent on specific environment".

The environment description work consisted:

- to gather cartographic documents on the vegetation, the landscapes, the soils, the statistics relating to the demographic evolution and the building surface over the period of 1949 to 2010.

- to proceed to the vegetation and the soils analytical and synthetic study.

The ground, the vegetation and the soils, analysis proceeded between 2010 and 2011. The plant species determination and recognition on the ground and at the laboratory were made while being helped off the Algeria flora, P. Quezel and Santa (1963) and of G. Bonnier/G. de Layens (2004) flora.

The transverse transects method was selected like a vegetation and soils quantitative inventory model. This method gives well an account the vegetation and the soils wet environment imbrication to the other ecological and anthropic factors.

The plant cover was inventoried according to the phytosociological techniques (J.B. Bouzine 2008). Sixteen (16) raised vegetation conspicuous the association individuals were led. The raised/plant species were sorted by a correspondences factorial analysis (c.f.a) and an ascending hierarchical classification (A.H.C), with the ginkgo software (De Càceres and al 2003).

The association individuals were classified with the syntaxonomical plan according to the anglo american school (a.a.p.e anglo-american plan ecology) classification system describes by J. Bouzine 2008.

The soils described by the techniques of the pedology of ground, D. Baise, and B. Jabiol (2012), were then referenced according to the pedological reference table of the french association of grounds (on 2008 A.F.E.S).the soil samples, underwent a physic-

chemical analysis in the regional laboratory of the soils and irrigation national institute (SINI/INSID) of Relizane, according to the analysis techniques exposed by D. Baize (2000).

In order to refine each particular ecosystem ecology and to establish supposed links with the l.c.z reservoir, 42 methods or variables quantitative edaphic belonging to 16 solums, were crossed with 16 raised vegetation in correspondences analysis (A.C.P) and a (C.A.H) which describes J. B. Bouzine (2008).

The edaphologic study is completed by a documentary and photographic analysis covering the periods 1949, 1972, 2010 and 2012. This spatiotemporal landscapes approach supported by the encased approach associating satellite pictures, the landscapes photography and aerial photos, allowed us to account for changes in ecological landscapes in relation to the demographic dynamic study site.

It's Rougerie 1985, which notes that "the landscape is so rich and complex that its study requires an understanding of both the top and inside." it is this combination of satellite images, aerial photos, snapshots with the fieldwork that has allowed us to better understood the complexity of ecotones in keeping with the tank of the L.C.Z in moist environment.

Results and Discussion

Ecological landscapes Analysis:
4-photo-S.Belgat-Dzira 2012,

Photo n° 1: burrows in housing borders modification

Photo n° 2: jerboas

Photo n°3:

Photo n° 4: landscape

These three photos show the wide changes undergone by the ecosystem. On the photo n° 1 and 2, the suburban habitat is stuck in the spreading zone and the jerboas active burrows.

On the photo n° 3, we note the artificial modifications (motor-road) crossing the spreading zone and the Chott chergui. This artificial corridor can appear like an accentuating factor risk to the disease propagation at other zones until then spare.

In the demographic plan, the city county town population is passed from 600 inhabitants at the origin of the creation of the center of hydrological studies of Ain skhouna in 1949, to 3000 inhabitants with the census of 1970 and to 7000 inhabitants at the last census of 2008 (source: Statistics National Office) (ONS) - Algeria and archives of the regional station of the National Institute of Forestry Research (INRF) of Ain Skhouna.

This demographic dynamic is the nomad population settlement policy and the new villages' steppe creation. This policy was initiated within the framework of the application of the land reform in the years 1970.

El Djezira Wet Spreading Zone Evolution:
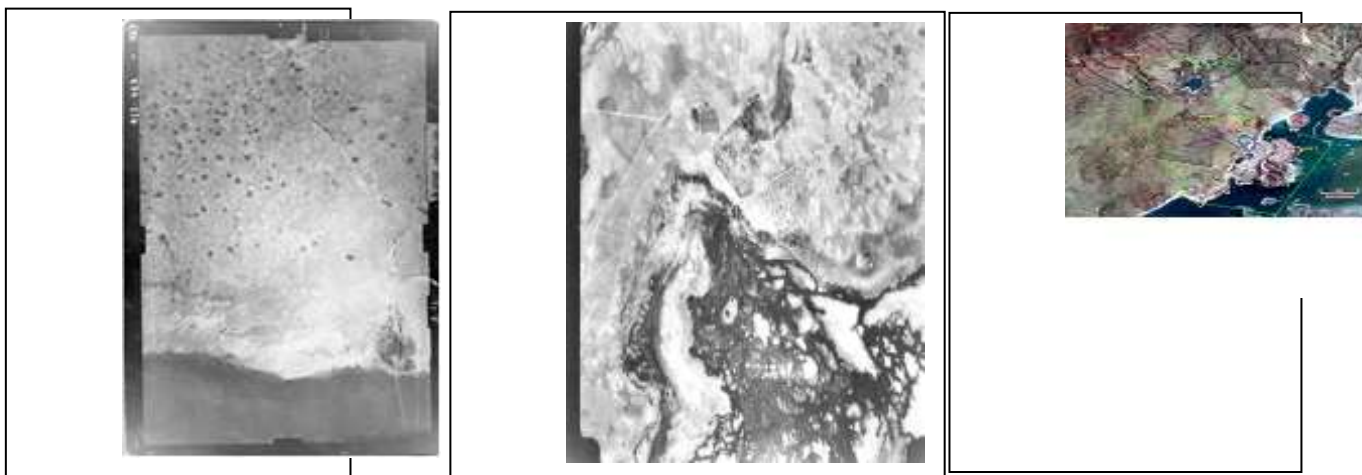
Aerial photo 1949(El Djezira)   Aerial photo (El Djezira) 1972   Spot image (El Djezira) 2010

The diachronic analysis of these three images shows the shrinkage of the wet zone of manure spreading of El Djezira. The ripisylves formation declined in favour of a halomorphic steppe. This narrowing is certainly the consequence of climate change, stressed by the pumping of groundwater from the Albian at the rate of 500 l/s to supply the "Saida" state county town.

The Urban and Suburban Habitat Evolution:

Habitat type	1949 (a)*	1972 (b)*	2010 © *
Urban habitat	0,09 km²	0,669 km²	0,870 km²
Suburban habitat	0,00 km²	0,0435 km²	0,295 km²

The urban and suburban habitat has greatly increased, especially from 1972 till 2010. This outerurban build extension, often undeveloped, put in contact the precarious

housing environments, the enclosures, the sheep-folds and the spreading zone, favourable the Z.C. L reservoir development, underlined in other places by Z.Harrat, A.Boudrissa, N.Benhabyles, N.Harrat-Hammadi (2005) and J.A Rioux (2010).

*The surface area of the outerurban and urban built was calculated starting from the funds of plans on the scale 1/25.000 of the Ain skhouna village (1949 - 1972 and 2010).

Vegetation Analysis:

Table n°1: species number per family:

Families	Species number of per family
Amaranthaceae	8
Asteraceae	6
Poaceaea	5
Plumbaginaceae	4
Plantaginaceae	2
Tamaricaea	2
Caryophyllaceae	2
Apiaceae	1
Geranicaea	1
Juncaceae	1
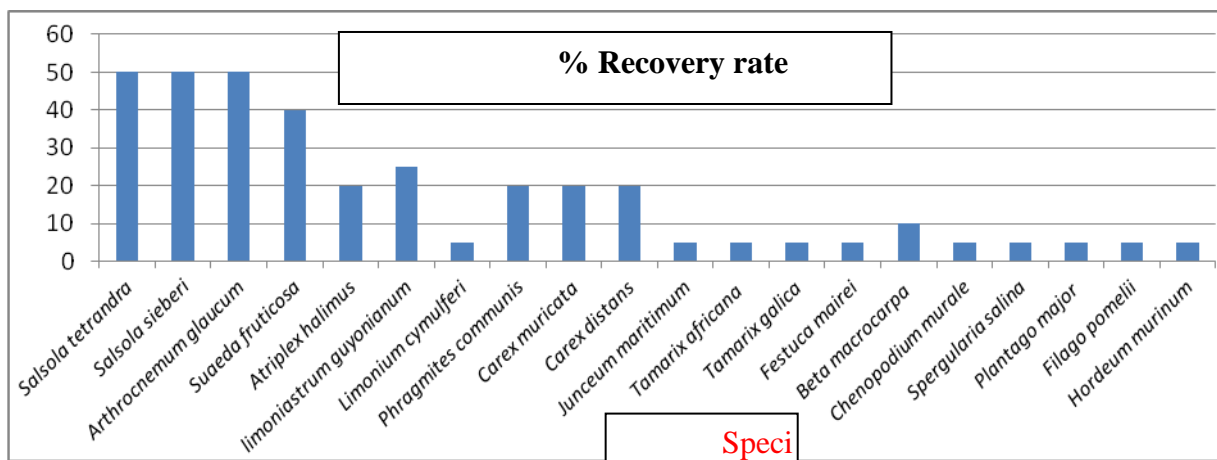
These are *Amaranthaceae* (*chenopodiaceae)* family species which dominate by their presence and the covering rate. Some rare species considered endangered species, like *Festuca mairei, Carex distans var oranensis* and *Malva rotundifolia* emphasize the one hand, the relative biodiversity of this ecosystem, and secondly its vulnerability to anthropogenic pressure.

Factorial Analysis of the Correspondences:

The treatment in AFC of sixteen (16) statements of vegetation where we took into account that the variable presence/absence of species and the 41 methods, or pedological variables, associated with a C. A. H, highlighted that follows:

Fig n° 1: axes factorial plan 1 and 2
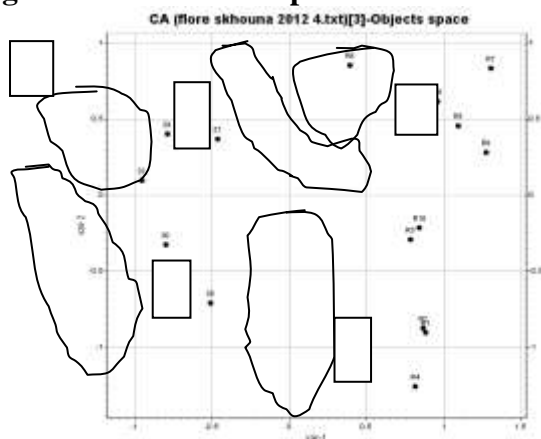
The factorial axes 1 and 2, (fig. n° 1), gather a respective inertia rate of 24, 0746% , and 13, 4718% a total of 37.5464%. This inertia rate is satisfactory, authorizes these two axes interpretation. All the species are regarded as halo resistant, to see even for A, B and C the strict halophytes factorial plan groups.

The D and E group species seem to follow a moisture gradient and are considered as halohydromorphic. It belongs to the Chott ech Chergui soils spreading alluvia field.

Ascending hierarchical classification:

Fig. N° 2
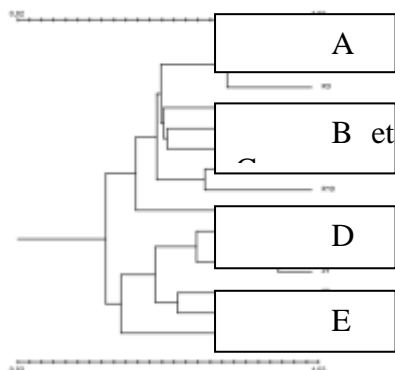
An ordination associated with C.A. H emphasizes in the phytosociological plan:

A first unity (A) of statements R1, R2, R3, R4. It defines the characteristics and transgressive association to **Spegularia salinae** the soils field that the salinity is higher than 30 M.S/cm.

This phytocoenosis occupies the alluvia low parts, the soil is gorged with water almost all the year The depth soil misled situation makes the jerboas installation difficult.

A second group gathering the unities B and C of the R5, R6, R7, R8, R9, R10 statements where we recognized the characteristics and the transgressives association as *Suaeda fruticosa* of the easily flooded periodically zones and unfavorable to the jerboas permanent installation.

These stations are similar to the littoral salted zones salt affected soil. It primarily made up of mixed halophyte vegetation to *Salsola* and *suaeda.* Even if we count some

burrows, because of the wintery floods, these biotopes don't present the jerboas ideal housing environment.

A third group gathers the unity "D" of the statements, 27.29, 31 of association with *Limoniastrum guyonianum*, occupying the soils with sandy loamy. From the soils texture and the structure this unity is favorable to the jerboas' installation, as much as the steppes to *limonium* are appreciated by the jerboas.

A vast unity gathering the associations to *Juncus maritimis* and to *Phragmites humilis*, ecologically very close, they characterize including by integrating the facies raised to *Tamarix africana* and *Tamarix.gallica* of the permanently flooded zones. The permanent flooding of these soils does not authorize the jerboas' installation.

A unity (E), integrating the statements, 32, 30 and 28, belongs to the associations synopsis and under associations with *Salicornia fruticosa*, where the soils are with sandy texture and friable structure favorable to the burrows digging and the jerboas installation.

11- SOILS TYPOLOGY:

Ain Skhouna's depression soils pedogenic evolution is dictated by:

- The brackish ground water presence with a high absorbable sodium rate, on average the RAS (ratio absorbable sodium) is greater than 15.

- The groundwater seasonal fluctuations,

- The xeric climate marked by a long dry period, from March to November.

- A strong evaporation power, the potential evapotranspiration is high.

These entire factors make that they belong to the French pedological reference **Salisols** and **Sodisols** GER (2008).

Salisodisols carbonated group: these solums pH is > to 8, it is honestly alkaline and the salinity is ascending.

The sodisalisols, this group belongs to the Dzira waterways field permanently flooded. It seems to be given by the sources sodicity n° 3. The salinity evolution contrary to the first group is vertical downward. The surface horizon is very thick and desalinated. It is in direct contact with the ground board. These solums have in common:

- An average electric conductivity(<3 M.S/cm).

– A lightly alkaline pH, the ionic trimming is dominated by exchangeable Na+,

- And a raised SAR (ratio absorption sodium), a fine texture where dominate the silts.

-The sodium titrates to more than 1500 mg/I, and the groundwater titrates to more than (5000 mg/I)

These results attest about sodicity of these solums and their typological attachment to the **sodisalisols**.

Principal Components Processing:

These treatments took into account 34 vegetation raised points/ soils and 13 edaphic Variables or modalities namely pH water, pH Kcl, Limestone total, Limestone active, electric Conductivity, organic Carbon, Organic matter, Phosphorus assimilated, Clay, Fine Silt, coarse Silt, coarse Sand, coarse sand.

The Whole Treatment Edaphic Parameters

Discriminating Variables:

The axes interpretation does not take into account only the edaphic variables where the orthonormal Specific values (O. S. V) are higher than 0.20.

axes	1	2	3
rate of inertia %	33,58	22,21	9,10

Axes 1 and 2 explain 56% of the variance and appear excellent.

Negative side		Positive side	
Variables	V.P.O	Variables	V.P.O
pH water	0,25	Total limestone	0,23
pH Kcl	0,22	Electric conductivity	0,29
Active limestone	0,27	Clay	0,28
Organic carbon	0,28	Fine silt	0,33
Total mat-org	0,28		
Coarse silt	0,39		
Sand fine	0,25		

- On the positive side variables are expressed in relation with the nature of these ionic electro soils, especially their double belonging to the carbonated **salisols** and the **salisols**. The pH due to seasonal fluctuations in salinity and sodicity, the horizon diagnosis, cannot be retained like these soils typological modality. Contrary, the silts more than the clays take part from their granulometry fine to reinforce this tendency. The relation with the vegetation, in particular *Amaranthaceae* (*Chenopodiaceae*) crassulescentes and *Plumbaginaceae* represented by the *limonum,* forming essentially the jerboas' alimentary regime is demonstrated.
- On the negative side to distribute the variables expressing an inflection of the edaphic horizon salinity or rhizosphere.
- The two poles of this axis represent the contrasted evolution of these soils. In wet period, they evolve to the **carbonated salisols** and in dry period to the **salisodisols**.

Negative side		Positive side	
Variables	V.P.O	Variables	V.P.O
pH water	0,25	Total limestone	0,23
pH Kcl	0,22	Electric conductivity	0,29
Active limestone	0,27	Clay	0,28
Organic carbon	0,28	Fine silt	0,33
Total mat-org	0,28		
Coarse silt	0,39		
Sand fine	0,25		

The positive side of axis 2 are distributed soils rich phosphorus and organic matter. These soils tend to express better the tendency to the alluvation which marked the area pedological history. On the negative side, variables are expressed in favor of the loss of fertility and therefore the xericity middle.

The Affine Unities:
Fig. n° 3

PCA (sois skhouna total1.txt)[Z](Components)
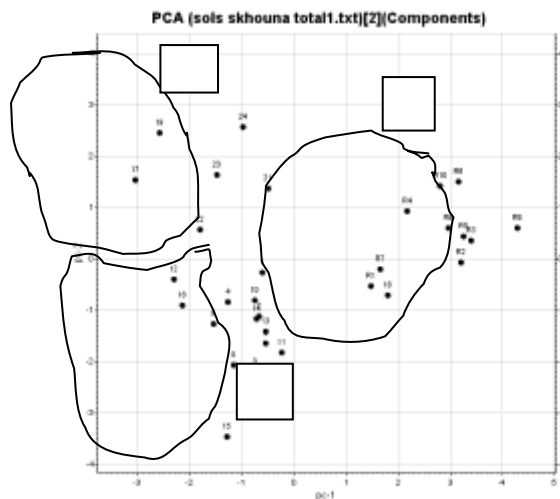
Axes 1 and 2 Factorial Plan Analysis:
The sample points cloud projection on the axes resulting from the A.C.P enables us to highlight three big unities

- Unity A: are gathered in this unity, all the soils with organic material strong rate and of assimilable phosphorus and a surface horizon relative desalination. The soils covering rate is the highest.

- Unity B where represented the soils to contrasted evolution, they are marked by an average salinity to strong, a rather weak organic material rate except the sample raised

point exceptional of 9 and 12. This unity gathers the depression soils and provided coarse silts.

- Unity C gathering all Moulay Abdelkader (Dzira) soils marked by a strong salinity.

Discussion:

The photographic documents analysis showed all the Ain Skhouna's wet eco-complexes regression extent. This regression was translated in time by:

-The ripisylves arborescent formations withdrawal and Oued skhouna sheep Warbler.

- These formations were replaced by *Amaranthaceae, Plumbaginaceae* halmorphes and crassulescentes steppe particularly appraisals by the jerboas. These formations *salicornes*, sodas, *salsola* and *limonium* made up constitute the jerboas trophic regime essential.

- Oued skhouna's marsh contracting left place to naked soils that the jerboas quickly colonized. In dray period the **salisodisols** and the **sodisalisols** presente in a sablo-muddy texture friable powdery structure, facilitating the burrows digging.

-The very strong anthropic pressure resulted in modifications and landscapes durable change, new corridors were open to facilitate the space displacement and colonization by the jerboas.

-The aggressions and upheavals undergone by this fragile ecosystem, where in particular Chott ech Chergui unconsidered drawing water, accentuated by a climate increasingly arid at the origin increase of salts and the spaces colonization by the halomorphic and haloresistant species.

-It supposes that these modifications took part in other environmental variables side not measured in this study in the installation and the jerboas dynamics expansive.

- Also, the burrows proximity with the human housing is a disease progression risk factor.

- As a hypothesis, we can suppose that the enclosures housing active burrows space rapprochement is one of the development landscapes changes first incidences - C. L

In short, these ecosystem changes conjugation seems to be with the climatic factors, those which favorable the reservoir demo-ecological explosion and the L.C.Z progression.

Conclusion:

The vegetation, soils study and the multivariate treatment enabled us to check the relations relevance between the vegetation, soils and the L.C.Z reservoir. We come to the conclusion that the observed dynamics and in particular that of the jerboas is intrinsically connected to the ecological landscapes and plant communities disturbances.

The diachronic photographic analysis emphasized substantial modifications, at the same time as regards urban planning, practice raising and the ecological landscapes. We note an important plant cover regression between the years 1970 and 2010, as moreover a wetland withdrawal which occupies apart from the area catchment big floods only Chott ech Chergui bordering zones.

In short, it is this change in the ecosystem that has led to the L.C.Z reservoir installation.

This hypothesis has been studied and checked in other places by Z. Harrat, A. Boudrissa, N. Benhabyles, N. Harrat-Hammadi 2005 and J.A. Rioux 1990.

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Comparative Effect of *Chrysanthemum* Macrocarpum and Stachys Mialhesi on the Rats Aorta Exposed to Homocysteine with B Vitamins

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Abstract

In the present work, the comparative effect of the Algerian species *Chrysanthemum macrocarpum* (CECM) and *Stachys mialhesi* (BESM) with B vitamins(B9, B12and B6) on the rat aorta exposed to two different concentrations of homocysteine(0.1 mM and 1mM) were described. The results obtained showed that both CECM and BESM abolished the activity of homocysteine (Hcy) at 0.1 mM and 1mM and stimulated the angiogenesis, reported for the first time.

Keywords: Chrysanthemum Macrocarpum; Stachys Mialhesi; Homocysteine; Angiogenesis

1.Introduction

Homocysteine was discovered in 1932 by Devignaud as a product of demethylation of methionine, it is a sulfur amino acid [1].Since 1974 altered homocysteine metabolism in transformed cells has become expending field of research *in vitro* [2]. The recent results demonstrated that increase of homocysteine is an independant risk factor for vascular diseases, and a toxic for the endothelial cell [3].

Vitamin treatment however can substantially reduce tHcy, as shown in many studies. Folic acid alone, but also combinations with vitamin B6 and sometimes vitamin B12 have been used. [4].

The relationship between B vitamins especially folate and plasma homocysteine is actually clear. Recent studies have provided evidence for an elevation of plasma homocysteine in folate, vit B12 and vit B6 deficiencies. Supplements of these vitamins reduce elevated plasma homocysteine levels [5].

Many herbal plants contain antioxidants compounds and these compounds protect cells against the damaging effects of reactive oxygen species, such as singlet oxygen, superoxide, hydroxyl radicals and peroxynitrite[6].An imbalance between antioxidants and reactive oxygen species results in oxidative stress, leading to cellular damage [7].

Natural antioxidants play a protective role in hyperhomocysteinemia [8]; however there is a paucity of experimental as well as clinical studies which indicates the protective role of medicinal plants in hyperhomocyseinemia.

The genus *Stachys* (Lamiaceae) contains about 200-300 species in the world and is considered to be one of the largest genera of this family. In Algeria, this genus is represented by 14 species including the endemic species *Stachys mialhesi* de Noé[9] .Pharmacological studies confirmed that extract or components of plants belonging to the genus *Stachys* exert significant antibacterial, anti-inflammatory, antitoxic, anti-nephritic, antihepatitis, anti-anoxia and hypotensive, antispasmodic, anti- asthma, rheumatic and other inflammatory activities[10-11] .

In another part, *Chrysanthemum* (Asteraceae) plants are used in folk medicine to treat fever, arthritis, vertigo, hypertensive symptoms and infection diseases such as pneumoniae, colitis, stomatitis. Anti-cancer, anti-HIV-1 and antioxidant activities have been established for *Chrysanthemum* species [12]. Fifteen *Chrysanthemum* species are growing in Algeria [9].

There are however no reports on antihyperhomocysteinemic activity have been carried out on the extracts of *Chrysanthemum macrocarpum(* BESM) and *Stachys mialhesi (* CECM) .

This work was therefore aimed to investigate the antihyperhomocysteinemic activity of the extracts of (BESM) and (CECM) in rat aorta and compared with B vitamins (B9, B12 and B6) *in vitro.*

2. Materials and methods

2.1. Collection of plant material

2.1.1. Collection of Chrysanthemum macrocarpum

Aerial parts of *Chrysanthemum macrocarpum* were collected on April 2005 at Ghardaia (Algerian Septentrional Sahara).

The voucher specimen was identified by Professor Gérard De Bélair   (University Badji-Mokhtar, Annaba) (Ozenda, 1958) and was deposited at the herbarium of the faculty of sciences, university Mentouri-Constantine under the reference LOSTCm.04.05.

2.1.2. Collection of Stachys *mialhesi*

Aerial parts of *S.mialhesi* de Noe´ were collected on April 2005 at Djebel El-Ouahch Constantine (North Eastern Algerian). The voucher specimen was identified by Professor Gérard De Bélair (University Badji-Mokhtar, Annaba) and was deposited at the Musée botanique de la Ville d'Angers (France) under the reference MBAng2005.10.

2.2. Preparation of crude extract

2.2.1. Chrysanthemum macrocarpum

Aerial parts of *chrysanthemum macrocarpum* are macerated in methanol∕ H2O (7∕ 3)   . After filtration and evaporation, the residue is extracted with different solvents successively with increasing polarity, petroleum ether, dichloromethane, ethyl acetate, and n- butanol. The extract is then evaporated until dryness.

2.2.2. Stachys mialhesi

Air-dried and powdered aerial parts (1 kg) of S. *mialhesi* were extracted with 70% MeOH. The residue was suspended in water and extracted successively with petroleum ether, dichloromethane, ethylacetate and n-BuOH.

2.3. Animals and treatment

This part of the work was done in Microbiology and Immunology Dept., NRC. The iliac aortas were   taken from two male rats 260g in weight, were purchased from the Animal House of the National Research. The vessels were cut into small segments. The tissue aorta were cultured on 32-well Tissue Culture plates and treated with different compounds of Homocysteine at 0.1and 1Mm, Vitamins B9, B12 and B6 at concentrations (0.7mg/kg, 0.75µg/kg and 50µg/kg respectively.   The study was compared with two different Algerian medicinal plants, Chrysanthemum macrocarpum and Stachys mialhesi at concentrations 10 mg and 5 mg, respectively.   Cultures were maintained in Dulbecco's modified Eagle's medium (DMEM) containing 2% fetal calf serum (FCS), 1:1000 Fugizone and 1:100 Garamycine and treated with different compounds at 37° C in 5% CO_2. Photography was performed using inverted microscope.

3. Results

Chrysanthemum macrocarpum and *Stachys mialhesi* may exhibit such activity on the damage of the aorta and heart induced by hyperhomocysteinemia. The exposed iliac aortas in *vitro* to concentrations of homocysteine 0.1 and 1 mM are shown in figure [1a] and figure [1b]. The homocysteine at 1mM inhibited the angiogenesis of the endothelial cells in the iliac aorta. The results obtained in this study showed that the medicinal plants *Chrysanthemum macrocarpum* and *Stachys mialhesi* play a role in the stimulation of the angiogenesis of the endothelial cells in the iliac aorta and inhibited the toxicity of homocysteine, as shown in figures [2b, c and 3b, c] . This results obtained with medicinal plants chloroformic extract of *Chrysanthemum macrocarpum* (CECM) and butanolic extract of *Stachys mialhesii* (BESM) which exert the same activity of vitamins B6, B9 and B12, as shown in figures [4b and c, 5 b and c] and compared with control figure [1] and positive control figures [2a, 3a,4a and 5a] .
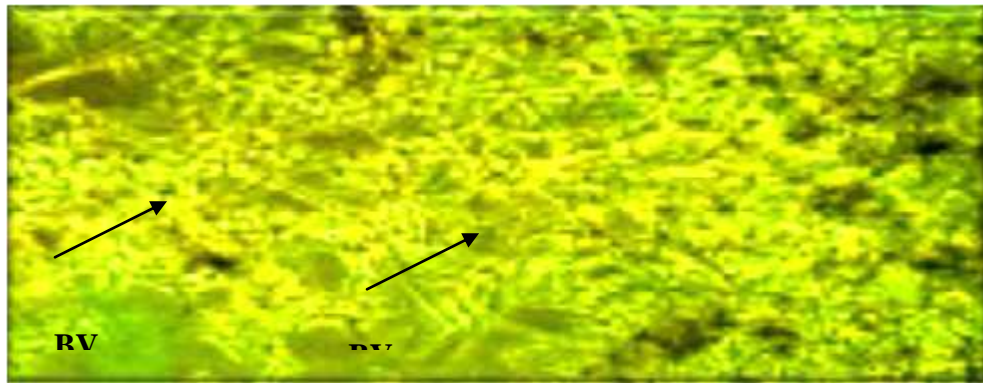
Fig.1 Control   : Iliac aorta tissue not treated   NBV: New blood

Fig.1a: Iliac aorta exposed to homocysteine at 0.1mM D: disruption of some capillary
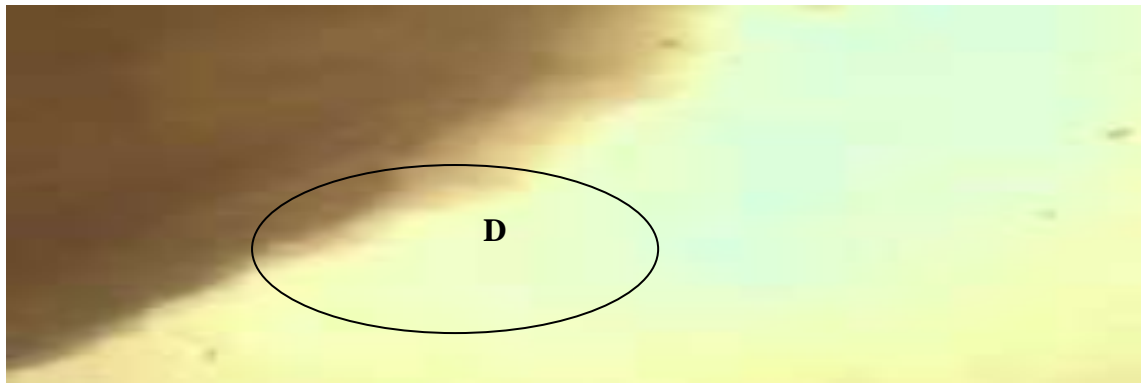
Fig.1b: Iliac aorta exposed to homocysteine at 1mM   D: disruption of capillary
And inhibition of angiogenesis
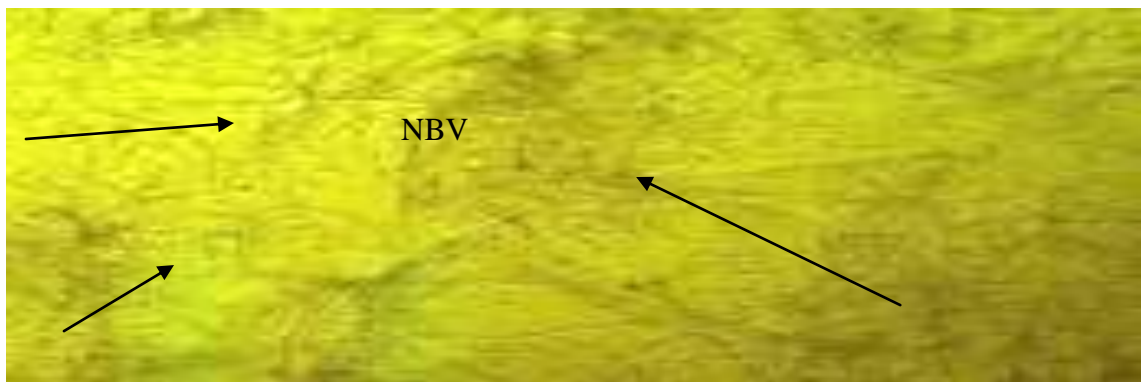
Fig.2a: Iliac aorta exposed to Stachys mialhesi at 5mg∕kg NBV: New   blood
vessel formation
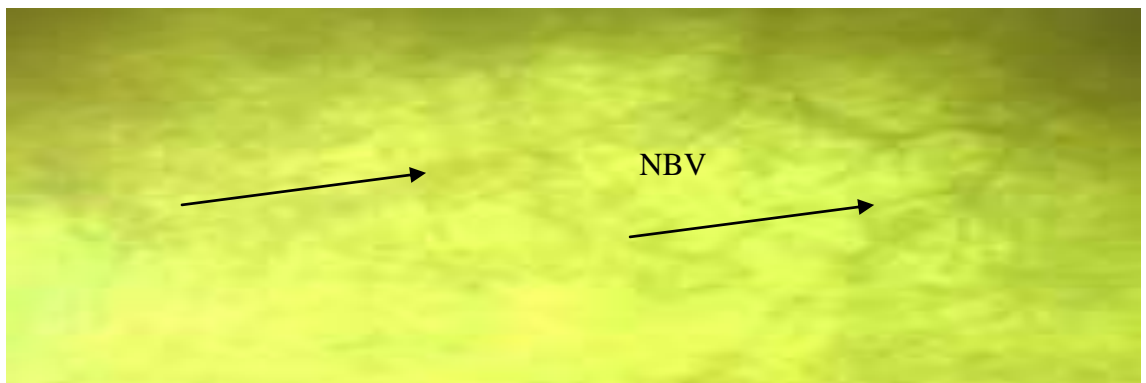
Fig.2b:Iliac aorta exposed to Stachys mialhesi at 5mg and homocysteine at
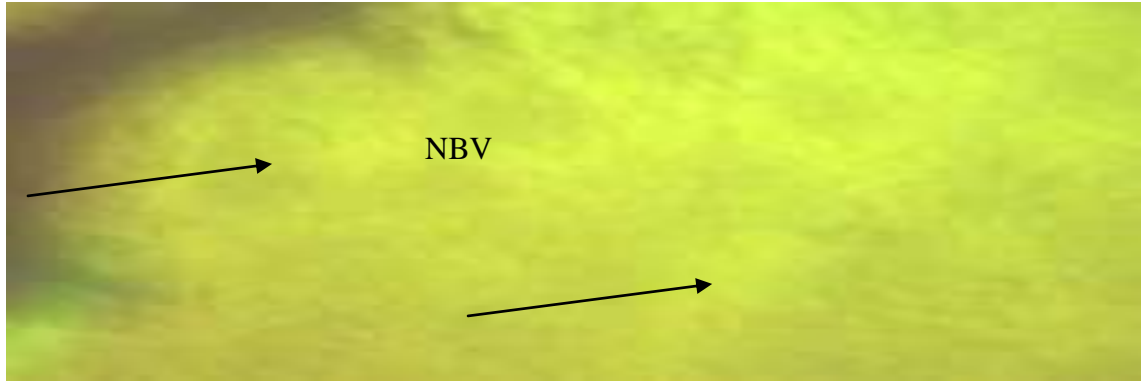0.1mM

NBV: New blood vessel formation

Fig.2c: Iliac aorta exposed to Stachys mialhesi at   5mg and homocysteine at 1mM
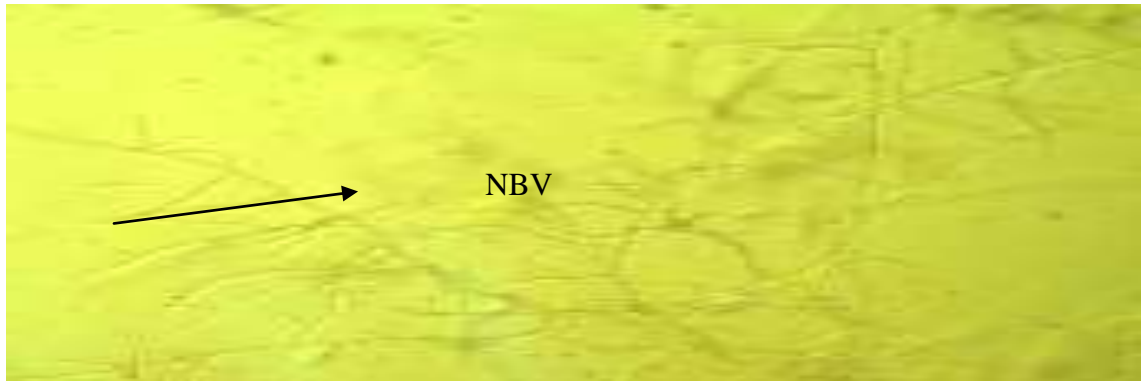
NBV: New blood vessel formation

 Fig.3a: Iliac aorta exposed to *Chrysanthemum macrocarpum* at   10mg∕kg NBV: New blood vessel formation
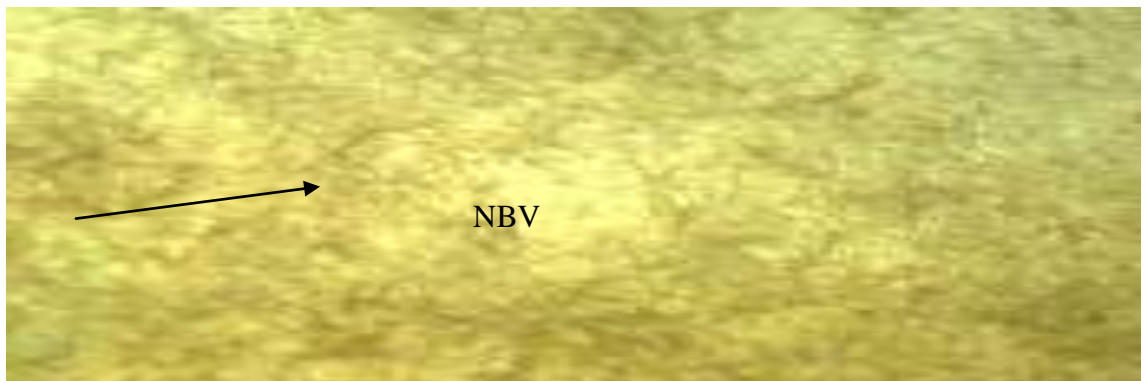
Fig.3b: Iliac aorta exposed to Chrysanthemum *macrocarpum* at   10mg∕kg and homocysteine at 0.1mM   NBV :   New blood vessel formation with inhibition of homocysteine activity
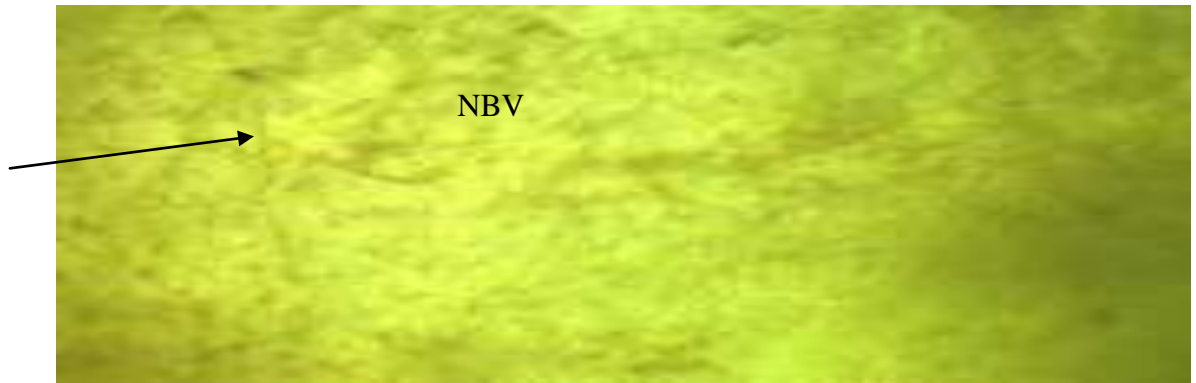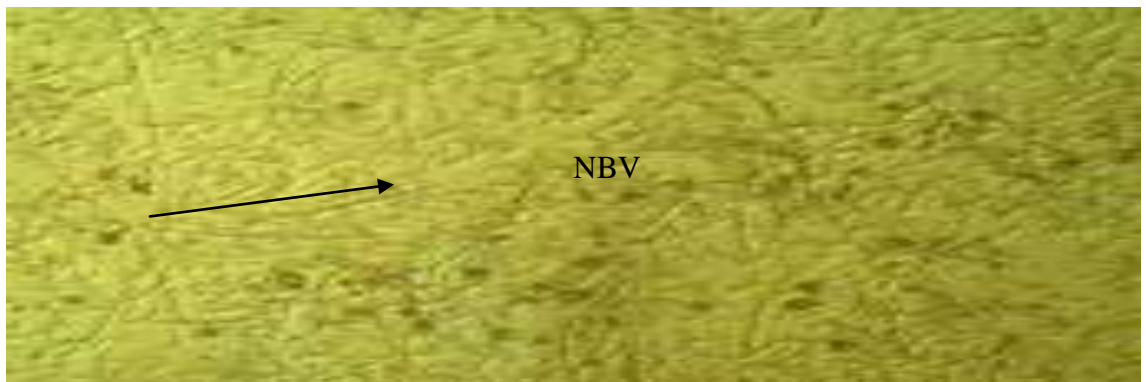
Fig.3c: Iliac aorta exposed to *Chrysanthemum macrocarpum* at 10mg∕kg and homocysteine at 1mM NBV: New blood vessel formation and inhibition of homocysteine activity

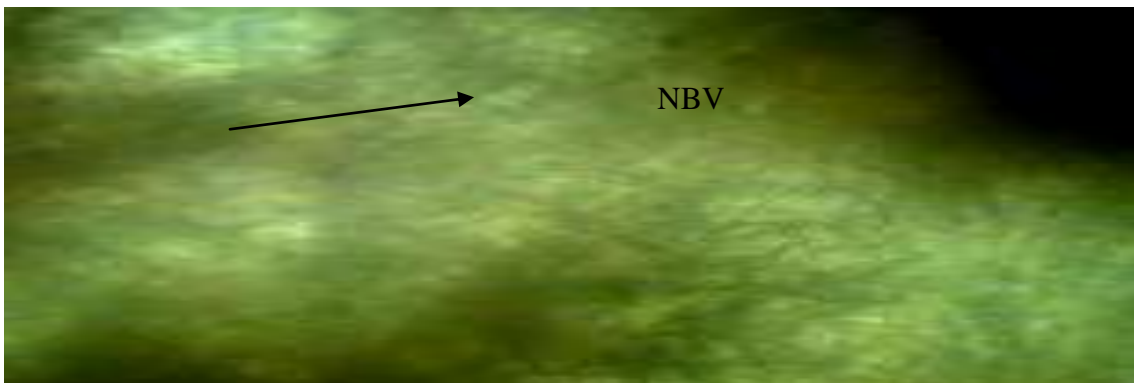Fig.4a: Iliac aorta exposed to Vitamin B6 at 50µg∕kg N: New blood vessel formation

Fig.4b: Iliac aorta exposed to VitaminB6 at 50µg∕kg and homocysteine at 0.1mM
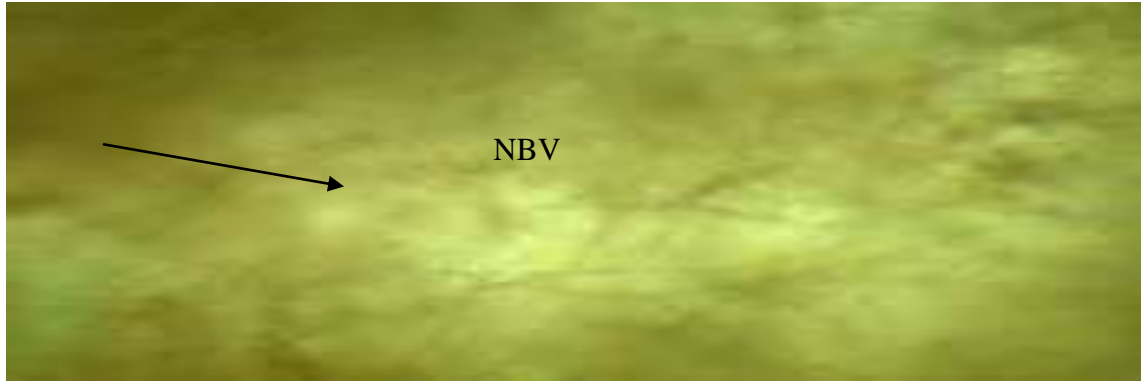NBV: New blood vessel formation and inhibition of homocysteine activity

Fig.4c: Iliac aorta exposed to *VitaminB6* at 50µg⁄kg and homocysteine at 1mM
NBV: New blood vessel formation and inhibition of homocysteine activity
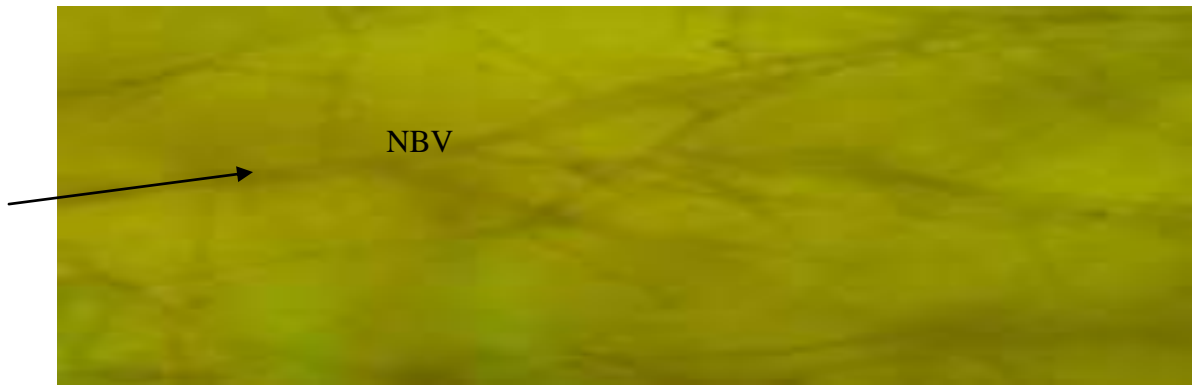

Fig.5a: Iliac aorta exposed to B9and *B12* at 0,7mg⁄kg and 0,75µg⁄kg respectively
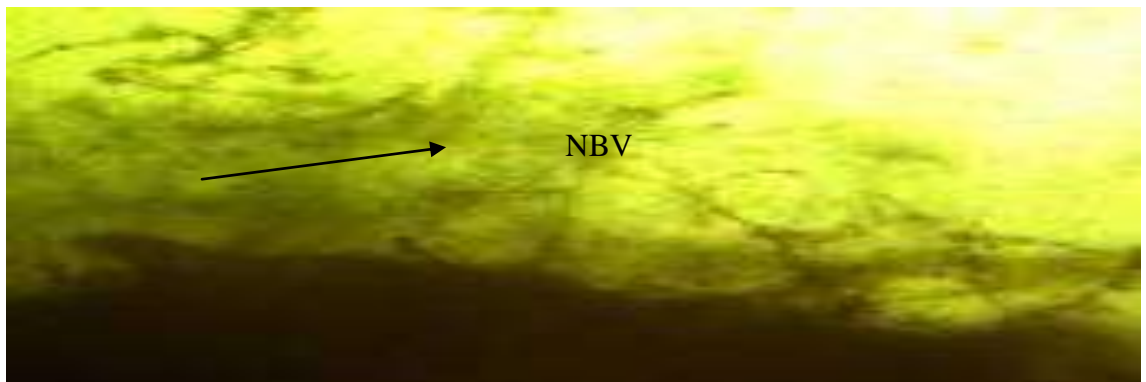N: New blood vessel formation

Fig.5b: Iliac aorta exposed to *Vitamin B9and B12* at 0,7mg⁄kg and 0,75µg⁄kg respectively and homocysteine at 0.1mM

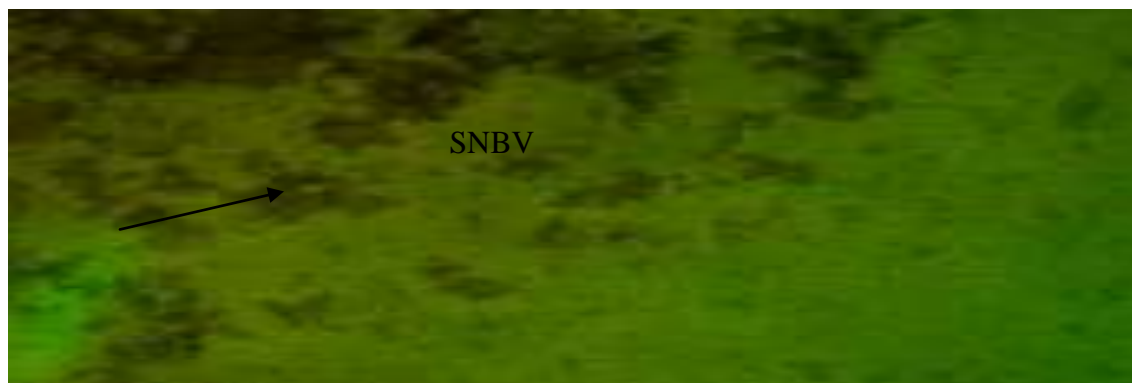   NBV: New blood vessel formation   and inhibition of homocysteine activity

Fig.5C: Iliac aorta exposed to *Vitamin B9and B12* at 0,7mg⁄kg and 0,75µg⁄kg respectively and homocysteine at 1mM   SNBV: Some of new blood formation

4-Discussion

The results of the present experiment demonstrated that the chloroformic extract of *Chrysanthemum macrocarpum* (CECM) and the butanolic extract of *Stachys mialhesi* (BESM) were tested *in vitro* on rats aorta exposed with homocysteine (Hcy) and compared with vitamins B6, B9 and B12 can play a role in the inhibition of homocysteine activity at concentrations 0.1 and 1 mM and these extract of medicinal plants stimulated the angiogenesis as vitamins B6, B9 and B12.   The results support previous work of Chan 2004 Who demonstrated the protective effect of Danshen extract against the homocysteine-induced adverse effect on human umbilical vein endothelial cell (HUVEC). Homocysteine (5 mM) not only decreased the cell viability but also caused the disruption of capillary-like structure formation *in vitro.* The protective effect of Danshen aqueous extract and its active compounds on endothelial cell function were demonstrated through an in vitro tube formation assay, which mimics the new blood vessel formation. And he obtained that Danshen extract at a concentration of 10 µg/gml can exert significant protection on Hcy - induced (5mM) [13] and also Uma et al 2008 reported that the aqueous extract of Embelia ribes (100 and 200 mg/ kg,   p.o) for 30 days , to hyperhomocysteinemic   rats , significantly (P<0,01)   decreased the levels of homocysteine.

Laggoune *et al*., 2011 found that the chemical structure of *Stachys mialhesi is* contains natural physiologically active substances such as Terpenoids, Flavanoids and phenolic compounds [14].

Flavonoids, saponosides and triterpenes have been detected in *Chrysanthemum macrocarpum* extracts (Cosson & Kralik) Batt.

5. Conclusion

The present results showed that these two different extracts *Stachys mialhesi and Chrysanthemum macrocarpum*   have an active compounds which abolished the homocysteine activity and synoptic   a new blood vessel formation and have same role of vitamins B.

Acknowledgement

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Producing Better and Effective Community Leaders

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Introduction

Many people like to be leaders or appointed to be one either in the area of politics or management. People are willing to do almost everything to obtain the position as leaders. But, how many of them are prepared or trained to be one? Or if they are lucky enough to be selected as leaders, could they carry the responsibilities effectively as what have been expected. Do the leaders have all the criteria needed to be leaders? These are some of the questions and issues that need to be addressed when we are taking about leadership. Thus, the objective of this paper is to explain and give guidelines to communities or organizations how to train and produce good quality leaders who eventually would be the future leaders either for the communities, groups, organizations or for the country. In order to achieve the objective, this paper would introduce a new leadership model for better and effective leaders. This leadership model is believed to be holistic for producing better and effective leaders. The model known as Shatar (S) Model will discuss and illustrate the process required before better and effective leaders are produced. Prior to the discuss of S Model, it is necessary to understand the definition and the principles of leadership.

What is leadership?

Leadership is the behavioral process of influencing the activities of an individual or group to accomplish goals in a given situation. Leadership is a learned behavioral skills which includes the ability to help others achieve their potential as individuals and as team members (Robinson, Jr. 1994: 44).

Community Development Academy (CDA) has illustrated that leaders could be defined in three different ways: (1) positional, (2) functional, and (3) influence behind the scene. Positional leaders are those who have been appointed to hold certain positions in the organization, such as the head of the department, the head of the club, or the head of the association. This position may be appointed either by the people in the organization themselves or by the authority in the areas.

Functional leaders are those who are recognized as leaders based on what they are involved in. The economic leader and the social leader are two of the examples. This is because, there are some peoples who are good in certain activities and they tend to become a leader in that particular activity only. Once the activity is ended, they are no longer considered as a leader.

Leaders categorized as "influence behind the scene" are based on the assumption that the reputational approach recognizes the potential and likelihood of affecting issues, activities, or decisions as a measurement of leadership. It also assumed that leadership participants are aware of other participants and acknowledge them as leaders

(Campbell, 1999).

The Principles of leadership

Jerry and Robinson, Jr. (1994: 44) have outlined ten important principles of leadership in organization. These ten principles are based on the philosophy of organizational development, leadership development and community development. Most of the principles cannot stand alone, instead each should be understood and practiced in relation to the other nine and in relation to the members of the group and situation in the organization.

1. Everyone is a leader

Group members do not have equal knowledge and skills (Bennis, 1989), but each person can excel in some aspect of organizational leadership. Organizational leaders must know the people in the organization and volunteers well enough to discover the ability of most of the people in the organization, even if abilities and skills are limited.

2. Leadership behavior is a learned skills

Leaders are not born, they are developed or made. Leaders usually evolve. Leadership is learned by copying role models, by trial, error and experience, and by study. Regardless who the leaders are, they can become a better leader by studying, practicing new behaviors and asking for constructive feedback from the groups.

3. Team work

Involving others in planning, program development, delivery and evaluation is the key to team work in organizations. Successful leaders are those who usually involved and continue to involve others.

4. Permit every team member to lead at some time

Leaders can not know all the answers to every problem in organization. One person does not have enough energy or time to solve all the problems faced in the organizations, especially those organizations working multi level departments, units or ministers. To succeed, people in the organization and leaders must depend on one another. When one individual or one group monopolizes power, resources and time, and takes all the credit, failure is imminent.

5. Everyone, in some capacity, is superior

Leaders may have to look closely to find something which someone can contribute to a specific efforts in the organization. Soon leaders will discover that many people have skills and abilities which leaders do not posses.

6. Democratic leadership is not permissive leadership

There is a common myth that team leadership is permissive, and autocratic persons are especially prone to believe this myth. While democratic leadership is more flexible, it is not unstructured. Many studies have shown that peer or work groups have more influence than the boss over the behavior of their fellows workers (Stogdill, 1974). Sometimes, democratic leadership is more difficult because more time, accommodation to divergent ideas and more people skills are required. Democratic leadership is developmental leadership because, through this system, it is easier to develop new leadership in an organization.

7. Democratic or team-centered leadership is not always best

When crisis arises, such as flood or fire, there is no time to call a committee meeting. Someone must make decisions and do something quickly. Democratic groups should develop policies as a group, then, the leader can be made responsible for implementing the policy. The leader cannot accommodate everyone or do everything in a group. For example, sometimes leaders encounter irresponsible people who must be told what to do, when and how (Hersey and Blanchard, 1993).

8. Autocratic leadership is not always bad

Some situations require the leader to take charge decisively, to exhibit and use authority and power. This is especially effective when the leaders are initiating an activity with people who are immature, irresponsible, disloyal or incorrigible. It is unfortunate, but some people only understand and respond to power. Some individuals have never been exposed to democratic team work, and they do not know how to follow a developmental team-center leader (Bass, 1985). In other situation, people in the community may be in dispute among themselves over work assignments. In such situations, the leaders should use authority to bring the group together.

9. The leader's knowledge and behavior in a particular situation and the expectations and experience of others determine leadership

Many people conform to the expectations of others to the power of the group. If a group expects authority in a crisis, the leader will frequently respond as a power actor. However, if a group is talented, loyal and expects to be involved in solving the problem in a crisis, a skilled team leader should quickly respond by involving members of the group in creative planning and teamwork.

10. Leaders must be flexible

Leaders must adjust their behaviors to meet the levels of experience, knowledge, skills, and the expectations of group members in every situation which faces the community development organizations. Leaders of a community must be many things to many people. One style of leadership will not be adequate in every situation.

What is the "S" Model

The "S" Model has been designed by Associate Professor Dr. Mohamamd Shatar Sabran, Director for Center of Entrepreneurship Innovation and Student Development, Universiti Putra Malaysia. This model is formulated based on several leadership researches that have been conducted for the last ten years. In addition to that, experiences gathered from seminars and conferences both from the national and the international levels were also helped formulating this model. The S Model for leadership consists of several processes. The detail of the "S" Model in shown in Figure 1 below.

Figure 1: The "S" Model for Leadership
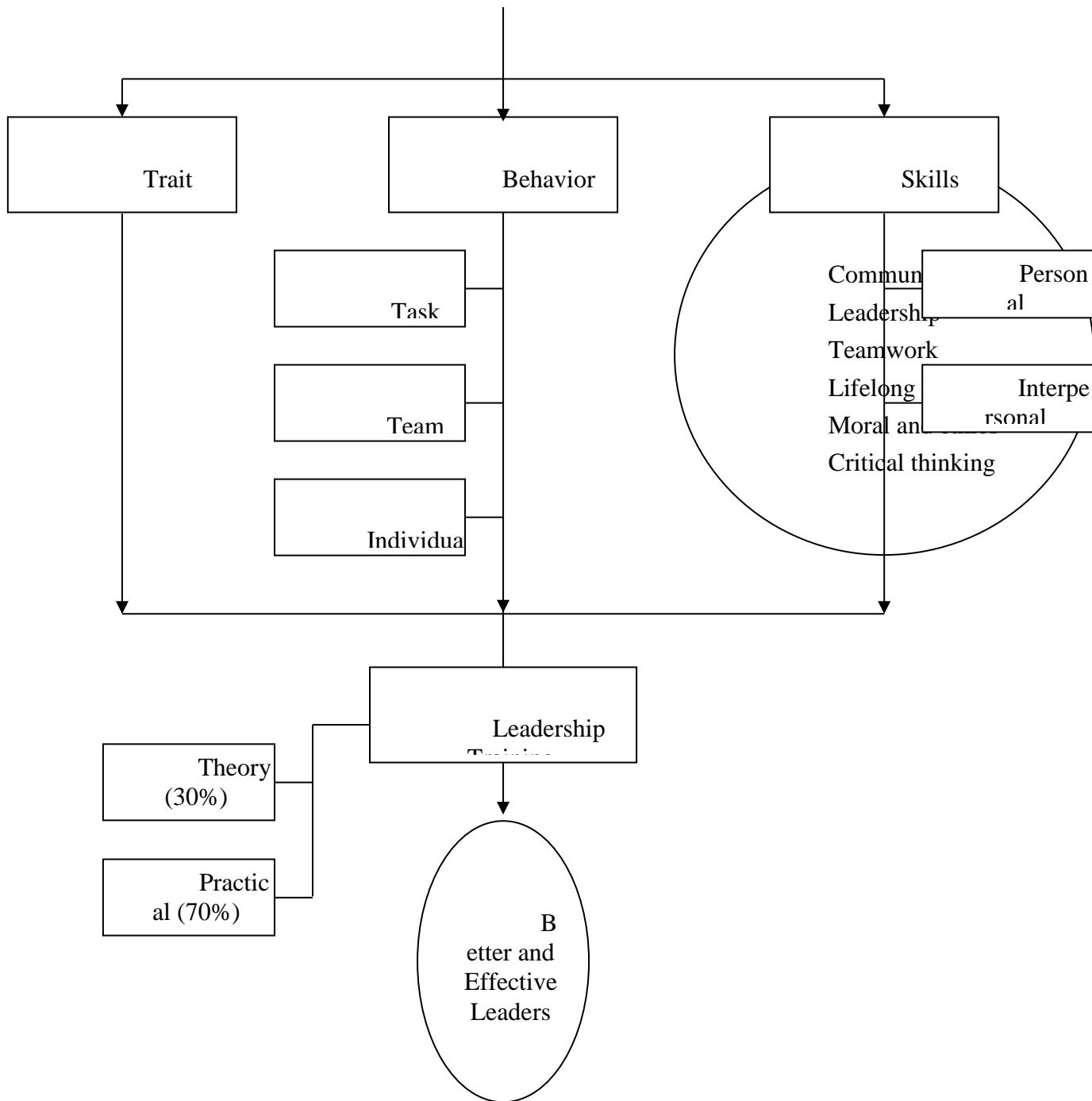
According to this model, the first process is ensuring the candidates acquire three basic criteria, which are the trait, behavior and skills. These three basic criteria could be obtained naturally (born with it) or acquire by learning and training. However, regardless whether the candidates have the criteria naturally or by learning process, the S Model would require all the candidates to go through the process of obtaining the three basic criteria by undergoing leadership classes or leadership workshops organized by the

organization itself or by other parties. Having these three basic criteria are very important as they are the foundation for holistic and outstanding community leaders.

The Traits of Leaders

There are several leadership traits that have been identified based on various leadership researches and studies. One of the pioneer studies on leadership trait was conducted by Stodgill in 1945. In his book, *Leadership*, he has managed to gather more than 15 traits for effective and holistic leaders. This list has been added up to 20 traits by Mohammad Shatar (1999, 2003) in his study on leadership in two communities in Malaysia. The summary of leadership traits for effective and holistic leaders based on both studies is shown in Table 1 below.

Table 1: Leadership Traits

Leadership Traits For Better and Effective Leaders	
Self confident	Self determination
Hard working	Educated
Willing to sacrifice	Creative
Friendly	Fluent in speaking
Religious	Open minded
Working together	High motivation
Respect	Caring and responsible
Adaptable to situation	Diplomatic and tactful
Persistent	Persuasive
Tolerant of stress	Energetic
Alert to social environment	Independent

Source: Stodgill (1945), Mohammad Shatar (1999, 2003)

The Behavior of Leaders

The behavior of leaders is based on the relationship and the interaction between leaders and other leaders and between leaders and followers. Gary Yulk in his book, *Leadership in Organization*, has identified three different means how leaders could carry relationship and interactions between leaders and followers which are based on task, team and individual. The detail description of how leaders use the element of task, team and individual as a mean for interaction and relationship is shown in Table 2 below:

Table 2: Means of Relationship and Interactions used by Leaders

Means	Description
Task	Leaders perform their duties and responsibilities based on the task that has been assigned to them. Leaders who are using this mean are also known as result or outputs oriented leaders.
Team	Leaders who are using this mean, will encourage and give a special attention to togetherness. The leaders believe that working together could produce better and more effective outputs or results. The leaders who perform his duties based on this approach is also known as the social emotion leaders.
Individual	Leaders who are using this mean, will carry out their duties and responsibilities as leaders based on their own personal judgment. The skills, experiences together with their expertise would help them to perform their duties as leaders.

Source: Stodgill (1945), Mohamamd Shatar (1999, 2003)

The Skills for Leaders

According to Ken Kay, a Phoenix-based consultant who serves as an officer for the Partnership for 21st Century Skills, defines the skills for leaders are few basic leadership skills mainly the critical thinking, interpersonal communication and innovation skills that are needed before they could become leaders. In fact, according to him, these basic skills are more important than technical skills and expertise. The studies have also found that, success in the workplace stems from having these abilities, regardless of what kind of work a person does.

The SA Model however, has expanded the scope of skills needed by leaders. Using the idea of soft skills concept, coined by the Minister of Higher Education (MOHE) of Malaysia, the SA Model has incorporated all the seven soft skills suggested by MOHE in the model. All of these skills are believed to be essential for holistic leaders.

What is soft skills? At present, there is no consensus on a precise definition of "soft skills," but in general the term is used to describe on-the-job abilities that go beyond any job and responsibility description. For example, an architect's ability to create and read blueprints would generally be described as a hard skill, whereas his or her ability to work effectively with co-workers, communicate with clients and manage projects would be lumped together under the soft skills banner. In the context of leadership, soft skills refer to the cluster of personality traits, social graces, abilities with language, personal

habits, friendliness, and optimism that mark leaders to varying degrees. Soft skills complement hard skills, which are the technical requirements of a job as leaders.

The detail of the seven soft skills suggested by MOHE that has been incorporated by SA Model is shown in Table 3 below.

Table 3: The Seven Soft Skills

| Soft Skills	Description
Communication	Ability to express ideas clearly, effective, full confident both in writing and speaking, verbal and non-verbal.
Leadership	Ability to understand the basic theories of leadership and the ability to lead others.
Teamwork	Ability to establish good relationship and interaction with other people to achieve the goals. Ability to understand other people needs and expectations among members in group.
Lifelong learning	Ability to find and manage the relevant information from various resources. Ability to accept new ideas and keen for new knowledge.
Moral and ethics	Ability to perform duties and responsibilities professionally and the ability to analyze the impact, economically, socially, and morally from any decisions made.
Critical thinking and problem solving	Ability to identify, analyze, justify and evaluate the problems in various situation and discussion. Ability to initiate and to expand the thinking process and creativity in problem solving.
Entrepreneurship	Ability to identify opportunities in business and the ability to plan, explore, and evaluate opportunities.

Source: MOHE, 2006

Leadership Training

In this process, all the identified and selected leaders who have gone through all the previous processes and have met all the criteria needed are required to attend the Leadership Training (LT) session. In this session, leaders are trained and taught how they could apply all the leadership criteria as leaders. This session will help all the leaders to bind and incorporate all the leadership skills and traits and train them how to apply all the skills and traits in their leadership practices. In order to accomplish the objective, this LT session must be conducted in accordance to the Module that has been designed for LT. The illustration how the LT session is used to bind all the leadership traits and skills to produce holistic leaders is shown in Figure 2 below.

LT is conducted based on the 70-30 approach, which is 70 percent practical and 30 percent theory. Thus, leaders attending this training are required to practice all the leadership skills and traits through the activities and games that have been designed in the

module. Leaders are to make aware about all the leadership skills and traits during the debrief session. LT believes that, by conducting the training using the 70-30 approach it will help the leaders to learn and realized the most the significant of having, using, and combining all those skills and traits before holistic leaders are produced. The approach used by LT Module is also known as the concept of *Learn By Doing* (CDA, 1999). *Learn by Doing* approach or concept is a new approach in many training program and it has been proven effective to accomplish the objective of the session (CDA, 1999).

Figure 2: Leadership Training for Better and Effective Leaders
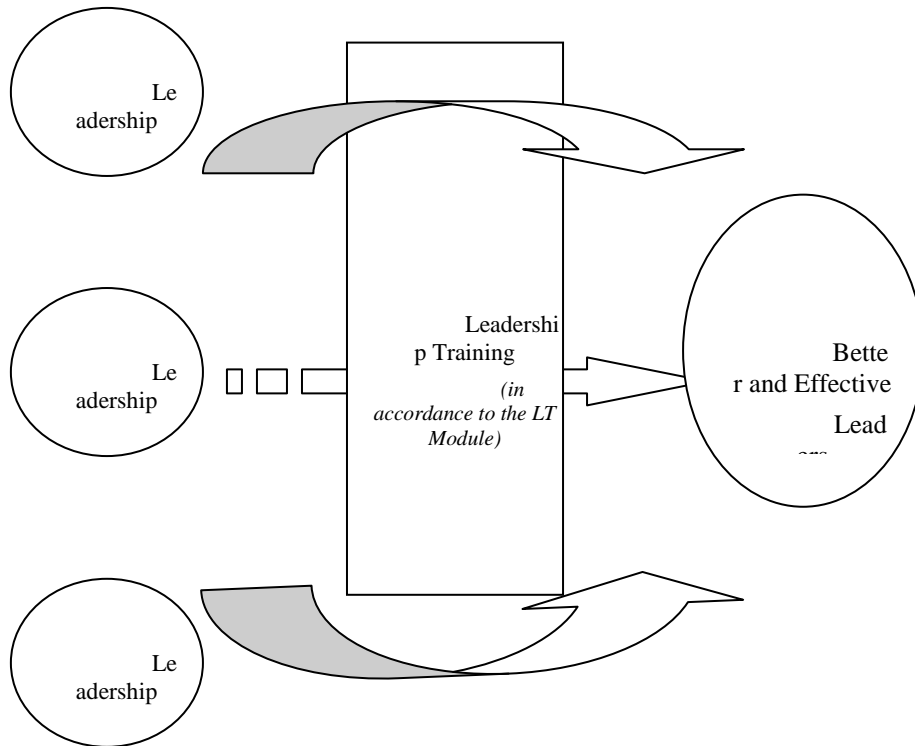
Better and Effective Leaders

Better and effective leaders are those who are able to translate all the leadership theories and concepts into action (Regina, 2007). Leaders produced by the S Model are expected to have the following criteria, as there are believed to be required and needed by the future leaders. The criteria are the following:

- They are able to lead from their mind, the heart, and the soul
- They are able to apply a methodology that encompasses a developmental systematic approach in order to impact oneself as leader, other as followers, and the environment.
- They are able to reflect a journey that leads toward transformation at the individual, team, and organizational or community level.

This model is also expected to produce leaders who are able to apply all the 10 dimension of effective and holistic leaders as described by Elliot Leadership Institute which are IT enabler, team developer, change agent, communication champion, culture expert, customer service ambassador, mentor, financial result expert, relationship builder,

and strategist. The detail explanation and the description of the 10 dimension of holistic leaders is illustrated in Table 4 below.

Table 4: The Description of the 10 Dimension of Holistic Leaders

Dimension of Holistic Leaders	Description
IT enabler	Understands and leverages the latest technological tools and communications resources to build and sustain a competitive advantage. Utilizes the most appropriate technologies in information, communication and operational systems to improve organizational effectiveness.
Team developer	Cultivates individual talents and encourages mentoring at all levels. Strives to continually elevate the effectiveness of the team by staffing with high level talent and developing team members.
Change agent	Embraces change and leads the team through innovation and rapid responses to change. Create an environment that foster creative thinking and decision making
Communication champion	Demonstrates excellent two-way communication skills with all levels of the organization in written, verbal and group presentation delivery styles. Listens and seeks feedback from others to insure communication is open, consistent and processed successfully.
Culture expert	Aligns organization vision, mission and values with business strategies. Creates and sustain strong organizational culture to improve the organization's ability to adapt to change, embrace innovation, and remove obstacles to success for its individuals and teams.
Customer service ambassador	Responsive to both international and external customers and partners. Dedicated to providing the highest level of service, resources and support to all customers.
Mentor	Values the diversity of others and seeks to foster an inclusive work environment. Promotes creative thinking and seeks opinions of other without playing favorites.
Financial result expert	Establishes financial expectations and operating budget. Set accountability for results. Evaluates and monitors results in order to provide continuing feedback and guidance to improve financial performance.
Relationship builder	Builds and maintain effective and collaborative relationships with diverse stakeholders and facilitates teams success. Initiates and cultivates strategic internal and external networking relationships that foster both individual and organizational goals.
Strategist	Aligns organization vision with long term strategies. Develops strategies by engaging key stakeholders in the process. Fosters creative and innovative thinking from a diverse and inclusive team and considers both short and long-term strategies.

Sources: Elliot, 2007.

Conclusion

The future leaders are very important for the success of any community or country. Choosing or having leaders with good quality and are able to manage the people, community and the country effectively need to be the main concern of the people

today. No community or country is willing to put their future at risk by electing no quality leaders.

For that purpose, this paper is proposing the "S" Model to be employed as a training module for the future leaders of a country. It is hope that, by employing the "S" Model, any community or country could ensure that the future leaders would meet all the leadership qualities that are needed to sustain the development and the prosperity of the country, yesterday, today and tomorrow.

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Strength Capabilities and Subjective Limit of Repetitive Manual Insertion Task

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Abstract

Manufacturing industry sector is one of industrializing parties that gives significant contribution in achieving the vision of 2020 in Malaysia. The ability of human works is compulsory in letting the industry to be successful in producing products. Unfortunately, many of painful afflictions of musculoskeletal system as Musculoskeletal Disorders (MSDs) are associated with the working posture. Ergonomic play an important role to give comfort ability to the workers who work at any manufacturing industry. Nowadays, there are so many companies that ignore about the ergonomic of their workers. They tend to push the worker to achieve the output of the company rather than think about comfort ability to the workers on the workstation. This project is conducted to investigate the subjective limit for repetitive manual handling tasks according to workstation area and body posture for workers and the pain or discomfort experienced by the workers while undertaken the task. Also the improvement of the body posture was made. The method used in this study included observation, questionnaire, company visit, interview and Rapid Upper Limb Assessment (RULA). RULA has been used in this study to assess the posture of the worker while handling the tasks before and after the improvement posture. After making the improvement, scores for body posture was reduced to the safe level.

Keywords: Musculoskeletal Disorders, Workstation Design, Repetitive Manual Handling, Body Posture, Rapid Upper Limb Assessment

Introduction

Repetitive work is a form of manual handling. The injuries that occur usually affect the muscles, tendons and other soft tissues. When the work mainly involves using the arms and hands it will easy to get numbness, tingling and loss of muscle strength. Typical examples may include production line work such as assembly, packing, wrapping and so forth. Repetitive manual work may also occur when there is a frequently lifting movement such as moving bricks or shoveling sand. Mital et al. (2000) gave the opinion about the concepts of repetitive works. Repetitive work refers to similar work tasks performed again and again. Repetitive work at upper extremity is considered one of several physical work load factors, associated with symptoms and injuries of the musculoskeletal system which known as Musculoskeletal Disorders (MSDs) problem. Other factors that influenced repetitive works are static loads, postures and exertion of external forces. Dennis et al. (2004) had done the study about the hand intensive repetitive tasks. They found out that for hand intensive repetitive tasks, the emphasis of the assessment on identifying which of the risk factors (force, repetition, awkward postures, contact stress and muscular fatigue) are significant enough to warrant reduction. If the task involves any of the following features, then it may pose a risk of MSD.

The good workstation is a workstation that allows the operator to do their job comfortably. An ergonomic workstation can give big impact to the operator to manage their work without being injured. Every company has their own problem. Some of problem that was identified is regarding ergonomic problem. The ergonomic risk factors on many companies are repetitive work, force exertion and body posture. Repetitiveness is probably the risk factor of greatest importance in many jobs in industry. It can give long period effect which is chronic effect to the workers. The operators do their work repetitively by using their hands and it may harm the operator for long period. The highest risk occurs when the same type movement is frequently repeated by the same joint. The example of body posture is static postures and movements. Static posture is considered in critical when the body segment being held in an intermediate position within the joint range for a prolonged period of time. The body posture that usually gives a problem to the workers is static posture. The operators used to work at same workstation without movement and stand for prolonged period of time. This usually happen at final assembly of the production line.

Therefore, the aim of this project is to investigate and analyzed the workstation area, body posture and experience on the body discomfort to all workers while undertaken repetitive manual handling task. Besides, project is carried out to propose the body posture method in order to reduce the pain experience for the workers.

Methodology

A wiring harness manufacturer in Pahang, Malaysia was selected to perform the data collection. This project is focus on the subjective limit for repetitive manual handling task. Five workstation and 100 workers were recruited as subjects in the study. The questionnaire is distributed to the operator at production line. The questionnaire was divided into two sections which is; part *A* are about demographic information. The second section part *B* was asking about the pain experience while undertaken the task include the discomfort at the hold body. The selected subjects represented more than 80% of the total production workers of five workstations which is conveyor, kitting, grommet, taping and layout workstation. The categories of the operator are divided into five parts which are gender, age, weight, height and process. In this survey, the repetitive manual

handling task of the operator is observed whether they are achieved good level of comfortable or not. Figures 1a to 1e shows the body posture while workers undertaken the task on five workstation in layout process.

Fig. 1a: Layout Workstation   Fig.1b: Conveyor Workstation

Fig.1c: Taping Workstation   Fig.1d: Kitting Workstation

Fig.1e: Grommet Assembly Workstation

Computer Aided Three-dimensional Interactive Application (CATIA) is software that used in this project to analyze the body posture of the workers while handling the jobs. From CATIA software, the person was developed according to the picture taken by the company. There is Rapid Upper Limb Assessment (RULA) analysis in CATIA that will used to make the analysis. The score of posture for each workstation was produced

by using RULA analysis. RULA analysis in CATIA made the analysis of body posture easier compared to the RULA worksheet. Carayon (2012) found out that Rapid Upper Limb Assessment (RULA) is a quick survey method that can be used as part of an ergonomic workplace assessment where MSDs are reported. RULA assess biomechanical and postural loading on the neck, shoulders, and upper limbs and was designed to assess sedentary work. It allocates scores based on the position of groups of body parts with additional scores for force or load and muscle activity. RULA has been used majorly to look at static work postures.

Results and Discussion

The finding result from the work comfort of the workers showed that the highest percentage at Grommet Assembly workstations which male workers 50% and female works 20% of discomfort. Table 1 shows the percentage work comfort at 5 workstations.

Table 1: The percentage of Work Comfort at 5 Workstations

| WORKSTATION | WORK COMFORT (%) | | | |
| | FEMALE | | MALE | |
	YES	NO	YES	NO
CONVEYOR	15	40	30	15
KITTING	45	20	20	15
GROMMET ASSEMBLY	15	20	15	50
TAPING	40	45	10	5
LAYOUT	45	35	10	10

From the result in the table 1, the highest percentage of the worker who did not satisfy with the current workstation is 50 percent which is for taping and grommet assembly workstations. The workers at these workstations tend and feel more discomfort compare to other workstations. In addition, the female workers felt discomfort compare to male workers due to the number of female workers are higher than male workers.

The structure of the grommet assembly workstations was quite dangerous compare others. The machine can make the worker easy to expose an accident. Therefore, the workers at this workstation had the higher percentage of accidents.

In terms of body injured, the works at the taping process had the highest percentage of the workers. The female workers tend to have more body injured compare to the male workers. The procedure of doing the job at this workstation seems like to use more strength at the hands part. The workers did not ware the glove and personal protective equipment (PPE) while handling the job so that the probability to have an injured was higher. The discomfort feeling for upper body was experienced by the female workers in this workstation. The workers need to bend their body while doing their job.

The taping process also need the worker to stand for prolonged period of time while conduct the job. So, the lower body of the worker is affected. The lower part of the body easy to expose to the injury because it involved with prolonged standing. The female workers tend to have health problem at this workstation due to the process at this workstation involved awkward posture and standing for prolonged period of time. The workers keep doing the same process by using their hand that can affect chronic injury. Salvendy (2012) said that the repetitive motion or overuse loading can cause chronic injury to tendon tissues.

According to the criteria of pain experience, the most workstation that needs to undergo the improvement is taping workstation. The process at this workstation needs the workers to standing for the long period of time. The workers also bend their body for several times in order to conduct the job. As we can see from the result, the body posture of the taping process mostly in wrong posture.

Bridger (1995) claimed that the existence of strong physiological component suggests that ergonomic intervention based solely on the analysis of posture and workstation layout would be insufficient on its own. Physiological and organizational analysis would be necessary. Hence, the postures of the worker need to analyze first in order to reduce ergonomic risk factors. Pradanos et al. (2011) have done the study about the RULA method. They found out that the continued or repeated adoption of painful positions while working generates tiredness and in the long run can cause disorders in the skeletal muscle system.

From the data analysis regarding the level of pain at certain parts body, the highest number of worker in worst pain category is at taping workstation for the whole body. The data shows that the kitting workstation has the highest number of worker for fairly pain. The part of body for the fairly pain is foot. The workers need to standing for the whole day while doing the job. So, the most part that give an impact for this situation is foot. The workers that experienced light pain have the highest number of worker at layout which is shoulder part. The layout process needs the worker to move the body according to the layout of the product. So, the shoulder part plays an important role in order to conduct this process.

The body posture analysis using RULA analysis for all workstations is made. Then, each of the body posture is improved in order to overcome the MSDs problem among the workers. The improvement is also made using RULA analysis. Appendix is shows body posture for each of the workstation before and after improvement. The improvement is made in order to reduce the score of RULA and awkward posture of the workers as well. The improvement of the body posture for each workstation is summarized in table 2.

Table 2: Summary of RULA Score Before and After Improvement

Workstation	RULA Score Before Improvement		RULA Score After Improvement	
	Left	Right	Left	Right
Layout	7	6	3	2
Taping	3	3	3	3
Conveyor	4	4	3	3
Kitting	3	3	3	3
Grommet Assembly	3	3	3	3

According to RULA score, layout, and conveyor workstation is in worse condition because the score of body posture analysis is high. But referring to the result of the questionnaire the worse workstation is in taping workstation. It is because when people stand in a long period of time the muscle will face with a problem. Hence, according to the muscle result as shown in Appendix A and B, the muscle score for taping, conveyor, and grommet assembly workstation is in red condition.

Conclusion

This study has performed muscle activity measurement in the left and right erector spinae, left and right tibialis anterior, and left and right gastrocnemius of workers at metal stamping process lines and handwork section in a metal stamping company. All workers performed their tasks in standing position for prolonged time periods. The measurements of muscle activity were conducted at three working sessions: beginning of workday, middle of workday, and end of workday. During beginning of workday, the two groups of workers show a significant difference in myoelectric level in the right erector spinae, right gastrocnemius, and left tibialis anterior. On the other hand, the two groups of workers did not show any significant difference in myoelectric level during the middle of the workday and end of the workday. Therefore, this study concluded that muscle activity of the workers was determined by the work load and duration of standing.

Recommendation

The suggestion for future works has been made in order to reduce ergonomic problem at the company. Hence, training on the proper posture that should company used in order to conduct the job. The training session will help the worker to work in a good posture and avoid ergonomic problem as well; Postures should be printed and posted at appropriate locations of the workstations that will remind the workers of the proper posture for conduct the job; the required force, repetition and duration of the jobs for the worker should be examined and the workload for each worker must be balanced.; the workstation must be redesign in order to make the worker did not use bad posture during conduct the job. The workstation must be design according to the posture that I already made the improvement.

Acknowledgment

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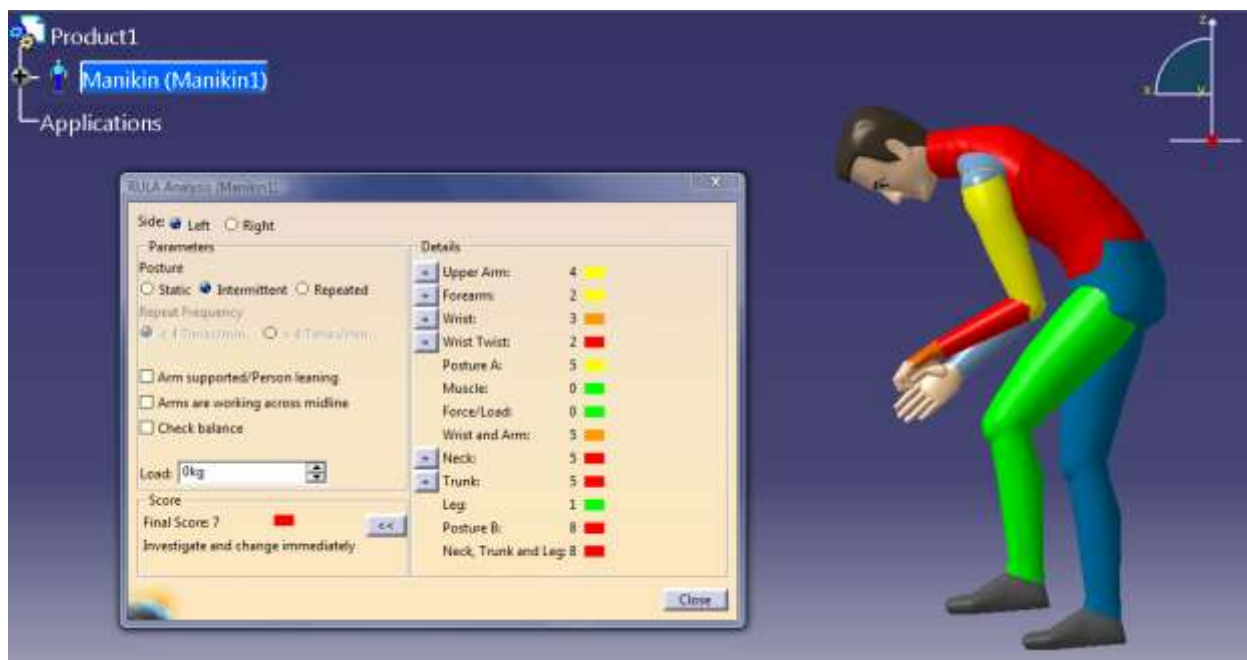
Appendix

Layout Workstation

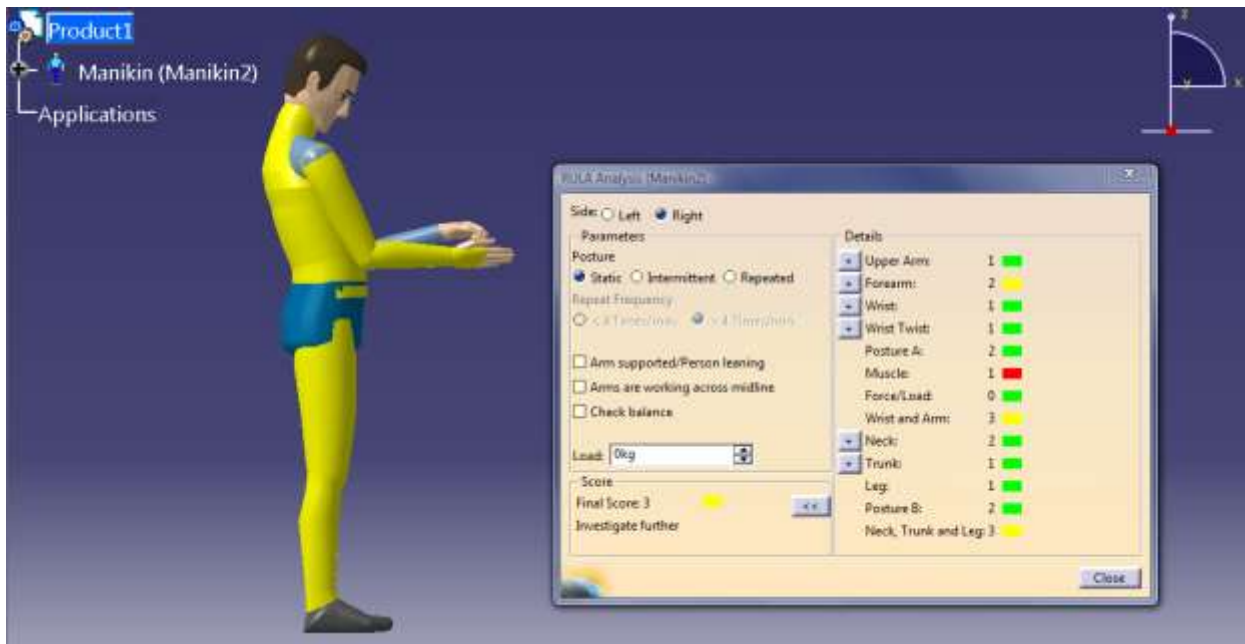Before improvement
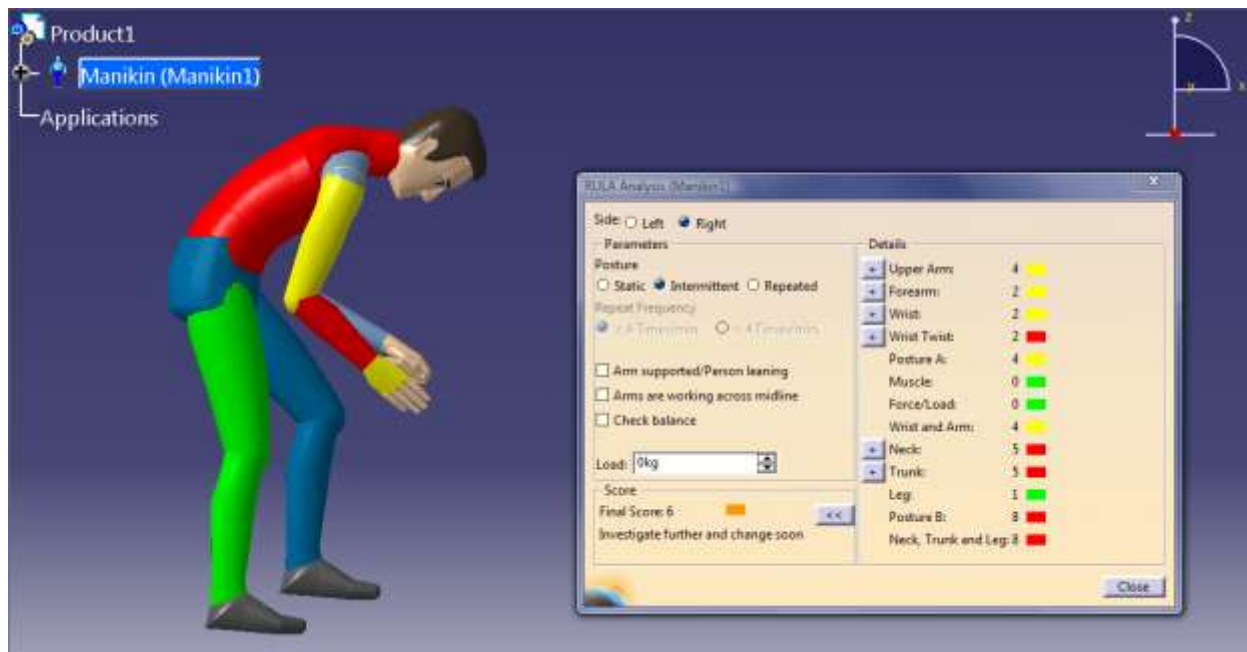
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After improvement

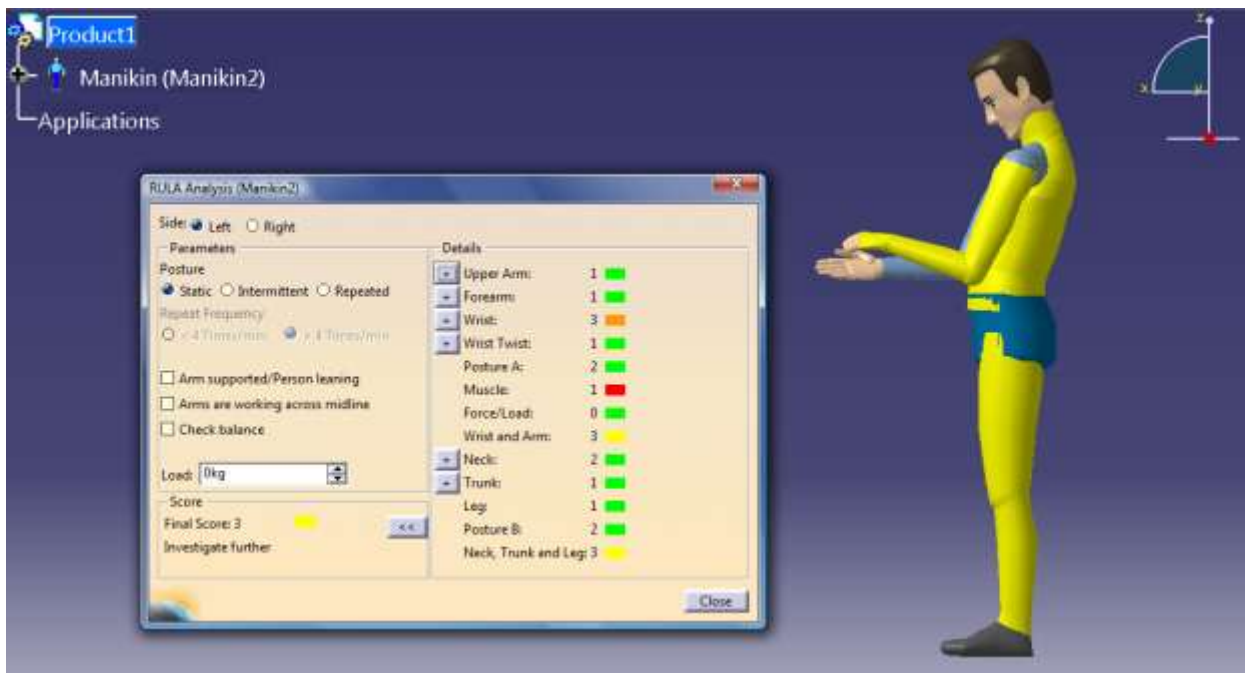Right side

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Taping Workstation

Before improvement

Right side

Left side

87

After improvement

Right side

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Conveyor Workstation

Before improvement

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Kitting Workstation

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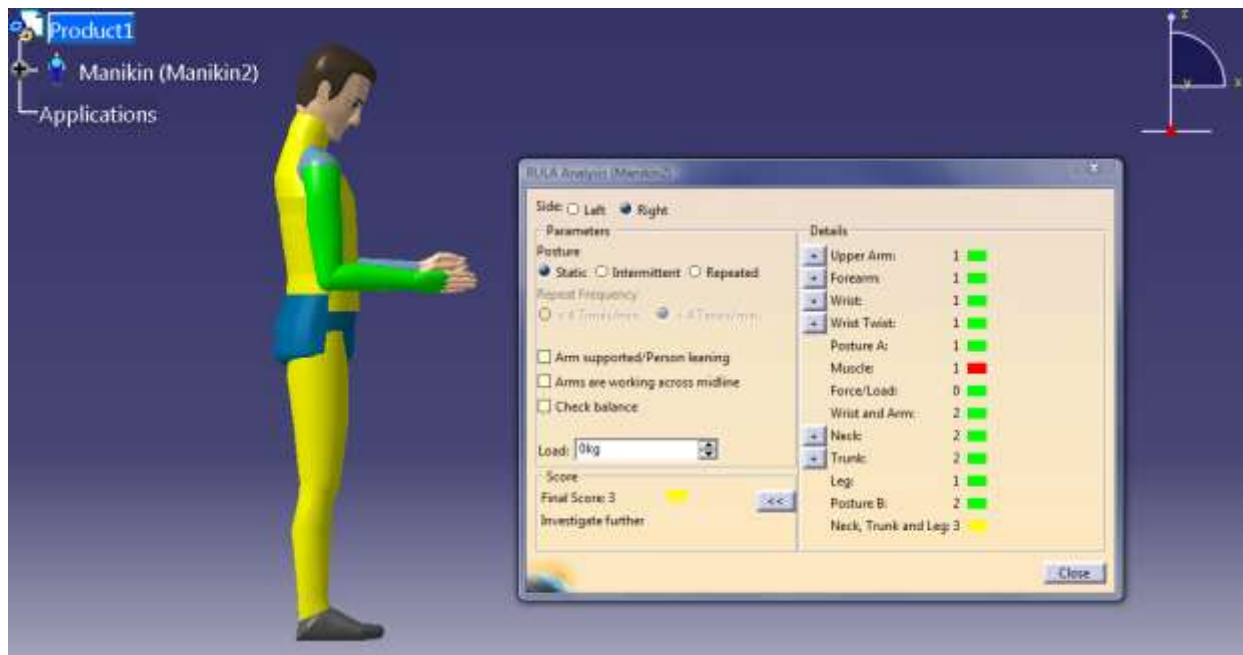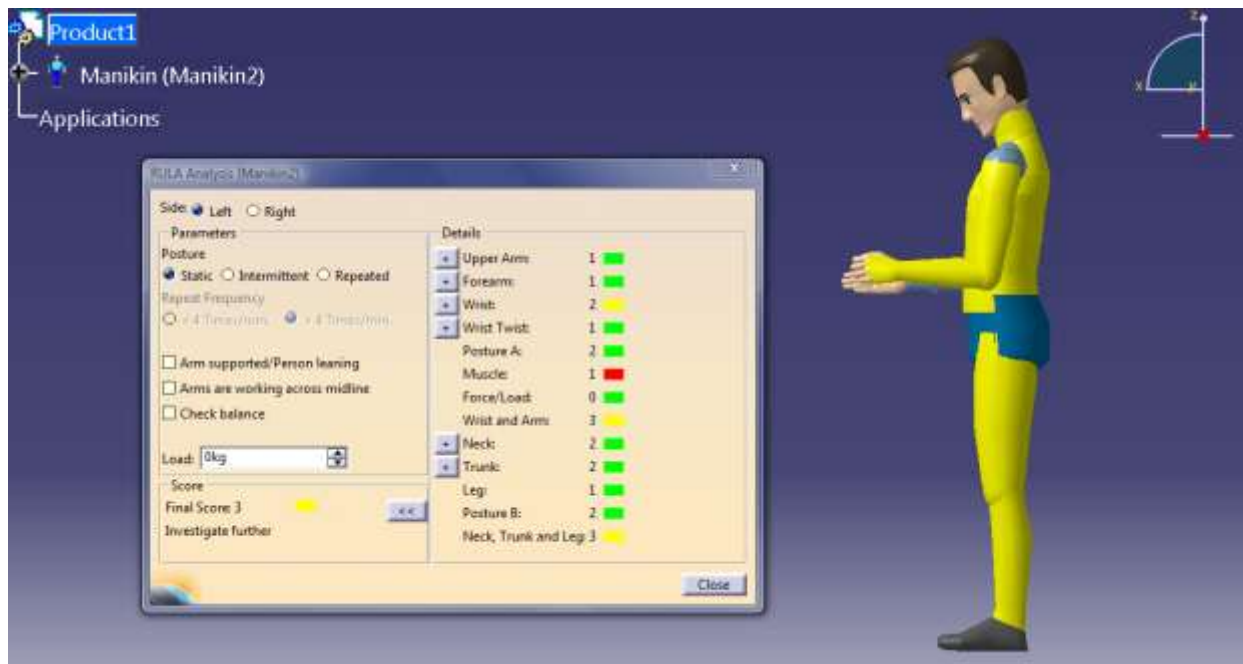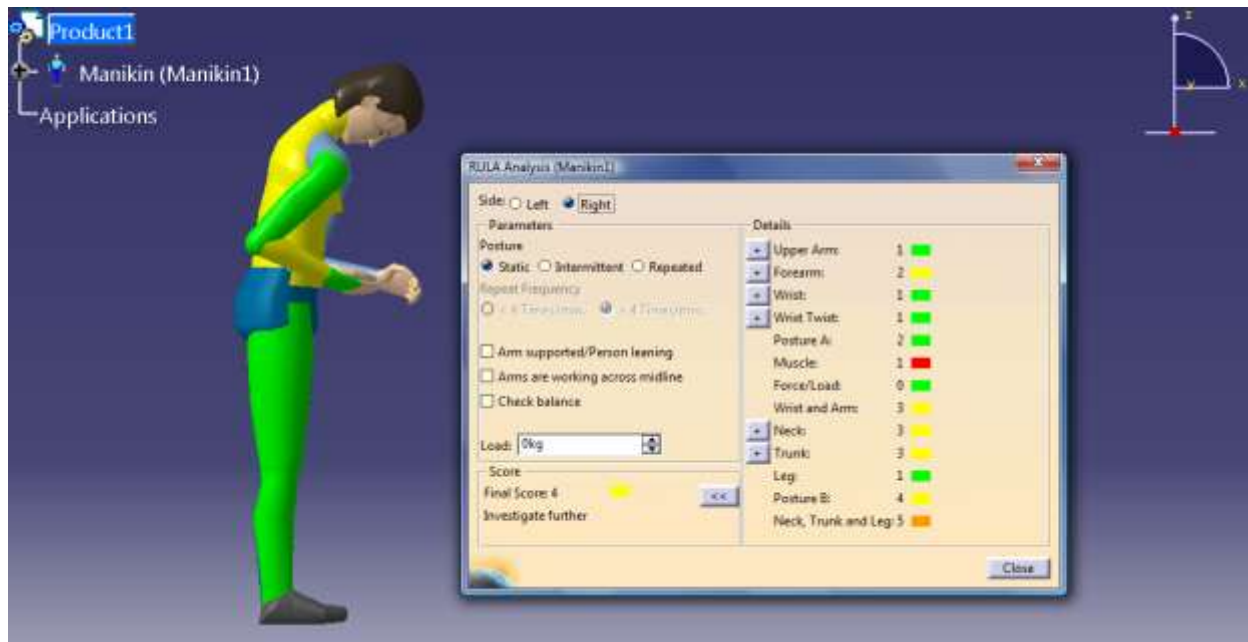
Grommet Assembly Workstation

Before improvement

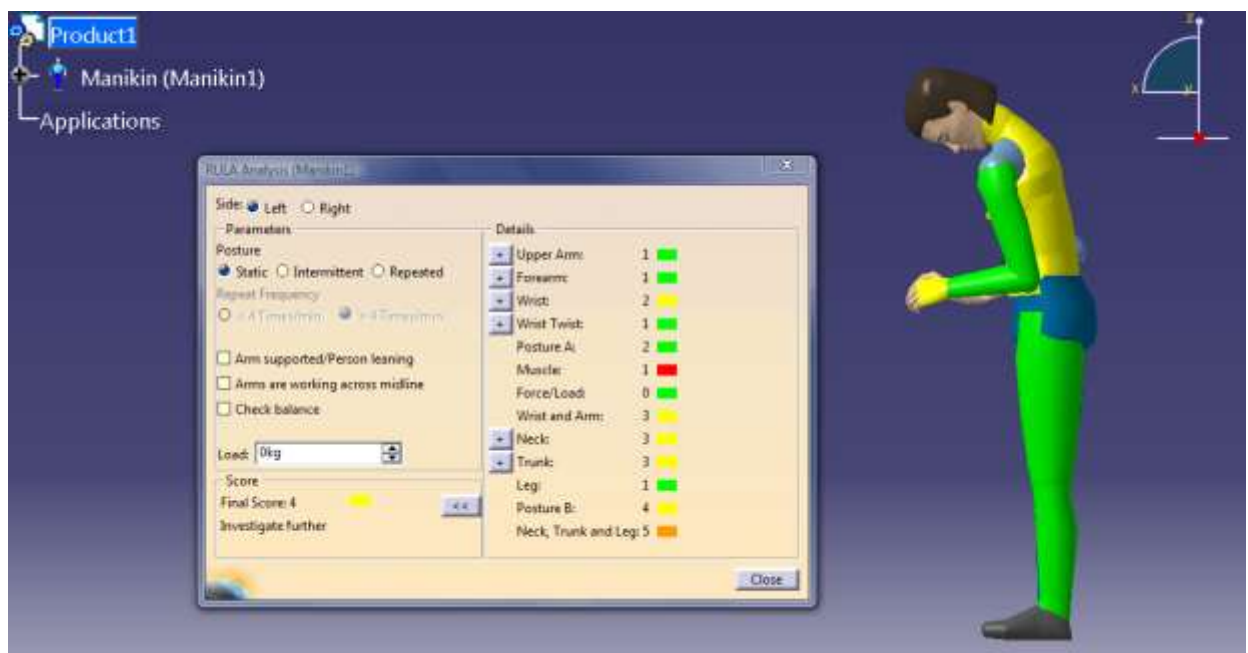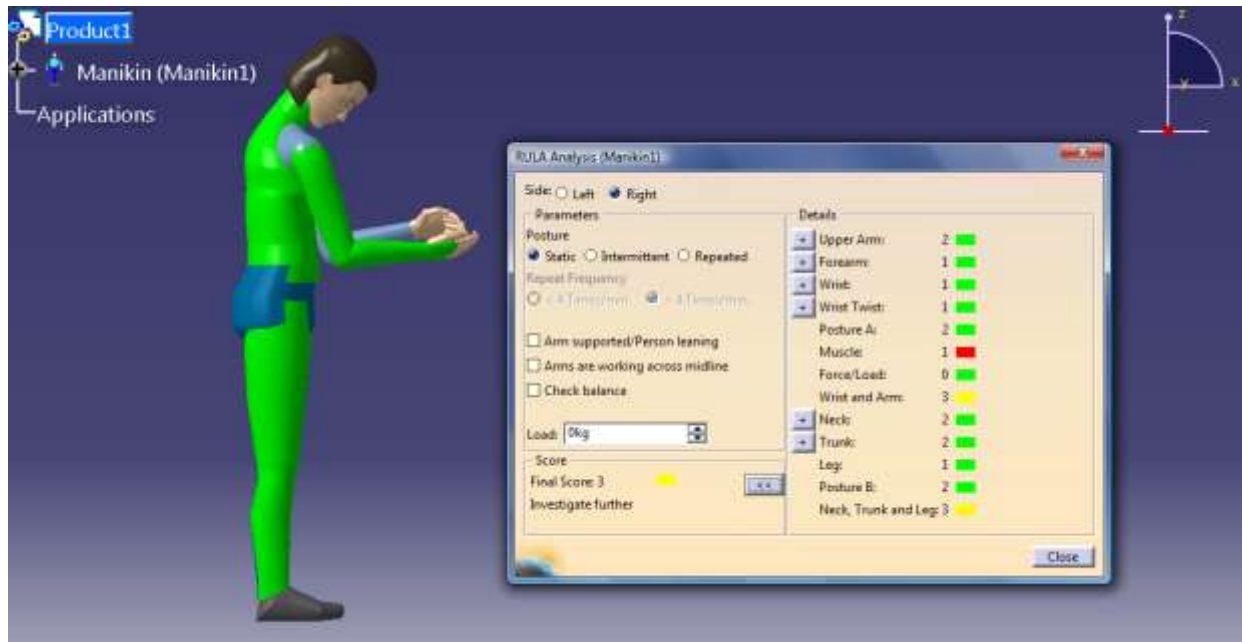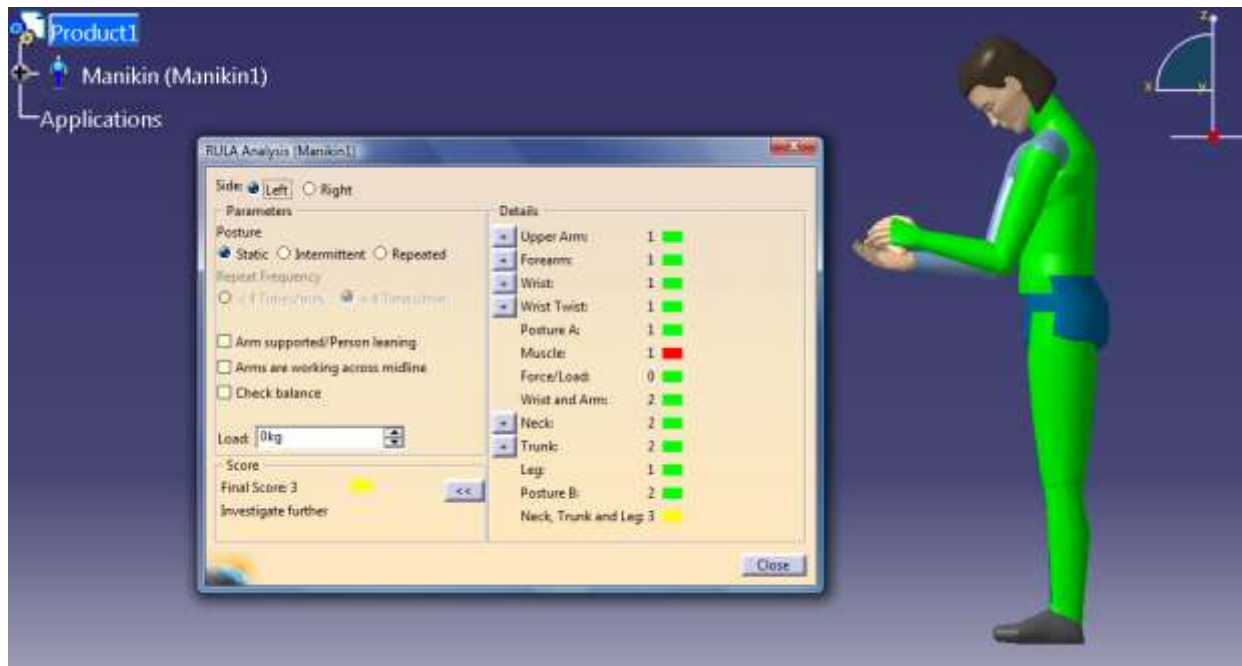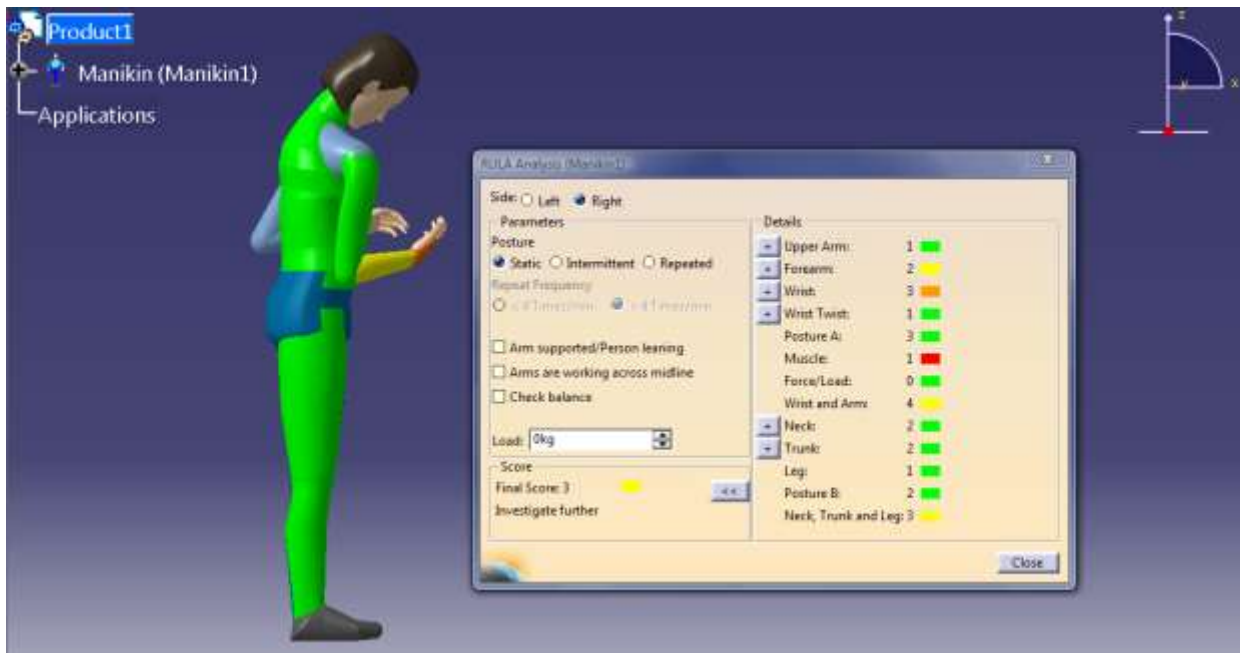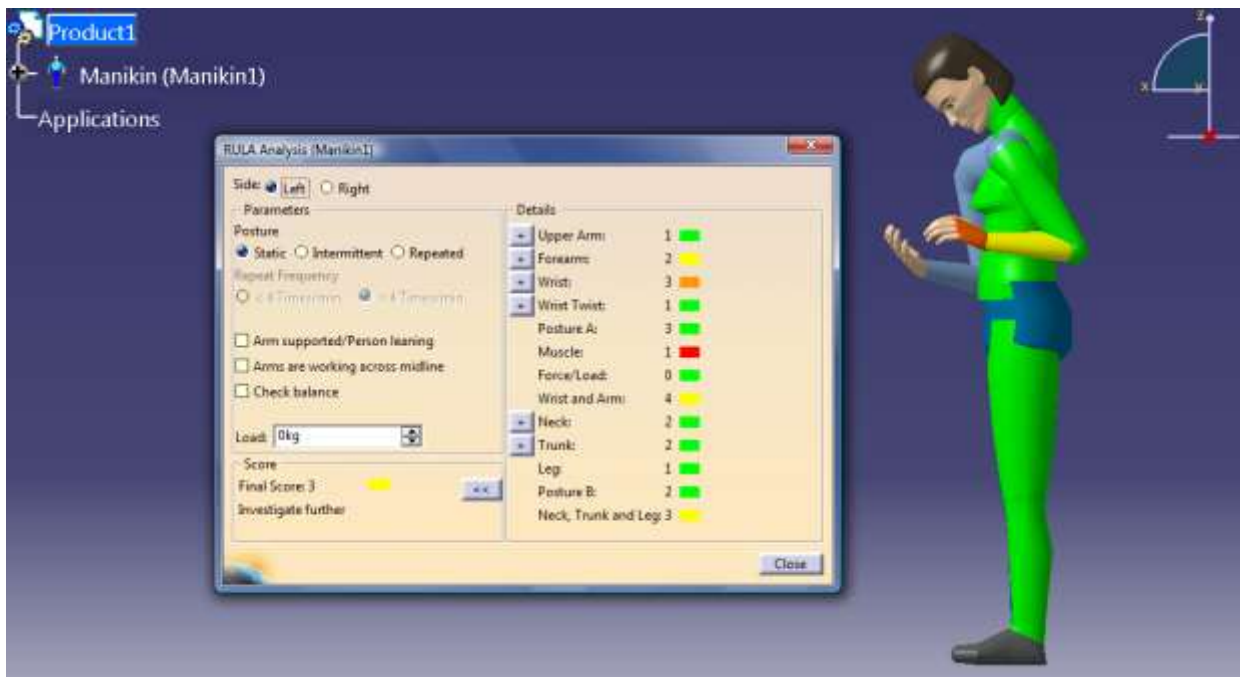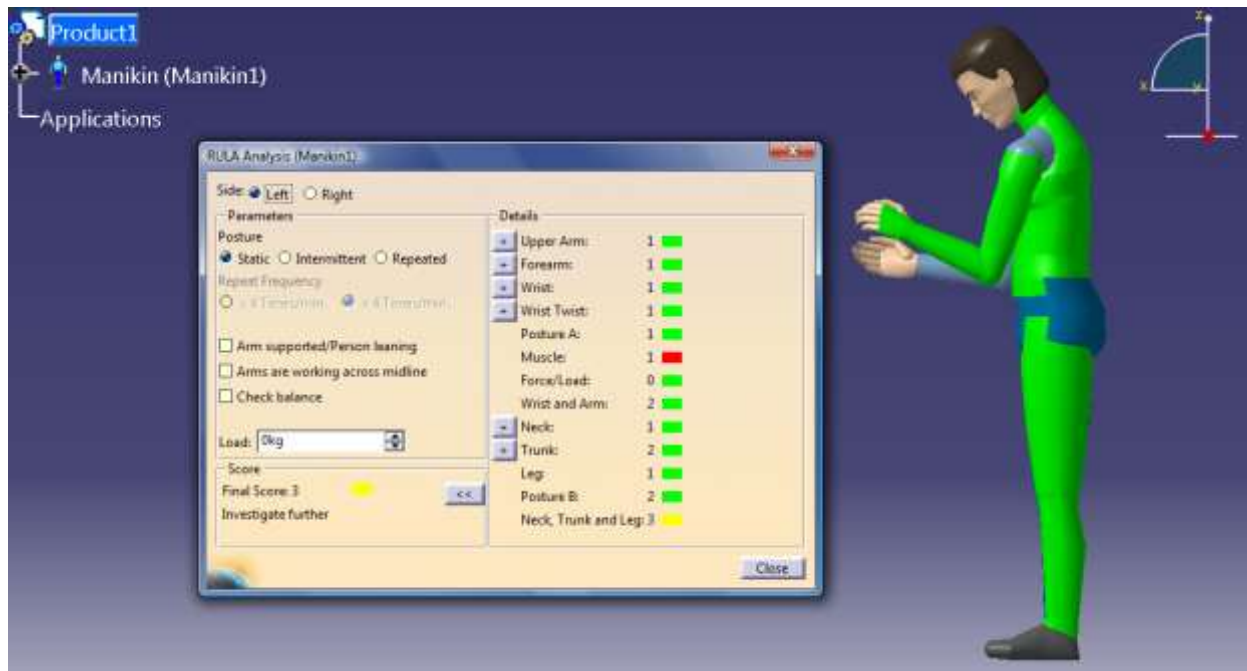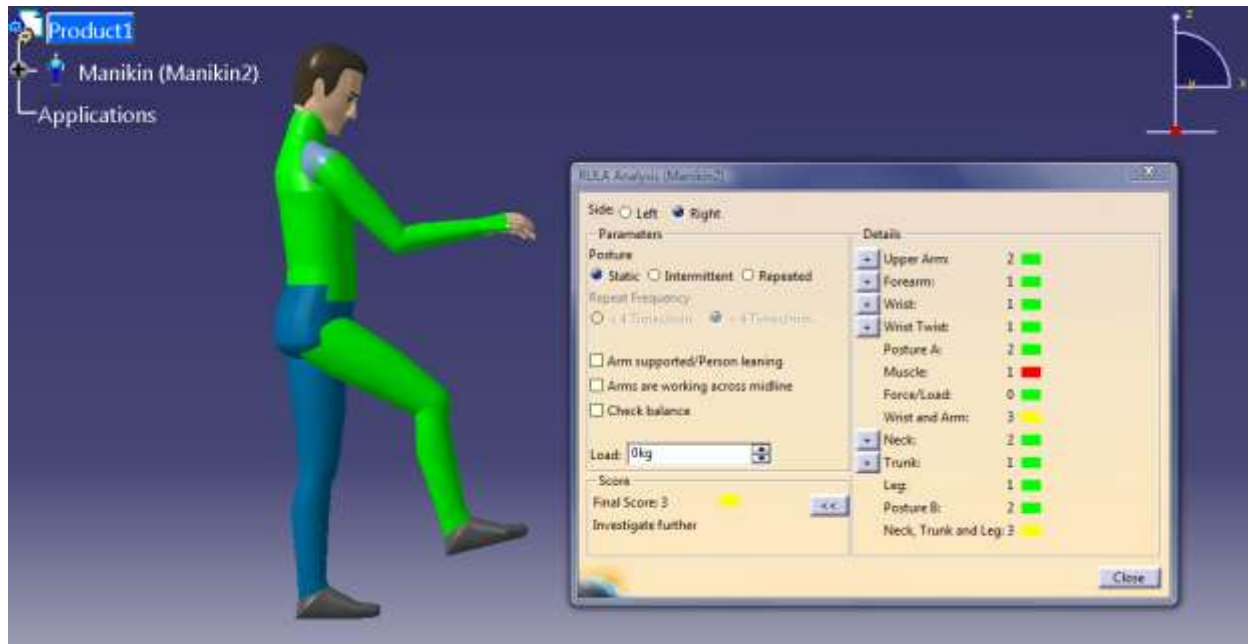Right side

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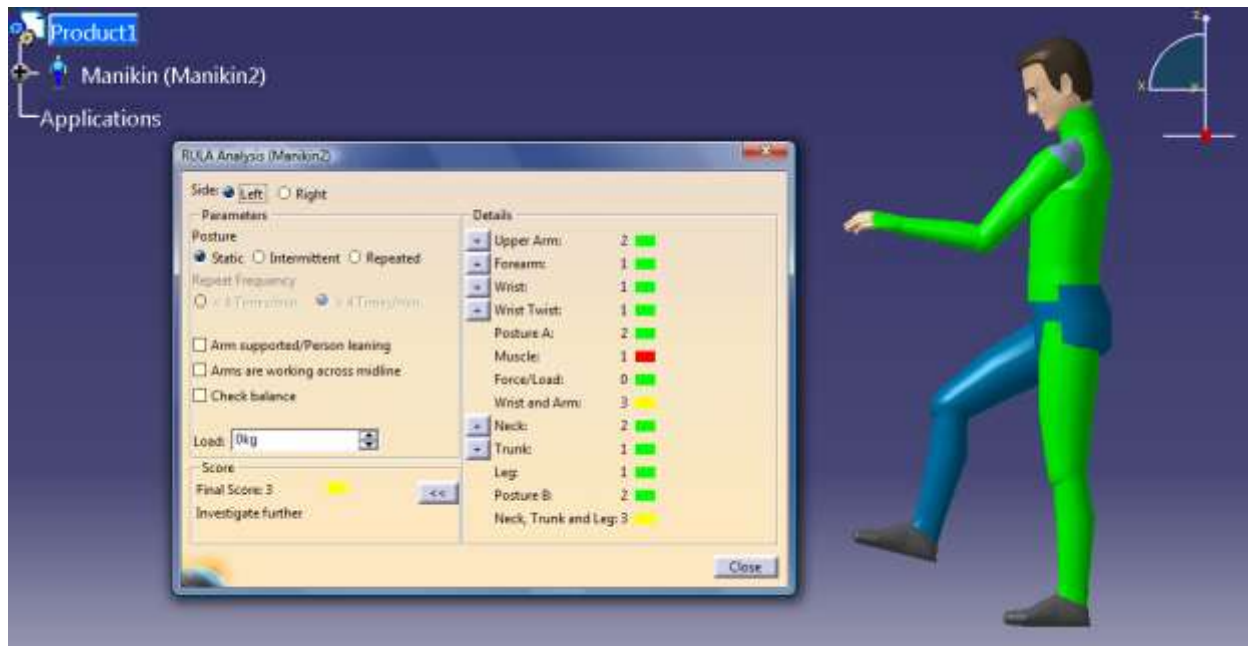
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Teacher support in the classroom: The impacts on students' attitudes toward Mathematics

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Abstract

This paper is an attempt to investigate the relationship between students' perceptions of learning environments and their attitude to Mathematics in secondary schools. The samples for quantitative data were gathered from 207 Form Four students in different classes from government secondary schools. Two instruments were used for data collection; *What is happening in this class* (WIHIC) questionnaire and *The attitude toward Mathematics* (TAM). Simple correlation analyses were carried out to find the relationships of teacher support and attitudes toward mathematics. The result demonstrated that teacher support and attitudes of students toward mathematics as being statistically significantly and positively associated. These results were consistent when tested separately for the male and female. Multiple regression analysis showed that the multiple correlation *(R)* was 0.388 and was statistically significant *(p<0.001)*. The impact was greater for females *(R²=0.419)* than the males *(R²=0.330)*. The finding will assist teachers to develop strategies to address the problem of students' declining attitude toward mathematics by changing their interpersonal relationship with the students.

Keywords: Teacher support, students' attitudes, classroom

Introduction

The Malaysian school curriculum offers three mathematics education programs, namely Mathematics for primary schools, Mathematics and Additional Mathematics for secondary schools. The Malaysian mathematics curriculum for secondary schools aims to develop individuals who are able to think mathematically, and apply mathematical knowledge effectively and responsibly in solving problems and making decisions; and face the challenges in everyday life brought about by the advancement of science and technology (Ministry of Education, 2004).

These are noble aim and intentions which formulated for the benefit of younger generation. To what extent have these noble intentions been implemented successfully in the Malaysian classroom? Teachers and researchers have become increasingly concerned with the performance of students in mathematics. Specifically, one of the challengers facing teachers and administrators today is how to improve students" attitudes towards mathematics. Research has shown that students in suburban tend to have more negative attitudes towards the learning of mathematics and perform poorly on public examination. Despite the importance of mathematics to the Malaysian country, statistics showed that the number of people taking up mathematics studies was declining.

The decline in the study of mathematics and science shown in the report of Trends In International Mathematics and Science Study (TIMSS) in 2007 which involved 60 countries. This is a four-yearly international comparative assessment of the achievements and attitudes towards mathematics and science of Year 4 primary and Year 8 secondary students in 60 countries. Malaysia plunged from 10th placing in mathematics in TIMSS 2003 to 20th placing in TIMSS 2007. Many factors contribute to the declinations; many parties put the blame on change language of instruction policy.

For decades, the development of positive attitudes toward mathematics has been the concern of mathematics educators. Such attitudes have been recognized as important goals of mathematics education. There is some evidence to suggest that the attitudes to mathematics which students hold might influence their academic performance (Shoenfeld, 1989; Mc Leod, 1992; Ramirez, 2005; Yara, 2009). Two studies in Malaysia; Abu Seman Sareh (1997) and Azizi Yahya (2007) found association between attitudes toward mathematics and students" performance. The correlation between student attitudes towards mathematics and their achievement in mathematics, however, appears to be strongest for students in grades 8 to 10 (Ma & Kishor, 1997).

Previous research (Wubbels, 1993; Tobin *et. al*., 1990; Goh & Fraser, 1998; Waldrip *et. al*, 2009) identified the important relationship between teacher-student interpersonal relationships and the outcome of attitude in different settings and different subject areas. One of the main areas of influence on attitude was the helpfulness and friendliness of the teacher. Therefore, structure should be developed and immediate solution need to be identified to address the declining popularity of mathematics and to improve students' attitude toward mathematics.

Therefore, it is essential to establish a means of addressing the decline in attitude which implied students" dwindling interest in mathematics at a higher level in secondary school. To what extend the students" attitude affected by what take place in the typical secondary school mathematics class? Are the students treated equally in mathematics classroom? What are the components of the classroom environment increase the level of students' attitudes toward Mathematics? Any gender differences in students"

perceptions of learning environment in the classroom? There are many answers I would like to know.

Background of the Study

A number of factors seem to be shaping attitudes towards mathematics. It is possible that classroom environment might be one of factors that play a role in both the formation of attitudes themselves. A considerable amount of work has been undertaken in many countries in developing methods for investigating how teachers and students perceive the environments in which they work. Remarkable progress has been made over several decades in conceptualizing, assessing, and researching the classroom environment.

Dorman (2002) suggested that the earliest recorded learning environment research, conducted by Thomas in the 1920s in the USA, used this method of observing and recording. In the late 1960s, Rudolf Moos and Herbert Walberg independently brought the concept of psychosocial environments into the research area with Walberg employing students" perceptual data collected by questionnaire. In 1972, Shulman and Tamir (cited by Henderson, Fisher & Fraser, 1998) suggested that affective outcomes are equally as important as cognitive ones in education.

The aim of this study is to investigate teacher support in the classroom and their impact on students' attitudes toward mathematics.

Literature Review

During the past 35 years, the study of classroom environments has received greater attention by researchers, teachers, school administrators and administrators of school systems (Chioh & Fraser, 2009). Since the learning environment is constant for all the participants at the time, the dynamic aspect that is changing is the interpersonal one between teacher and students. A demonstration of enthusiasm, a positive attitude in the subject area by a student is a measure of success for the teacher. How does a teacher instil the positive attitude towards the subject area? How does the teacher–student relationship that affects the student outcomes – the attitude?

Teacher is the heart of the education even though education process could have taken place without a teacher (Abu Bakar Nordin and Ikhsan Othman, 2008). Traditionally, the teacher"s role was perceived to place emphasis on moral training and instruction (Hoyle, 1969 cited in Laila Hairani, 2002). Sorcinelli (2006) cited in T. Subahan Mohd Meerah *et. al*. (2010) suggested that effective teaching occurs when a teacher enjoys teaching, inspires interest and excitement in the content of the course, relates the subject to current events outside of the classroom, provides clear, well-organized presentations, gives prompt frequent feedback on student progress and encourages student involvement in the classroom. Many studies also characterise these effective teachers as being reachable, sympathetic, professional, supportive, caring, patient and friendly. For most of the students, they are yearning for intelligent, gentle, creative, and empathetic teachers who listen to students" problems, and who create trustworthy and respectful environment for learning in their classrooms (Robertson, 2006).

Fielding (2006) views the teachers were the most important part of the entire education system since the environment that they created had a direct impact on the

students in their care. All teachers need to be aware of that impact and the potential effect it has.

Kilgour (2007) argues that teachers should not treating everyone the same 'whole class' approach, but attend to the specific needs of particular students. He reported that those students who are at lower ability rated equity very low for the class. He agrees with Rousseau and Tate (2003) view that teacher looking for equity in their profession should be aiming at equity of outcome rather than equity of process.

The role of teacher is to provide an environment that allows for everyone needs, especially in multi-cultural like Malaysia. On the top of that, each student possesses their own learning style, learning pace, ability, set of expectations, and level of success. An effective teacher should recognise students' characteristics that differentiate them from one to another and also aware of different needs of the students (Lalor, 2006). All the children have the right to be treated equally. There should be given same opportunities to speak out, give ideas and appraised equally.

Teachers must love children and take serious consideration into interests of their students, being there for them to give support and treat them equally, graciously. The goal of every teacher should be to foster a classroom which is beneficial for the students. When students are please with their environment and treat equally, generally, they can perform better (Dorman *at.el.*, 2006).

Methodology

This study used quantitative methods involving the use of classroom environment questionnaires and an attitude questionnaire. The quantitative approach used in present study is similar to Margianti et. al. (2003), Ogbuehi & Fraser (2007), Chioh & Fraser (2009) and many more.

The main purpose of this paper is to address the issue of students' dwindling interest in mathematics. Establishing a mean of tackling declining in attitude in a relatively quick and easy way prompted the development of the specific research questions. Recent studies (Lalor, 2006; Madihah, 2007; Hoang, 2008; Siti Mistima Maat & Effandi Zakaria, 2010) recognised the most influential factor upon the attitude of students' toward mathematics is teacher support in mathematics class.

The sample employed in this study consisted of 216 students from 12 classes, represents 50.82% of total population of Form Four students in SMK Demak Baru and SMK Bako, in north east of Kuching District. Out of 216 set of questionnaires distributed, 209 sets returned. A quick examination discovered two set of questionnaires were not fully answered. Hence, two were removed from the data set leaving 207 cases which represents 48.71% of total population of Form Four students in SMKDB and SMKB. This sample size is adequate for level of precision and confidence to meet the objectives of the study (Krejcie and Morgan, 1970 cited in Sekaran, 2003).

There are many instruments available for assessing the students' perceptions on classroom learning environment. The chosen instruments, What Is Happening In the Class? (WIHIC) and Test Of Mathematics Related Attitudes (TOMRA) have been proven to be reliable, solid and accepted in wide range of classroom settings (Fraser, 2009). Furthermore, Aldophe (2001) explained that the items in the instrument are not threatening to both teacher and students in the classroom. Teachers and students would not feel intimidated because the items do not evaluate the performance and personality or character.

WIHIC and TOSRA/TOMRA have been used to investigate the relationship between classroom learning environments and student outcomes (Lalor, 2006; Hoang, 2008; Chionh & Fraser, 2009) and in various languages in different countries; Taiwan (Huang & Fraser, 1997), Korea (Kim, Fraser & Fisher, 2000), Indonesia (Margianti et al;l 2004), Singapore (Chua, Wong & Chen, 2000). Reviews of classroom environment studies also indicated that there are associations between students' perceptions of their classroom learning environments and their affective learning outcomes (Salina Hamed et. al., 2009; Fraser, 2009; Thienhuong N. Hoang, 2008; Kongkarnka & Fisher, 2007 and Telli et. al., 2006).

Finding

Teacher Support Scale

The Teacher Support scale was made up of five items within the Learning Environment (WIHIC) set of questions. Each question was answered on a four-point scale from Strongly Disagree (Scored 1) to Strongly Agree (Scored 4). The Cronbach Alpha coefficient of Teacher Support Scale alone (7 items) was 0.832 showed the scale has high internal consistency. The strong results from the factor analysis proved the decision to create the Teacher Support scale from the seven items was appropriate. Table 1 shows the mean score and standard deviation for each question. Table 2 shows the Teacher Support scale broken down by gender.

Table 1 shows Teacher's compassions ('teacher considers my feelings), helpfulness (teacher helps when I have trouble with the work and teacher's questions help me to understand) have the highest means. Table 2 reports score for Teacher Support for females (Mean = 2.766, SD = 0.508) was higher than for the males (Mean = 2.666, SD = 0.598). This suggests females perceive Teacher Support in Mathematics classroom to be higher than the males do. However, a run in the independent samples t test shows the difference was not significant ($t = -1.297$, $P>0.05$). This result has matched Lalor's study finding.

Table 1
Descriptive Statistics of the Teacher Support Scale

Item	Mean	Standard Deviation
The teacher considers my feelings.	3.077	0.759
The teacher talks with me.	2.778	0.737
The teacher is interested in my problems.	2.636	0.769
The teacher moves about the class to talk with me.	2.304	0.829
The teacher takes a personal interest in me.	2.220	0.767
The teacher helps me when I have trouble with the work.	3.048	0.762
The teacher's questions help me to understand.	3.009	0.812

Table 2
Mean of Teacher Support Scale broken down by Gender.

Gender	N	Mean	Standard Deviation	*F*	*Sig.*	*t*
Male	86	2.666	0.598	2.658	0.105	-1,297
Female	121	2.766	0.508			
Total	207	2.725	0.548			

P>0.05

Attitudes toward Mathematics

The Attitude scale was consisted of 14 items of the survey. Each question was answered on a four-point scale from Strongly Disagree, Disagree, Agree and Strongly Agree. Table 3 shows the mean score and standard deviation for each one.

A test in reliability analysis showed that the Cronbach Alpha coefficient for attitude scale was 0.904 which proved very high internal consistency among the items. Together with the factor analysis, it was determined that the Attitude scale from the 13 items. Table 3 shows the Attitude toward mathematics scale broken down by gender.

Table 3
Descriptive Statistic of the Attitude Scale

Item	Mean	Standard Deviation
Mathematics lessons are fun.	2.903	0.852
I like math lessons	2.850	0.837
School should have more math lessons each week.	2.502	0.902
I would enjoy school more if there were math lessons.	2.652	0.873
Mathematics is one of the most interesting school subjects.	2.585	0.848
The material covered in math lessons is interesting.	2.739	0.800
I look forward to math lessons.	2.493	0.818
I like to listen to people whose opinions are different from mine.	2.672	0.799
In mathematics problems, I like to use new methods which I have not used before.	2.604	0.755
I like doing similar problems to make sure I understand the concept.	2.932	0.773
I am curious about the world in which we live.	3.304	0.750
Finding out about new things is important.	3.483	0.696
I like to hear about new ideas.	3.387	0.741

N=207

From the Table 3, it has shown that north east Kuching secondary school students have moderate to strong positive attitudes with most of the scores above medium score, few more than 0.50. They are most agree about 'curious about the world', 'finding new things is important' and 'like to hear about new ideas and least agree about 'school should have more math lessons each week'. Also, looking at the standard deviations, it

appears there is quite some variation in students' attitudes with respect to 'more math lessons', 'enjoy school more if they were math lesson' and 'math lessons are fun'.

The mean score for the Attitude scale for female was higher than for the males (see Table 4). This suggests that the females have more favourable attitude toward mathematics in the classrooms than do the males. Again, the Independent Samples t test showed the difference was not significant (F= 0.036, $P < 0.05$).

Table 4
Mean of Attitudinal Scale broken down by Gender

Gender	N	Mean	Standard Deviation	*F*	*Sig.*	*t*
Male	86	2.751	0.570	0.360	0.549	-2.316
Female	121	2.928	0.516			
Total	207	2.854	0.545			

P<0.05

Associations between the Teacher Support, Equity and Attitude Scale

In the field of learning environment research, there were many previous studies investigated associations between various components of environment and attitude toward mathematics. My study attempted to identify relationships and associations between teacher support, equity and their impact on students' attitude toward mathematics.

To investigate associations between Teacher Support, Equity scales and students' attitude outcome, simple correlation and multiple regression analyses were conducted. A simple correlation analysis of relationships between students' attitude and two learning environment scales were performed to provide information about the bivariate association between each of these two learning environment scales and student attitude. The correlation coefficient (r) has a possible range of values from -1 to +1, the value indicating the strength of the relationship, the positive and negative sign indicating the direction. Multiple regression analysis was conducted to identify the relationship of the attitude scale as dependent variable with the set of learning environment scales as independent variables. Through this method, a linear equation gives us a mathematical model for how Teacher Support and Equity scale has impact on the independent variable. A multiple correlation analysis of relationships between attitude scale and teacher support–equity scales was conducted to provide a more parsimonious picture of the joint influence of correlated environment scales on an outcome and to reduce the Type I error rate associated with the simple correlation analysis. The multi correlation coefficient (R) is based on inter-correlations between variables. The highest possible relationship is 1.00. The standard regressions coefficient (β) explained the influence of a particular environment variable on attitude when the other environment scale is controlled. To interpret which learning environment scale makes largest contribution to explaining variance in student attitudes, the regression β were examined to ascertain which ones were significantly greater than zero.

Table 5
Associations between Teacher Support and Equity Scales, and Attitude Scale

Scales	R	β
Teacher Support	0.599*	0.212
Equity	0.490*	0.474
Multiple Regression	R = 0.623	R2 = 0.388*

The results of the simple correlation analysis in Table 5 suggest a statistically significant ($P<0.001$) and positive association between students' attitude and Teacher Support, Equity scales in learning environment. The Pearson correlation score between Teacher Support and equity, the combination of both scales (multiple correlation, R) and attitude toward mathematics are 0.599, 0.490 and 0.623.

These also indicate a direct and strong relationship between students' attitude toward mathematics lessons and the perceived Teacher Support and Equity scales. The results suggest that improved student attitudes towards a subject as associated with greater emphasis on these scales. The results replicate past studies which suggested Teacher Support and Equity scale is related to their attitude (Lalor, 2006; Telli et. al, 2006; Dorman & Fraser, 2008) and a Malaysian study which indicated Teacher Support scale has strong association with students' attitude toward mathematics (Salina, et. al., 2009).

An analysis of variance (ANOVA) was conducted for the purpose of establishing the nature of the relationship between the attitude to mathematics classroom survey responses and the two scales of the WIHIC. The R2 value was 0.388 indicated that 38.8% of the variance in students' attitude toward mathematics might have attributed to their perception of teacher support and equitable treatment they received in the classroom. The results also suggest a small amount of Teacher Support ($\beta= 0.212$) and Equity ($\beta=0.474$) would increase greater level of attitude toward mathematics. Equity has more influence in students' attitude toward mathematics than Teacher Support. This explains more of the variance in attitude than teacher support which did not go with several previous studies like Lalor (2006), Telli et. al. (2006). Equity scale was not significant independent predictors of attitudes in Hoang (2008).

Discussion

Students perceived their teachers treat them equally in mathematics class. Students more positive perceptions of equity than teacher support. These students felt that each student was treated with equality related to their opportunity and potential. The least the students perceived was 'praise as other students work'. This could be explained as some teachers do not or rarely praise students in the class.

Overall, students had moderately favourable attitudes of their learning environment in mathematics. Some students found mathematics lesson are fun but only few of them agreed to have more mathematics classes. The present time allocation for mathematics is adequate. An average Form Four student has to attend 1360 minutes to 1800 minutes mathematics lessons in a week. Any additional mathematics lessons would prolong their time in schools.

The major finding of this study is that teacher input into the learning process is a key factor in influencing students' attitudes and perceptions of their learning environment and this adhere the findings of Kilgour (2006). The first research questions asked the effect of students' perception of teacher support on their attitude toward mathematics

class. The second question considered the impact of equitable treatment on students' attitude in the mathematics classroom. The third question concerned the combination of teacher support and equity and their impact on students' attitude.

Simple correlation and multiple regression analyses were conducted using two WIHIC scales and one attitude (TAM) scale to answer above three questions. The results of my study demonstrated that attitudes of students toward mathematics as being statistically significantly and positively associated Teacher Support and Equity. These results suggest that improved, student attitudes towards a subject are associated with greater emphasis on these scales. All relationships were positive, thus replicating the finding from past research (Chioh & Fraser, 2009; Chee, 2007; Lalor, 2006).

A multiple regression analysis was conducted to gain insights into the joint influence of correlated learning environment scales on student outcome. The multiple correlation (R) was 0.388 and was statistically significant ($P<0.001$). The standardized regression weights (β) indicate the contribution of Teacher Support and Equity for a significant ($P<0.001$) amount of variance in students' attitude toward mathematics. Teacher Support and Equity were statistically significant independent predictors of attitudes.

Amongst these two scales, equity has most impact ($\beta = 0.474$) on attitude. The findings of the present study do not match earlier findings (Lalor, 2006; Telli et. al, 2006, Dorman & Fraser, 2008) which teacher support has more or most impact on attitude. This may be because some classes are large; the time teacher to move about the class and to give personal attention is limited. These can be seen from the score given relatively low compared to other items. This means that there is a need to have smaller class size so that teachers can pay personal interest in every student especially those with specific needs and assistances.

Students perceived equity slightly positive and more impact on attitude. The selected samples are come from similar cultural background. They are streamed in several classes based on their PMR (*Penilaian Menengah Rendah*) results. The samples are almost monogenic. Their teacher have created equal opportunities for discussion, treated and encouraged them appropriately. Multiple regression were repeated separately for female and male to investigate the effect of Teacher Support and Equity on students' attitude scale (research question no. 4). The results showed that the associations between Teacher Support and Equity were significantly and positively associated with attitude $P <0.01$) for both females and males. Result showed that the impact was greater for females ($R2=0.419$) than males ($R2=0.330$).

Previous researches (Chioh & Fraser, 2009; Chee, 2007; Lalor, 2006; Kilgour, 2006) and my study has once again confirmed positive associations between classroom environment dimensions and attitudinal outcomes, especially attitude toward mathematics. Teachers should consider these results as confirming long held anecdotal views. Teachers who provide support, demonstrate equity in the classroom, ensure that students complete learning activities, involve students in class work and cater for diverse students' needs are more likely to enhance student attitudes to their subject.

Conclusion

The study has reported the relationship between the perceptions of secondary schools Form Four students in relation to teacher support and equity in the classroom and attitude toward mathematics classes. The findings have supported other studies (Chioh & Fraser, 2009; Chee, 2007; Lalor, 2006) showed that the impact of both teacher support and equity on attitude is positive and statistically significant.

Effective learning is influenced by students' attitude. If a student developed positive attitude, the students' is ready to be involved in the learning process; fully concentrated on the lesson presented by teacher and develop their potential according to their own capabilities. Therefore, an effective teacher must building rapport with students. By developing teachers' awareness of the benefits of intentionally demonstrating basic classroom etiquette, such as giving support to the students and treating them all equitably, it is hopefully could be a simple, cost effective way to eliminate negative attitudes toward mathematics.

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Academic achievement at the Nigerian secondary school level and its relevance to university undergraduate programs

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Abstract

Over the years, Nigerian universities had to run remedial programs for products of the nation's secondary schools. This development could be seen as a distraction from the primary focus of the universities. This paper reports a study carried out to provide empirical basis for the remedial academic programs of Nigerian universities. In the study, the academic performance of 1,538 students of Adekunle Ajasin University, Akungba-Akoko was investigated in relation to their mode of admission into the university. It was found that pre-degree students, who had been exposed to the university remedial programs, had an edge over UME students in their academic performance in the university undergradute programs. The findings raise the issue of how to render secondary school education relevant to, and coherent with, university undergraduate academic programs.

Keywords: Remedial programs, Coherence, Relevance, Pre-degree, UME

Introduction

The main focus of schooling at any level is to bring about learning as shown by changes in the learner that cannot be achieved otherwise. In this connection machinery is set in motion to ensure desirable learning takes place along the preferred direction. At any level therefore, learning is based on relevant previous experience of the learner and in anticipation of subsequent learning. Two key concepts that should characterize learning therefore are relevance and coherence. What is learnt at any level must be relevant to what has been learnt, as well as, what is to be learnt, while coherence ensures a smooth link between what is learnt at the different stages and levels of learning.

The Nigerian educational system has passed through different stages in the attempt to fashion out the best for the school system. This development should be expected in line with the dynamic nature of any school system that seeks to ensure progress and be in line with the international academic community. Years back, undergraduate programs in Nigerian University run for three years. That was the time when education at the secondary school level was for five years. "Advanced level" programs in what was then referred to as the "Sixth Form" would cover another two years. But somehow, universities became dissatisfied with this arrangement. Then in the early 1970s, a preliminary one year program was introduced for candidates who successfully completed schooling at the secondary level but who did not or could not acquire the "Advanced level" certificate.

Eventually, the preliminary program was absorbed into the Nigerian undergraduate programs thus making undergraduate programs in Nigerian university to run for a minimum of four years. The preliminary program can be seen as a form of redemptive educational program to make up for what was lacking in the learning provided at the secondary school level. One may refer to this arrangement as a corrective or remedial mechanism (Oluwatayo, 2003). This development raises the issue as to the extent to which learning at the Nigeria secondary school level is relevant to and coherent with Nigerian undergraduate academic program.

History repeated itself in the late eighties when Nigerian Universities again became uncomfortable with the products of education at the secondary school level. This time Nigerian universities introduced pre-degree programs besides the four year undergraduate programs. Candidates who could not meet university admission requirement generally or for their preferred course of study must be successful at these pre-degree programs before they are admitted into Nigerian undergraduate academic programs. Again education at the secondary school level was being called into question in terms of relevance to and coherence with university undergraduate program. A question that comes to mind is that: should Nigerian universities continue to commit resources into "corrective/remedial mechanism" due to failure at the secondary school level?

The concern about the quality of learning at the secondary school level in Nigeria can be considered along two major lines of reasoning. In the first place, the poor performance over the years of students in public certificate examinations at end of secondary school has been well reported (WAEC 2010: Belo–Osagie, 2011; Oguntuashe, 2011; Akindehin & Akindehin, 2011). The certificate examination is conducted by the West African Examinations Council (WAEC) and the National Examinations Council (NECO). Since achievement test has since been regarded as the best quantifiable indicator of the effect of schooling (Bejar, 1983; Baker, 2011) this suggest that generally,

students "… could not be said to have gained much from secondary school education" (Akindehin & Akindehin, 2011). The second consideration about the quality of learning at the secondary school level in Nigeria is the relevance of whatever students gained from secondary school level to undergraduate programs in universities. In other words, are there empirical grounds in support of the running of pre-degree program in Nigerian universities? This is the focus of the study reported on in this paper. In the study, the academic performance of students in the four year undergraduate academic programs at the Adekunle Ajasin University, Akungba-Akoko (AAUA) was investigated on the basis of their mode of admission into the university which could be directly after successful completion of secondary school, or through the university pre-degree program. It should be noted that students who meet the University admission requirements, must also pass the University Matriculation Examination (UME). In addition, these candidates must pass a post-UME examination conducted by the university before they could be considered for admission into the university's undergraduate academic programs. However, the UME has been restructured and is now referred to as Unified Tertiary Matriculation Examination (UTME).

The four year undergraduate programs considered in this study covered eight semesters. Students write examination at the end of each semester. At AAUA academic performance at each semester is determined by a combination of course work assessment as well as end of semester examination. Moreover, a Grade Point Average (GPA) is computed for each student by a weighted combination of the scores obtained in the courses offered by the student and the unit assigned to each course. This ensures a uniform grading system for all university undergraduate programs. A final Cumulative Grade Point Average (CGPA) is computed covering all courses offered by the student in the eight semesters of the undergraduate program. Level of performance as indicated by the CGPA determines students' class of degree which can be First, Second Upper, Second Lower, Third or Pass.

Subjects for the study

The set of student admitted to AAUA in the 2006/2007 academic session and who completed their undergraduate program in the 2009/2010 academic session were involved in the study. These students (1,538) were admitted into undergraduate programs provided in twenty-four departments housed in the Faculties of Arts, Education, Science and Social Sciences. The number of students and their Faculties were Arts 172, Education 292, Science 447 and Social Sciences 627.

Data collection

Data was obtained from records in the university on the 1,538 students involved in the study. The data obtained were: mode of admission, academic performance at the end of secondary school, scores on UME, Post UME, Pre-degree, and GPA for the eight semesters as well as Class of Degree.

Admission requirement into undergraduate programs in Nigerian university is a minimum of credit pass in five subjects including English Language and Mathematics, as awarded by WAEC or NECO. In this study, scores were assigned to subjects that qualify students for admission into the university (based on level of performance), and summed up, to determine academic performance of the student at the end of secondary school. The score is referred to in this study as 'O' Level Result.

Data analysis

The Statistical Package for the Social Sciences (SPSS) computer program was used for data analysis carried out in three main stages. In the first place the CROSSTABS model of the SPSS was adopted to investigate relationship between Mode of Admission and Class of Degree of the 1,538 students. A significant chi square was obtained. The next stage was to investigate the variables that determine the class of degree of students based on their mode of admission. We therefore have a situation of multivariate outcome measures which favors the discriminant analytical model (Akindehin 1986; 1991; James, 2011). In this regard, the class of degree was a five level grouping variable while GPA for the eight semesters and other student characteristics were the discriminating variables. All students had the same grouping variable, but slightly different sets of discriminating variables. The discriminating variables for UME students were 'O' Level Result, UME score, post-UME score as well as GPA score in the eight semesters. Thus for this group of students there were 11 discriminating variables. For pre-degree students the discriminating variables were 'O' Level Result, pre-degree score as well as GPA score for the eight semesters. They had 10 discriminating variables.

Since a significant chi-square was obtained in the first stage of the data analysis, the concern in this stage of the data analysis was to find out how the 10 or 11 student characteristics determine their class of degree. The stepwise option of the DISCRIMINANT model of the SPSS was adopted for this stage of the analysis.

Result and discussion
The class of degree of the students and their mode of admission is shown in Table 1.

Table 1: Mode of Admission and Class of Degree
Class of Degree

Mode of Admission	Second Class Upper	Second Class Lower	Third	Pass	
UME	11	445	636	125	1217
Pre-degree	12	126	153	30	321
	23	571	789	155	1538

The table shows that 52% of the students who graduated with second class upper were pre-degree students as against 48% of UME students. It could also be seen from the table that while 4% of pre-degree students graduated at the second class upper level, only 0.9% of UME students graduated at that level. Further, Table 1 shows that 19% of students who had pass degree were pre-degree students while 81% were UME students. The chi-square statistic computed, as obtained from the computer printout, was 15.402 and at 0.002 level of significance. This result indicates that on whole, pre-degree students as a group perform significantly better (as indicated by class of degree) than UME students in the undergraduate academic programs they were exposed to at AAUA.

The investigation was carried further for each group of students separately. At this next stage of the study, attention was focused on the student characteristics (discriminating variables) that determine their class of degree (grouping variable). The purpose here is to find out if the highly significant difference obtained between pre-degree and UME students in their class of degree (observed above), could be traced to differences in their characteristics. It should be noted that student characteristics considered combine their background academic entry point characteristics as well as their

academic performance in the university. It should also be noted that pre-degree and UME students were exposed to the same academic programs in the twenty-four departments of the university.   The result for this stage of the study is presented for UME students first.

UME students

The GPA 5th semester was found to be the best discriminating variable for UME students (Table 2). It should be noted that the Stepwise option of the Discriminant model of the SPSS was adopted for this stage of the analysis. As seen from Table 2, the first three discriminating variables for the UME students involved in this study are GPA 5th Semester, GPA 8th Semester and 'O' Level Result in that order of importance.

Table 2: Discriminant Analysis Summary Table.

Step	Variable Entered	Wilks' Lambda	Significance
1.	GPA 5th Semester	0.970	0.000
2.	GPA 8th Semester	0.958	0.000
3.	'O' Level Result	0.953	0.000
4.	GPA 4th Semester	0.948	0.000
5.	GPA 7th Semester	0.943	0.000
6.	GPA 6th Semester	0.940	0.000
7.	GPA 3rd Semester	0.938	0.000
8.	GPA 1ST Semester	0.936	0.000
9.	UME Score	0.935	0.000
10.	Post-UME Score	0.934	0.000
11.	GPA 2nd Semester	o.934	0.000

These discriminating variables put together are the best to determine the class of degree of UME students. This finding is further confirmed as we consider the discriminating function derived in the analysis. In this regard, three discriminating functions were derived (Table 3). A significant chi-square statistic was obtained for the Wilks' Lambda that measures the extent to which the groups (Class of Degree) were distinct as set apart by the discriminating variables. A canonical correlation of 0.206 (Table 3) is an indication that about 4% of the variance in the functions is explained by the groups.

Table 3: Summary of Canonical Discriminant Functions.

Eigenvalues			
Function	Eigenvalues	% of Variance	Canonical Correlation
1.	0.044	63.4	0.206
2.	0.013	19.1	0.115
3.	0.012	17.5	0.110
Wilks' Lambda			
Test of Function(s)	Wilks' Lambda	Chi-square	df	Significance
1 through 3	0.934	77.563	33	0.000
2 through 3	0.975	28.711	20	0.094
3	0.988	13.738	9	0.132

Pre-degree

The variables that significantly discriminate among the groups (Class of Degree) for pre-degree students involved in the study are shown in Table 4. For this group of

students, the three most important discriminating variables that determine their class of degree are GPA scores for 3rd, 1st, and 6th Semesters. In other words, for pre-degree students, the 3rd and 1st semester GPA scores affect their class of degree. The situation is different for UME students. In their case, class of degree is affected by the 5th and 8th semester GPA scores.

Table 4: Discriminant Analysis Summary Table

Step	Variable Entered	Wilks' Lambda	Significance
1.	GPA 3rd Semester	0.871	0.000
2.	GPA 1st Semester	0.841	0.000
3.	GPA 6th Semester	0.820	0.000
4.	GPA 5th Semester	0.810	0.000
5.	GPA 2nd Semester	0.803	0.000
6.	GPA 7th Semester	0.796	0.000
7.	Pre-degree Score	0.790	0.000
8.	'0' Level Result	0.787	0.000
9.	GPA 8th Semester	0.785	0.000

Further, it could be noted that for Pre-degree students, '0' Level Result could not be entered into functions until the 8th step of the computations, just after Pre-degree score had entered in step 7 (Table 4). For UME students however, 'O' Level Result entered the functions in step 3 (Table2). This can be taken as an indication of its effect on UME students' class of degree. One can then infer that for Pre-degree (unlike UME) students, their class of degree depends more on academic performance in the university. The first six discriminating variables (for Pre-degree students) are the GPA scores for the first seven semesters.

Three discriminant functions were also obtained for the Pre-degree students.The chi-square computed in the test of significance of the functions was found to be highly significant (0.000). This shows that the groups (class of degree) are made distinct by the discriminating variables. For pre-degree students the canonical correlation (0.419) shows that about 18 percent of variance in the functions is explained by the groups (Table 5). It could be noted that the value was only 4% for UME students.

Table 5: Summary of Canonical Discriminant Functions

Eigenvalues			
Function	Eigenvalues	% of Variance	Canonical Correlation
1	0.212	80.8	0.419
2	0.035	13.2	0.183
3	0.016	6.0	0.125

Wilks' Lambda				
Test of Function(s)	Wilks' Lambda	Chi-Square	df	Significance
1 through 3	0.785	73.056	27	0.000
2 through 3	0.952	14.983	16	0.526
3	0.984	4.726	7	0.693

These findings which suggest that pre-degree students have an edge over UME students in terms of academic performance in undergraduate programs in the university, call for some further consideration when one realizes that most of these students could not meet admission requirements through UME in the first instance. But after a one-year pre-degree university academic program, they seem to benefit more from university undergraduate academic program than UME students. They readily fit into the academic demands of university undergraduate better than UME students presumed to be more suitable for university undergraduate academic programs. There might be need for further studies on this issue.

It should be noted that students involved in the study are products of secondary schools from different parts of the nation. In addition, they were admitted into courses in twenty four different academic departments in the university. The issue raised from the findings of the study reported in this paper is mainly what goes on in Nigerian secondary school classrooms. In an earlier study, Akindehin and Akindehin (2011) raised "… the question of what is taught in Nigerian classrooms and what is tested in public examinations" as indicated in the '0' Level Results issued to students. This point needs to be given urgent consideration. Available literature supported by findings from this study point to the fact that the effect of schooling at the secondary education level for now, as indicated by achievement test, is well below expectation. It could be that instruction at the secondary school level should facilitate cognitive development as well as students' social and personal growth (Hong, Greene & Higgins, 2006). In addition, one may suggest that for teachers at the secondary school level, efforts should be intensified in promoting corporate vision and job satisfaction (Slack, Orife & Anderson, 2010). This might substantially enhance school learning.

The point being made here is that teachers might need to review their classroom job behaviour. This could be by deviating from perceiving school as giving more and more information to students and expecting them to reproduce same on demand (Hubbard, 2004). Where this is the case, the school system would continue to be a safe place for students who find learning tedious and unbearable. If by some means such students find their way to the university, they are not likely to measure up to the standard academically. The quality of learning at the Nigerian secondary school at the moment suggests that many secondary school students withdraw from learning but not from school. They come to school but are not actively engaged in learning. They see themselves as passive recipients of learning expecting teachers to bear the full responsibility for learning to take place (Akindehin, 2006). Most times they have a short attention span and spend much time on off-task activities. As observed elsewhere (Read, Archer and Heathwood, 2003), such students would like to cover up their ignorance. Besides they would not ask questions in the classroom. They are involved in absenteeism and truancy. Such students may put up difficult behaviour since they do not derive satisfaction from learning activities and may be alienated. A review of classroom learning activities is called for in Nigerian secondary schools so that these students can be brought into the mainstream of classroom learning activities.

It is heartwarming that findings from this study suggest that with the right approach to teaching and learning there are bright chances that the quality of academic achievement at the Nigerian secondary school can be considerably enhanced. As observed earlier the one-year remedial program offered at AAUA gave secondary school

leavers exposed to it an edge over those without the experience but who are supposed to be better suited for university education.

Conclusion

Universities have the mandate to produce high level manpower to run the economy of the nation. At the same time, universities should be at the fore front in extending the frontiers of knowledge to enable them contribute significantly to the quality of life in the society. It is crucial therefore, that effort is made to ensure that universities are not distracted from their main focus. In this regard, universities should not be expected to devote their attention into redemptive work over students admitted into their undergraduate programs.

The concern over the quality of learning at the secondary school level is further highlighted by findings from this study. As seen from the study reported on in this paper, the one-year instruction program designed for secondary school graduates put them at an advantage over students without the exposure in their academic performance in a Nigerian university undergraduate program. The question begging for answer has to do with the quality of instruction at the Nigerian secondary education level and how it could be made relevant to and coherent with undergraduate academic programs in the university. It should be realized that at the university level academic demand is more of independent study. Students at that level are expected understand new things and be able to look for new ways of doing things.

The result from this study could be taken as an indication that secondary school students in Nigeria are yet to be familiar with such way of learning. It is heartening to note from this study that the exposure of student to university remedial program fostered this learning skill in the students. Learning at the secondary school level should therefore be reviewed along this line.

By the time students are in the final year of the secondary school, they should be introduced to some form of independent study at an appropriate level of scope. It is hoped that this way learning at the secondary school level would be rendered relevant to and coherence with university undergraduate programs. When this is obtained universities would not have to bend over backwards providing remedial programs to compensate for short comings in students' learning outcome at the secondary school level. Consequently, universities would be better placed to conserve resources for the goals designed for them. The remedial programs universities in Nigeria are constrained by the quality of learning at the secondary school level to be involved in should be seen as an unnecessary distraction. The earlier this extra load currently carried by Nigerian universities is dispensed with the better for the nation's educational system.

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