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Players of the Agribusiness System and their Problems: Philippine Case Studies

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Abstract - The main purpose of this paper is to present problems of the players in the Agribusiness System to help us better understand the challenges they have to deal with to remain dynamic, viable and profitable as important contributors to the health of the industry where they belong. The study used the descriptive method. A collection of 59 case studies actually conducted and successfully defended by agribusiness students were coded and used as samples in studying the different industry players. Each case study was written and analyzed as an output of a practicum to complete their BS Agribusiness Management degree. The students immersed themselves, observed the actual operations of these different players and at the same time gathered related data. Results showed that the problems encountered were production, marketing, personnel, finance, administration and extension. The study concludes that each industry player belongs to a specific agribusiness subsystem and performs a particular or multiple roles in the industry.

Keywords - Agribusiness Players, Agribusiness System; and Management Problems

INTRODUCTION

Agribusiness known as the food and fiber system, plays a very important role in a country's economy. It is a large and complicated system starting with the many activities of the farm input suppliers, the agricultural production activities of farms, the processing, and then marketing and distribution of agricultural products to the ultimate consumers. Agribusiness worldwide represents approximately one-fourth of the total world economic production and provides employment for nearly half the population on earth (Rawlins, 1998). Data and statistics from "**Project Jobs Fit: The Dole 2020 Vision**", a recent labor market study conducted by the Philippine Department of Labor and Employment (DOLE), predicts that agribusiness will emerge as a key employment generator in the next five to ten years.

In each of the different agricultural industries like Vegetable, Poultry, Livestock, Fruit, Cereal and Grains and many others, numerous firms are involved even before the start of agricultural production in the farm up to the point of bringing each agricultural commodity to the final consumer. Many services are needed in agriculture, such as transportation, storage, refrigeration, credit, finance and insurance. Input manufacturers furnish the production agriculturalist with supplies and equipment needed to produce and protect crops. Government agencies inspect and grade agricultural products to ensure quality and safety. Hundreds of agribusiness trade organizations, commodity organizations, committees and conferences educate, promote, advertise, coordinate and lobby for their agricultural products. Science, research, engineering, and education help improve agribusiness (Smith et al., 1991).

Manalili, head of the Agro-Industrial Development Program of SEARCA at UPLB, in her 2001 paper: *Agribusiness Management towards Strengthening Agricultural Development and Trade* noted that the economic developments of agricultural based economies are greatly anchored on the growth and survival of their agribusiness

sectors. Agribusiness plays a crucial role as it absorbs agricultural surpluses and at the same time meets the needs of both the urban and rural populations through its value added activities. It has likewise been viewed as the vital link between agriculture and industries and as such is similarly seen as the vehicle for agro-industrial development and consequently economic growth (www.mcc.cmu.ac.th/agbus/isam/others/downloadpdf.asp?...pdf)

Drilon (1971) stressed one very important feature of agribusiness: the viability of an industry is traceable to the viability of the firms that form part of the industry. The industry could be expanded and moved forward only if the firms in it are able to do so. The industry's posture is shaped by the strength or weakness and by the life or death of the firms in the industry. Thus, probing into the problems confronting these agribusiness players including their possible causes can help us better understand the challenges they have to deal with to remain dynamic, viable and profitable as important contributors to the health of the industry where they belong.

FRAMEWORK

The first step in diagnosing and analyzing the problems of these players is first to know their respective roles under the big picture of the agribusiness system, particularly by looking at the subsystem components or sector where they fit in.

Agribusiness before was considered sectorally simply as made up of the whole of Agriculture and a portion of the industrial sector which contains the sources of farm supplies for the producers of farm products. Later on, it was defined by Davis and Goldberg in 1957 as the sum total of all operations involved in the manufacture and distribution of farm supplies; production operations on the farm; and the storage, processing and distribution of the resulting farm commodities and items made from them (Davis and Goldberg as cited by Ricketts and Rawlins 2001). It was then translated into a three-part agribusiness system made up of the agricultural input sector, the production sector and the processing-manufacturing sector.

The agricultural input provides farmers and ranchers with feed, seed, credit, machinery, fuel, chemicals. The middle part of agribusiness is the production sector that uses the products of the input industries to

produce raw agricultural and livestock commodities. The commodities they produce are sold to processors and food manufacturers in the processing-manufacturing sector. The Processing-Manufacturing sector includes all the individuals and firms that process agricultural commodities, manufacture food products and distribute and retail food products of the consumer (Seperich et al., 1994).

The economic importance of these three sectors is described as follows: A large increase in the farm sector efficiency is directly attributable to the input sector. Improving varieties of seed and feed, farm machinery and equipment, and the facilitating services offered to the farmers help improve the output-input ratio. At the hub of the agribusiness system is the farm production sector. As this sector grows in size, level of output and efficiency, the other sectors of agribusiness are directly affected. The health of this sector has a vital and direct impact on the financial well being of the input supply and output sectors of agribusiness. The final sector in the food production and distribution system is the output sector. This sector is responsible for the transformation of the raw farm output into a final consumer product at the retail level. It is the largest of the three sectors in the food system (Downey and Erickson, 1987)

Colleges in India offering Agribusiness Management Degree provided another way of categorizing the sectors. Agribusiness system with forward and backward linkages consists of the following four major sectors: agricultural input, agricultural production, agricultural processing or manufacturing and agricultural marketing or distribution sector which add value to the agricultural produce. (www.mbandiacareer.com/.../Agribusiness-Management-htm-India).

Manalili further considered the concept of agribusiness to include the primary production of agricultural produce; the upstream economic activities (production and distribution of all inputs and services used in on-farm production); the documentation industries (processing, manufacturing, transportation and related services); and the transformation of raw agricultural produce into finished products either for domestic consumption or export.

Rickets and Rawlins had introduced another one important sector. Within the big picture of agribusiness system are agribusiness companies that provide input supplies to production agriculturalists

(producers and farmers). The production agriculturalists produce food and fiber, and the output is taken by agribusiness companies which process, market, and distribute the agricultural products. Many other support services, such as research, education, and finance are also involved (Rickets and Rawlins 2001).

According to these authors the support or agriservices sector of the agriculture industry is concerned with researching new and better ways to produce and market food and to protect food producers and consumers, and with providing special, custom-type services to all the other phases of agriculture. The major emphasis of public agriservices includes research, education, communication and regulation while private agriservices have three major areas available to the agricultural industry: financial services, trade associations, and agricultural cooperatives.

Dr. Ngaruko of the Open University of Tanzania also described Agribusiness, being the Food and Fiber industry as the chain of industries directly and indirectly involved in the production, transformation and provision of food, fiber, chemicals and pharmaceutical substrates. The primary roles in this chain include: Primary production of commodities such as food grains; Processing of commodities e.g. milling; Inputs supply to the primary and tertiary sectors; Retail and wholesale; and Service provision such as education, banking and technical advice. (www.out.ac.tz/current/course%20outlines/FBM/OBs405.pdf).

The authors of the book, *Agribusiness Management: Systems approach*, further described the Agribusiness System as an area composed of Production, Processing, Marketing, Supply Chain Management and Strategic Alliances (Dy et al., 2005).

The next step after identifying the roles that each player performs in the Agribusiness System is to further examine specific management functional areas within the individual organization where problems are encountered. This is reflected by the type of organization structure.

A functional structure organizes employees around specific knowledge or other resources. Employees with marketing expertise are grouped into a marketing unit, those with production skills are located in manufacturing, engineers are found in product development and so on. Organizations with functional structures are typically centralized to coordinate their activities effectively. Coordination

through standardization of work processes is the most common form of coordination in a functional structure (McShane and Von Glinow, 2000).

Organization brings together in one department everyone engaged in one activity or several related activities that are called functions. For example, an organization divided by functions might have separate manufacturing, marketing, finance, human relations and sales department. The marketing function for example, commonly consists of sales, promotion, distribution, and market research activities (Stoner et al., 2005).

In departmentalization by function, the activities of the organization are divided into primary functions to be performed: manufacturing/engineering (Production), Marketing, research and development, employee relations (Personnel) and Finance. This arrangement has the advantage of specialization and concentration of similar activities within a departmental unit. It is the most prevalent form and is seen not only in business enterprises but in hospitals, government agencies, and many other kinds of organizations (Kast, F and Rosenzweig, 1986).

The tasks that every business needs to do to succeed were enumerated as follows: 1) Human Resources - ensures the business has the best staff for the job and that they are able to work effectively in a safe environment; 2) Finance - will keep a record of all money coming in and going out of the business. They have responsibility for securing finances for future expansion and paying staff and suppliers; 3) Administration - ensure the smooth running of the business on a day-to-day basis including security, health and safety; 4) Operations - have the task of producing the goods or service in the most efficient way. This is done by making best use of the business's staff, machinery, building and raw materials; 5) Marketing and sales - will try and maximize the level of sales by carrying out market research and promoting the goods or service through a motivated sales team; 6) Customer Service - will help the customer before and after a sale has been made by providing information, giving advice, providing credit facilities, delivering goods and providing after-sales support; and 7) Research and development - will help the business remain competitive by developing new goods and services and updating the existing ones.

Similarly, agribusiness players also have their own functional

departments depending on the type of role they perform. The management functions are implemented through the use of the various skills, principles, and tools that have become part of the professional agribusiness manager's knowledge and ability. To be successful, the agribusiness manager must apply this functional knowledge and ability to each of the four basic areas of the agribusiness: that is, financial management and planning, marketing and selling, production and operations, and personnel or the human dimension (Downey and Erickson 1987).

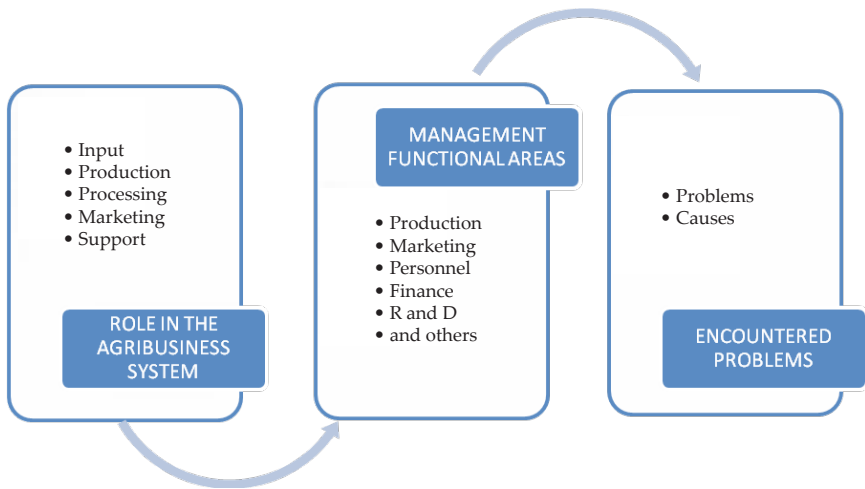


Figure 1. The schematic diagram of the study

OBJECTIVES OF THE STUDY

The paper intended to look into the problems of players of the Agribusiness System. Specifically, it sought to answer the following objectives: (a) to determine actual roles performed by these industry players; (b) to show specific relationships among players within the same subsystem and among players from different subsystems; (c) to identify the management functional areas of the firms where the problems were encountered; (d) to identify what are some these problems and be aware of their possible causes. The study postulates that each agribusiness player performs a specific role in the agribusiness

system and problems with causes may occur in any of the management functional areas regardless of the organizational structure.

MATERIALS AND METHODS

The study used the descriptive method. To completely understand these agribusiness players, a collection of 59 case studies actually conducted and successfully defended by agribusiness students who graduated during the academic years 2009 until 2011 from the Department of Agribusiness Management, College of Agriculture, Mindanao State University, Main Campus in Marawi City, were used as samples in studying the different industry players.

It should be emphasized that case materials of the Department of Agribusiness Management, MSU Main Campus are for classroom discussions only and not to illustrate either effective or ineffective handling of administrative problems. Each case study is being written and analyzed as an output of the summer on the job trainings. The students immersed themselves, observed the actual operations of these different players and at the same time gathered related data. Each case is being supervised by an assigned adviser and defended in front of panelists as a requirement to complete their Bachelor of Science in Agribusiness Management degree. To hide the identity of the industry players, the cases are coded. Furthermore, the cases available depended on the players that accommodated the students and finally each case author can only suggest a chosen alternative as a solution to a specific problem but has no authority to impose it on the player for implementation.

RESULTS AND DISCUSSION

The findings revealed that each of the players performs varied roles/functions. The input subsystem players provide inputs to farm producers of livestock, poultry and crops. An input manufacturer may also provide raw materials to its satellite plants and tooling partners. The production subsystem players engage in actual farm production activities and at the same time it is a supplier of raw material to an input manufacturer. A hog producer may not purchase

but opt to manufacture own feed requirements. The processing subsystem players process the products of the production subsystem and sell it for direct consumption or sell to other processors for further processing. A product processor may also produce its own raw material for processing or produce inputs for its farm growers. A player in the marketing subsystem buys the product of farm producers, owns it and sells it without necessarily transforming or further processing the products. The players in the support subsystem provide assistance to farm producers and agriculture in general for its growth and sustainability in terms of research, extension, training and development, technology, information and financing. They produce inputs like seeds and planting materials for the production subsystem.

Examining relationships among players disclosed the following results. An input manufacturer needs an input distributor to market its product while an input distributor needs an input manufacturer for products to sell. A major input manufacturer needs a tooling partner to help its processing activities because it is expensive to maintain its own processing plant. On the other hand the tooling partner needs the major input producer to maximize use of its existing processing equipments and facilities. Although players in the production subsystem have their own farms but still they need contract growers to meet their targeted production requirements. The contract growers also need the big producers to be assured of markets for their produce.

On the other hand, interdependence among players of different subsystems also exists. If there is a shortage of raw material for feed processing for ex. corn, the input manufacturer needs corn producers or corn traders. A crop producer may supply raw materials to an input processor such as corn and cassava. The farm producers need to establish relationship with contract buyers such as exporters and retailers to be assured of markets for their produce. Processors to be assured of raw materials to be processed need to establish relationships with contract growers aside from having their own farms. A cooperative processor may establish a rice mill and offer milling services to members and other farmer producers for a fee. A vegetable marketer needs vegetable growers and traders for product to sell to customers. At the same time it needs institutional buyers and retailers as its market. The players in the support subsystem are needed by farm producers for assistance in

terms of research, extension, training and development, information, logistics and financing. While support subsystem players also need the farm producers to serve as beneficiaries of their researches and extension services, training and to attain the very purpose why they are created or established.

The problems encountered were *production, marketing, personnel, finance, administration* and one additional function is *extension* on the part of the support subsystem. **Production/Operations problems** of the players include delayed or shortage of raw materials; augmenting current production rate; plantlets contamination; attaining production target; spread of diseases; increased mortality rate of animals, plantlets and useful fungus; proper herd management; minimizing product rejects & utilization of these rejects; slow egg sizing operation; decreasing yield, malfunctions of machines; speeding up operation; and delayed data collection. **Personnel/Human resource problems** are concerned with minimum workers performance; unfavorable working attitudes and low skills of personnel; attaining effective and efficient task performance; and stopping unfavorable conduct of workers. **Marketing problems** dealt with beating competition; speeding up product distribution and delivery; boosting product quality and popularity to enter new markets; sustainability of product supply; meeting orders on time; and maintaining product quality. **Administration problems** focused on providing safe working environment; checking on the employees' complaints against the manager; exploring new opportunities; improving supervision of operation and how to maximize performance among workers. **Finance problems** had to do with speeding up loan collections from borrowers and limited budget. And **Extension problems** are concerned with introducing a new technology; helping producers increase production and teaching them to process their products; and to facilitate continuous implementation of government programs.

Looking at the causes of the different problem disclosed the following findings. **Production/Operations related problems** are caused by having only few suppliers of raw materials; limited resources such as land and management skills; spread of diseases; less know how of workers on certain processes; malfunctions of equipment and machines; uncommitted workers; workers disregarding SOP;

incorrect plantation and herd management practices; overlapping of functions; lack of specialist; wrong choice of varieties; limited facilities, equipments, machines, and working space; presence of rejects every production cycle; misunderstood instructions; soil acidity and salinity; poor farm to mill access facilities; unfavorable terrain; irregular attendance of workers, low farm production of raw material; and inefficient performance of hired workers.

Marketing problems are generated by the presence of better known competitors; non-strategic location; competitor with better products; product shortage; orders not delivered on time; and improper handling of products. **Personnel/human resource problems** are caused by unsatisfied workers complaining against poor management-worker relationship, lack of positive motivation and tenure insecurity; workers' deviation and disregard of operation standards; rush of tasks to satisfy overtime; violation of company rules; workers demanding salary increase; overlapping of tasks; lack of educational qualification; workers lack of skills; and unfavorable conduct of workers. **Administration problems** are triggered by occurrence of accidents; no specific task assignment; manager's unfavorable behavior; scarcity of resources; supervisor's education-position mismatch and overlapping of duties. **Finance problems** are caused by borrower's lack of knowledge on how to gain more profit and be able to pay; and limited budget that limits the ability to purchase a much needed vehicle. And finally the sources of **Extension problems** are underutilized potential of the area; clients' unfamiliarity with a new technology; and presence of pest infestation.

CONCLUSIONS AND RECOMMENDATIONS

Based on the different case studies presented, the following conclusions and recommendations were derived:

1. **Each of the industry players belongs to a specific agribusiness subsystem and performs a particular role or carries out a combination of roles in the industry where they operate.** Despite the multifaceted point of view of Agribusiness, diverse interests and individual uniqueness, each of the players recognize the need to perform their roles effectively and efficiently because of the significance, contribution, and impact of roles to make the subsystem where they belong more

effective and efficient. Any positive contribution they make will benefit the other agribusiness subsystems that directly or indirectly need them and the whole agribusiness system as well. To reiterate, the industry's performance is caused by the strength and weaknesses and its posture is shaped by the life or death of the agribusiness firms within the industry

2. Interdependence among players within the same subsystem and interdependence among players from the different subsystems exist. Players within each subsystem and players of the different subsystems need to recognize the importance and impact of this interdependence considering that each player needs business partners or strategic alliances to survive. The players need to reinforce and support existing partners for their mutual benefits and for the growth and viability of the industry where they belong. Already established relationships need to be strengthened while new strategic alliances local or foreign need to be explored because of opportunities that either local production or globalization has to offer.

3. Similar with other organizations, each of the players has to meet head-on problems in one or combination of the basic functional areas of management. These problems serve as challenges to agribusiness decision makers and need serious attention in order for their ventures to remain viable and profitable. To face these problems, agribusiness decision makers must be equipped with the management principles and knowledge including entrepreneurial skills. Agribusinesses firms being diversified and unique also require unique application of managerial abilities and skills. And finally to make good decisions each decision maker needs to be well-informed of the status, developments, updates including forecasts of the industry where they align themselves. The decisions they make in solving these problems may affect their performance affecting also other firms in the industries where they operate as a whole.

4. The problems of the players are caused by either external or internal factors or a combination of both. Internal factors causing problems can be controlled while impact of external factors can be minimized. Agribusiness players need to constantly evaluate their performance, checking internal capabilities against the challenges of the external environment by using SWOT Analysis. The SWOT

analysis classifies the internal aspects of the company as strengths or weaknesses and the external situational factors as opportunities or threats. Strengths can serve as a foundation for building a competitive advantage, and weaknesses may hinder it. By understanding these four aspects of its situation, a firm can better leverage its strengths, correct its weaknesses, capitalize on golden opportunities, and deter potentially devastating threats (www.netmba.com/strategy/swot/).

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Education for Sustainable Development as Strategy for Climate Change Adaptation and Mitigation: A Literature Review

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Abstract - The World Health Organization (2003) stated that there is growing evidence that changes in the global climate will have profound effects on the well-being of citizens in countries throughout the world. The “business as usual” frame of mind in dealing with this phenomenon is no longer feasible. Rather, there is a great need for a “sense of urgency” to empower and actively involve every individual to adapt and to mitigate the worsening of climate change. A great number of studies show that the leadership of the educational system in developed countries for more than 2 decades has been successful in promoting environmental sustainability. Some of these studies are reviewed and documented in this paper so that vulnerable countries may learn and benchmark from their experiences.

Keywords - Education, sustainable development, climate change

INTRODUCTION

Climate change refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change might result from natural factors and processes or from human activities. The term “climate change” is often used interchangeably with the term global warming. Global warming refers to an average increase in the temperature of the atmosphere near the Earth’s surface, which can contribute to changes in global climate patterns. However, rising temperatures are just one aspect of climate change (US EPA, 2010).

Climate change is real. One can easily see and feel its impact all around the globe. For instance, flooding is becoming a more common occurrence. Birds are nesting earlier, animals are moving territories, the duration and range of seasons is changing. Every day, the reporting on climate change highlights the risks and alerts people to measures they can take to both mitigate and adapt. Some countries have a choice of media, a choice of funding and a choice of strategies to cope with climate change. However, other countries are less fortunate. For the vast majority of people, the impact of climate change means an increased risk of losing their homes and livelihoods, more disease, less security and sometimes death. Children in the world’s poorest communities are the most vulnerable. They are already seeing the impacts of climate change through malnutrition, disease, poverty, inequality and increasing risk of conflict – and ultimately an increase in child mortality rates. According to the World Health Organization (WHO, 2008), it will be the young and the poor in developing countries that will suffer the earliest and the hardest.

Another fact is that climate change is a global issue. Hence, addressing it is a shared responsibility. CARE International (2009) reported that the world’s poorest countries and the most vulnerable people will bear the brunt of climate change. Failure to act will render the environments of millions of children and their families even more hazardous. Many poor people already live in fragile climates, where food and clean water are scarce and shelter inadequate – climate change will exacerbate this fragility. The children – particularly those in Africa and Asia – are already facing a future in which it appears likely that

disasters will increase in number and become more intense, where economic growth will falter and incomes fall, where disease outbreaks will be more frequent, clean water and good sanitation harder to secure, and habitats and communities less stable (Confalonieri, et al., 2007).

Moreover, many developing countries have poor infrastructure and lack the technologies that could help them cope with a changing climate, such as flood defences and early warning systems. Thus, they are more vulnerable to the impact of climate change and their children are the most vulnerable of all. The potential impact on children has been a critical missing element from the debate about climate change. While there is a growing body of literature on the links between climate change and vulnerability, particularly in relation to the impact of natural disasters, research and advocacy activity on climate change and children specifically is less developed (UNICEF for UK Committee, 2008).

The examples of the currently unfolding environmental and human impacts of climate change outlined above are striking enough. However, projections of future climate change suggest that the worse is yet to come. The Intergovernmental Panel for Climate Change (IPCC, 2008) scenarios indicate that a warming of 2–3 degrees across the globe is likely within the next 50 years – largely the result of greenhouse gases already in the Earth's atmosphere. Thereafter, levels of potential warming are likely to be significantly influenced by the levels of greenhouse gas over the coming years. Such scenarios predict rising sea levels to threaten large cities in Africa and the densely populated river deltas of the Ganges and Mekong. More so, the glacier melting is likely to disrupt water supplies in Asia and Latin America.

In the 2006 United States Climate Action Report, it was stated that health impacts will be disproportionately greater in vulnerable populations. Globally, people at greatest risk include the very young, the elderly, and the medically infirm. Low-income countries and areas where undernutrition is widespread, education is poor, and infrastructures are weak will have the most difficulty adapting to climate change and related health hazards.

FRAMEWORK

In answer to this pressing need to adapt, the United Nations Framework Convention on Climate Change (UNFCCC, 2007) proposed that more can be done to limit human contributions to further climate change. More can also be done to support the poorest and most vulnerable to cope with the likely increase in global temperature and its effects. The likely impacts of climate change compel each individual to act, both to minimize the projected increase in global temperature and to build the resilience of nations and communities to withstand its effects.

One very significant strategy is to mainstream climate change-related lessons in education from pre-school to tertiary level of education (Selby, 2008 and Namsouk, 2008). A concrete example of this is the United States' "Climate Change Education Program" headed by the National Science Foundation (NSF). The vision of the Climate Change Education (CCE) program is a society that can effectively weigh the scientific evidence as it confronts the challenges ahead, while developing an innovative scientific and technical workforce that can advance the knowledge of human-climate interactions and develop solutions for a sustainable, prosperous future. To achieve this vision, the NSF supports activities to develop more effective models and resources for formal and informal climate change education and training that integrate interdisciplinary climate research and current understanding of how people learn. NSF also supports efforts to establish or enhance mechanisms that help to disseminate, scale-up, or increase utilization of effective practices for climate change education.

Protecting human health is the "bottom line" of climate change strategies. Climate change can no longer be considered simply an environmental or developmental issue. More importantly, it puts at risk the protection and improvement of human health and well-being. A greater appreciation of the human health dimensions of climate change is necessary for both the development of effective policy and the mobilization of public engagement.

Strengthening of public health services needs to be a central component of adaptation to climate change. The international health

community already has a wealth of experience in protecting people from climate-sensitive hazards, and proven, cost-effective health interventions are already available to counter the most urgent of these. Broadening the coverage of available interventions would greatly improve health now. Coupled with forward planning, it would also reduce vulnerability to climate changes as they unfold in the future (WHO, 2008).

Some degree of future climate change will occur regardless of future greenhouse gas emissions. Adapting to or coping with climate change will therefore become necessary in certain regions and for certain socioeconomic and environmental systems. The need for adaptation may be increased by growing populations in areas vulnerable to extreme events. However, according to the IPCC, "adaptation alone is not expected to cope with all the projected effects of climate change, and especially not over the long term as most impacts increase in magnitude" (UNDP, 2008).

Hence, education is now considered a vital means of reducing vulnerability and increasing adaptive capacity to climate change. A vast majority of studies and literature already talked about strategies to combat climate change health impacts through legislative and technical programmes. However, there is a dearth of data venturing on utilizing education as an effective strategy for empowering every individual to cope with and prevent potential health effects of climate change (Selby, 2008; Namsuk, 2008).

It is in this light that this study is conducted. This research will try to look into the possibility of tapping the educational system, from the pre-school to the basic education, to the secondary and tertiary levels, as well as post-graduate and graduate studies, in the capacity-building to combat the ill-effects of climate change.

OBJECTIVES OF THE STUDY

This paper explored the various educational strategies on climate change adaptation and mitigation from the pre-school up to the graduate school. In particular, this described the experiences, as well as, the best practices on environmental education and education for sustainable development among educational institutions in developed countries.

MATERIALS AND METHODS

This study utilized the descriptive-analytic research design aided by content analysis of the reviewed literature. Educational strategies related to combating climate change, whether adaptation or mitigation strategies, are documented in this paper. Both online and printed literatures were explored and organized. Data gathered were then analyzed according to the different themes identified.

RESULTS AND DISCUSSION

Environmental Education (EE) versus Education Sustainable Development (ESD)

The world movement for environmental education (EE) first started in the early 1960's after several experiences of environmental problems. Ten years later (1972), during the United Nations Conference on the Human Environment in Stockholm, governments of member countries issued a declaration. The declaration highlighted that education in environmental matters, for the younger generation as well as adults, is essential for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension (as cited by Venkataraman, 2008).

In 1975, 3 years after the declaration, the United Nations held an International Workshop on Environmental Education in Belgrade. Its culminating document, called the Belgrade Charter, contained the global framework for EE, asserting that it is an *active process which will ultimately lead to a society that has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.*

For 20 years after the Stockholm Conference, EE programs developed slowly due to the lack of teachers and professors trained in ecology and multidisciplinary teaching styles. Fortunately, at present, there is already an explosion in EE programs. While EE programs initially focused on environmental cleanup and good waste management practices, schools, colleges and universities are beginning to embrace elements of EE with increasing numbers, emphasizing environmentalism as a core principle of their education.

In United Kingdom, for example, the national curriculum for primary and secondary levels includes education for sustainable development. In India, organizations such as the Indian Environmental Society are actively involved in establishing public and school EE programs and a National Green Corps. In the United States, the Environmental Protection Agency's Office of Environmental Education and organizations like the National Environmental Education Foundation have accelerated curriculum development and professional development for teachers. As a result, primary, secondary, and higher education have been increasing efforts to integrate environmental topics across curricula and as real-world applications of scientific principles.

However, in 2002, the United Nations promoted another framework called Education for Sustainable Development (ESD). It further declared 2005-2014 as the Decade for Education for Sustainable Development (ESD) and highlighted the difference between EE and ESD. As defined, **EE** is a well-established discipline focusing on *humankind's relationship with the natural environment and on ways to conserve and preserve it and properly steward its resources*. **ESD**, on the other hand, *encompasses EE but sets it in a broader context of socio-cultural factors and the socio-political issues of equity, poverty, democracy, and quality of life*.

According to the United Nations, ESD equally addresses all three pillars of sustainable development- society, environment, and economy- with culture as an essential additional and underlying dimension. By embracing these elements in a holistic and integrated manner, ESD enables individuals to fully develop the knowledge, perspectives, values, and skills necessary to take part in decisions to improve the quality of life. The question now facing the educational community is how can ESD be translated into practice so that it can be effective in transforming society to a more sustainable future?

The UNESCO (United Nations Educational, Scientific and Cultural Organization) in 2006 pointed out that the traditional educational structure acts as an obstacle to ESD. They argued that sustainability is not just another issue to be added to an over-crowded curriculum. Instead, sustainability must be viewed as a gateway to a different view of curriculum, of pedagogy, of organizational change, of policy and particularly of ethos. At the same time, the effect of patterns of un-

sustainability on the current and future prospects is so pressing that the response of higher education should not be predicated only on the integration of sustainability into higher education because this invites a limited, adaptive response. According to Venkataraman (2009), people needed to see the relationship the other way around- that is, the necessary transformation of higher education towards the integrative and more whole state implied by a systemic view of sustainability in education and society.

The problem on nature-deficit disorder and videophilia among children

Author and child psychologist, Richard Louv (2005) was the first to coin the term and to diagnose America's children as having "nature-deficit disorder". The term refers to a child's alienation from the natural environment. Louv was not alone in this assessment. In 2006, Pergams and Zaradic added the concept of "videophilia", which is defined as the human tendency to focus on sedentary activities involving electronic media (entertainment options such as television, video games and the internet). This was concurred by many educators who have witnessed firsthand the difference between children nowadays and children 30 years ago (Bartels, 2008; Stevenson 2010; Loughheed, 2008; and Blum, 2008).

According to these authors, not long ago, kids commonly spent after-school hours and summer vacations playing carefree in the woods, fields, hills and water. Today, however, most children are busy with electronic games and demanding schedules of structured activities. Per observation, this circumstance is not only happening in the Americas and Europe, but all around the globe. Even in developing and poor countries, this is a common everyday scenario, for as long as people can afford to have televisions, video games and the internet. Thus, there is a pervasive and fundamental shift away from nature-based recreation. Nature Conservancy chief scientist, Peter Kareiva (as cited in Loughheed, 2008), suggested that this shift could well be the most serious environmental threat facing the world today. If a substantial proportion of the population has little or no direct interaction with pristine natural environments as children, how will that affect their lifelong attitude toward such places? How will they come to regard the value of environmental science or policy?

Kareiva wrote further that the fate of biodiversity and ecosystems depends on political and individual choices. If people never experience nature and have negligible understanding of the services that nature provides, it is unlikely that people will choose a sustainable future. Cornell University psychologists, Wells and Lekies (2006) found out that when children become truly engaged with the natural world at a young age, the experience is likely to stay with them in a powerful way-shaping their subsequent environmental path. Moreover, they noted that the lifelong impact was more profound when the engagement with nature was spontaneous and unstructured, as characterized by the general unpredictability of pursuits such as huntings, fishing, or simply wandering around a forest. Wallace (2008) added that by helping children experience the natural world, they are also moulded as future stewards of the Earth.

Starting young: the children and the environment

There are a number of ways to teach children about nature conservation and to increase their environmental awareness as it relates to home and school. Integrating nature appreciation in the daily school and home activities is a good start (Cline and Leuvan, 2009). Pre-school teachers may simply take the kids outside for a walk in the park, let them play in the stream or appreciate animals in a farm. These kids may also be involved in tree planting and gardening. Any activity done “outside with nature” may do as long as these children appreciated and enjoyed communing with nature (Clarke, 2010; Stevenson, 2010).

Elementary teachers, on the other hand, can show the older children how others have assumed responsibility to claim a role as an environmental advocate. There are many true stories of young heroes who made serious commitments to saving the environment (Lange, 2009; Cole 2009; Slater 2007; Blum 2008; Henderson, 2007). Driven by internal passions, these “earth angels” (children guardians of the earth), “enviropreneurs” (children who raise money for environmental causes), and “green kids” (children who think of new ways to save resources, promote environmental education and innovative applications) are unstoppable in their determination to make a difference in their communities, regions, and in some cases, globally.

Behind many of the “green kids” are teachers who have inspired grades 4-12 students to turn anxiousness about an uncertain future into understanding and finally to transfer knowledge into positive actions that can have small or large scale results. These stories provide actual examples that can be read in class, which demonstrates that environmental stewardship is not just something an adult should be concerned about. In fact, an 11-year old child was quoted saying, “you don’t have to be an adult to make a difference!”

From the true stories shared, the kids were able to figure out the need to save the environment, brain-stormed ideas for solutions to the problem, found creative ways to raise money and to increase public awareness on climate change. Environmental issues also offer a good opportunity to begin discussions in science, current events, economics, politics, geography, and research. Freitag (as cited by Blum, 2008), another conservationist, aptly stated that there may be some direct, short term benefit in the money raised or some land saved because children learned to love the environment, but the real payoff may come 50 years later. Investing in kids- introducing them to the beauty of nature- is investing in the people who will be making the decisions about how the environment will look in the future.

A model Middle School

In September 2006, Sidwell’s middle school in Washington DC, where the 2 daughters of President Obama are enrolled, received a Platinum rating from the US Green Building Council (USGBC). It is the first K-12 school in the United States to have a LEED Platinum rating and the first LEED Platinum building in the District of Columbia (Goffman, 2009).

Primarily, the building was constructed following the LEED standards. The LEED (Leadership in Energy & Environmental Design) Rating System is a voluntary standards & certification program created in 1993 by the US Green Building Council. It is the industry standard for rating high-performance green buildings. LEED awards credits for green building attributes including strategies for sustainable site development, water savings, energy efficiency, materials selection, & indoor environmental quality. There are four levels of certification; the certified, silver, gold, & platinum.

According to the school head, Sidwell wanted to integrate environmental stewardship into teaching and life, keeping with its Quaker philosophy. The construction of the LEED Platinum Middle School Building has sparked a renewed interest in integrating environmental stewardship into their curriculum. Below are some examples of how the building has impacted what goes on in and out of the classroom.

SIDWELL FRIENDS SCHOOL
Environmental Sustainability Student
Activities

1. Middle School Student Advisory Projects - During the 2007-2008 academic year, several advisories explored how Sidwell Friends treats its stormwater run-off, how drinking water is treated, and where the trash goes.
2. DC Environmental Inventory - For the past several years, 8th graders have worked to find out how healthy Washington, DC's environment is. Students interviewed scientists, regulators, and enforcers, visited city facilities, took photographs, and wrote up their research.
3. AP Environmental Science - Students conduct labs including comparing water quality in the on-campus biology pond to water in a nearby tributary, studying the invertebrate biodiversity in the soil on the green roof, and comparing stormwater runoff from the green roof with runoff from the conventional roof.
4. 8th Grade Environmental Science - Students participate in labs in which they measure and compare nitrogen and phosphorus levels in various levels of the wetland and in the basement holding tank, and learn the valuable role that wetlands play in purifying water.
5. 8th Grade English - Students engage in reading, writing and thinking about a variety of environmental texts which have sparked communal social action and make connections between the building's systems and the world outside the building.
6. Middle School Environmental Challenges invite students to reduce their carbon footprint. Several challenges are posted

each trimester and students of all ages are encouraged to participate. At the end of the year, the pounds of carbon saved are calculated.

7. Green Housekeeping - The goal of the housekeeping program is to maintain a healthy learning environment. The focus is on cleaning for health, not just appearance. All contracted cleaning staff receive training on green cleaning prior to and during their employment. They use energy-efficient equipment with less environmental impact—low moisture processes, quieter operation, higher filtration, and lower emissions. Their cleaning service provider uses Green Seal Certified cleaning products, 100% recycled paper towels and tissues.
8. Recycling allows them to reduce the burdens on the environment as a result of both solid waste disposal and the extraction of the natural raw materials. They recycle mixed paper, cardboard, cans, glass, and type 1 (PETE) and 2 (HDPE) plastics.
9. Additionally, they use a solar-powered trash compactor on their Wisconsin Avenue campus that operates on 100% solar energy. While its footprint is the same as an ordinary trash receptacle, its capacity is five times greater. This increased capacity reduces collection trips and can cut fuel use and greenhouse gas emissions.
10. Green Food Service - Sidwell Friends' commitment to environmental stewardship extends to their cafeterias. The food service provider is dedicated to reducing food waste and selecting regional vendors as much as possible to reduce the impact of long distance deliveries on natural resources and promote food safety and integrity.

Figure 1. Examples of school-related environmental sustainability activities.

Sidwell Friends School has become a model institution which schools around the world can emulate. It just illustrated how an academic institution may teach and involve children in sustaining the environment, at the same time ensuring their future. Even at young

ages, the way children and young people view the environment, and themselves in relation to it, will play a vital role in fighting climate change.

Towards “cool” colleges and universities

All across North America, colleges and universities are taking steps to green their campuses (Chiras, 2010). Green is not a new color in college campuses. For the past 2 decades, many colleges and universities have started environmental sustainability initiatives such as recycling waste and other measures to reduce their impact on the environment.

Today's green movement is much deeper and greener, aimed at creating a sustainable future. Over 600 colleges in the United States have joined the Campus Climate Challenge which was started to reduce their contribution to global warming. They are buying renewable energy and implementing energy-efficiency measures that lower their carbon emissions as part of their university policy. They are also building new classrooms and other facilities to much higher, more energy-efficient standards using green building materials—often thanks to student insistence (Hattam, 2007; Underwood, 2007; Whittelsey, 2009).

So, although the United States government did not ratify the Kyoto Protocol, most of its citizens, through colleges and universities have taken big steps toward saving the environment. Noteworthy to mention is its annual search for top 10 “Cool Schools” which started in 2007 (Hartog, 2008). The top schools earned points in ten categories, namely; policies for building, energy, food, investment, procurement, and transportation, curriculum, environmental activism, waste management, and overall commitment to sustainability. A perfect score in every area would give a school 100 points.

The Eco League schools prided themselves on integrating experiential learning into the curriculum - from backpacking trips to analyses of “leave no trace” ethics and how education can affect avalanche safety. They are also actively pursuing environmental studies, of which a great number of scholarships are offered. College of the Atlantic has started paying to offset all its greenhouse-gas emissions. Green Mountain College now gets more than half its

electricity from generators powered by methane from dairy cow waste. The Northland College students voted to tax themselves \$20 per semester to fund clean-energy projects (ecoleague.org).

Also in a league of their own are the 10 University of California campuses. With 220,000 students and 170,000 faculty and staff, the UC system has the ecological footprint of a large city. Efforts to reduce that footprint one campus at a time mean the system now leads the higher education pack in making big green changes. At UC Berkeley, for example, campus dining options are 65 percent vegetarian, reducing the use of resource-intensive meat-based meals. (Pound for pound, more energy, water, and land go into producing meat than vegetables.) Harvests from UC Davis' olive trees that once left oil slicks on bike paths have been put to better use in a line of award-winning olive oils. Meanwhile, UC Santa Cruz has offset 100 percent of its carbon dioxide emissions since, and four of UCLA's high-rise dorms now have solar-powered water heaters. Farther south, UC San Diego generates 7.4 megawatts of its electricity (10 to 15 percent of its total energy) using renewable sources including methane-powered fuel cells, solar, and wind (universityofcalifornia.edu).

Another environmental-friendly action is the development of "ECO-DORMS". Schools around the globe have taken to greening campus housing with innovations such as renewable energy, recycled building materials, and composting facilities. In 2008, 318 students at California's Pitzer College moved into a new residence hall that has rooftop gardens, solar panels, and low-flow showers and toilets. Most building materials, including lumber and metal, came from within 200 miles of the campus. At Kentucky's Berea College, 50 to 100 students live in the Ecovillage, a group of apartments and learning facilities built around a perm culture food forest (where food grows among trees instead of on a cleared swath of land), vegetable gardens, and a wastewater-recycling system.

UNIVERSITY OF COLORADO- BOULDER

Environmental Policy

Purpose:

In keeping with its mission, CU-Boulder is committed to providing an educational model for fiscally sound, environmentally responsible stewardship of the campus and its resources. The institution intends to maintain its reputation as a proactive leader in the environmental sciences and campus sustainability. The campus values choices and decisions that reduce the environmental impacts of its actions. Compliance with the law is required. Environmental education and participation in campus environmental programs are encouraged.

Policy Statement:

CU-Boulder strives to proactively manage how it impacts the environment, while responsibly managing the resources provided to the campus. As a leader in environmental issues, UCB's policy is to be responsible in protecting the environment and natural resources. We are committed to:

- Complying with sound environmental practices, including the commitment to meet or exceed applicable legal and other requirements.
- Properly managing wastes and pollution.
- Managing our processes, our materials and our people in a way that considers the environmental impacts associated with our actions.
- Striving for continual improvement in our environmental management system.

Date: August 18, 2004

Approved by: Richard L. Byyny, Chancellor

Author: Director of Environmental Health & Safety

Figure 2. Sample of a university environmental sustainability policy.

In 2000, the University of Colorado (CU) became the first U.S. university to buy renewable energy credits. Today the mile-high school supports local offset projects. CU does more than buy its way out of carbon guilt, however. The Buffaloes have also made strides in reducing emissions produced in the first place. Eighty percent of students commuted car free since 2007. Another highlight is on transportation wherein the tuition covers city bus passes and loaner bikes. Most campus shuttles, or Buff Buses, run on biodiesel.

Implications to Education

The United Nations recognizes education as a tool for addressing human development, health care, environmental sustainability, human values and human rights issues. Anghay and Japos (2009) concluded in their study on Worldwide Patterns of Education across Human Development Indicators that education is a major component of well-being and is used to measure economic development and quality of life. Given this vital role in global development, it is very important to explore the implications of education in reducing vulnerability to climate change impacts.

Based on the literature, management of the impacts of climate change should be two-pronged: adaptation and mitigation. However, many scientists recommended that adaptation should be prioritized first, but must go hand in hand with mitigation measures (Bo, 2010). Both require political will and technological know-how. Therefore, whatever actions will be planned in the educational system for the management of impacts of climate change, they should be enforced from top management up to the bottom. If there is no political support by the educational leaders, these plans may be bound to fail.

Prior to planning, a review of existing adaptive mechanisms is necessary. The adaptation plan is intended to increase the resilience or the capacity to cope with current and future climate change. Adaptation may be anticipatory or reactive, the former being preventive and the latter spontaneous. Hence, for a comprehensive plan, it may be important to develop both anticipatory and reactive adaptation plans.

According to Lacanilao (2009), there is hardly anything the people can do to prevent climate change, but people can increase chances of survival through a paradigm shift in education and research. It

means, a “transition from a crisis/symptom mode to a prevention/cure mode” of problem solving. Moreover, Lucido (2009) emphasized that education must now take a radical turn. Education must no longer be confined to teaching the basic and specialized disciplines, but it has to integrate values and lifestyle changes among all its stakeholders. It must not relate only to personal and professional development, but it has to relate as to how people should live to make their present and future sustainable. This is what encompasses Education for Sustainable Development (ESD).

ESD was already endorsed at the highest political levels during the World Summit in 2002. The landmark declaration at Johannesburg states that sustainable development is built on 3 interdependent and mutually reinforcing pillars. These are economic development, social development and environmental protection, which must be established at the local, national, regional and global levels.

Given the established relationship among socio-economic, health and environment in this study, it may be imperative to shift from the traditional education framework and adopt the ESD framework. As aptly expressed by Lucido (2009), only a visionary approach to education, like ESD, can reorient mankind to better understand their present roles in addressing the complex and interdependent problems that threatened the future.

ESD seeks to empower people to assume responsibility for creating a sustainable future. The goal of UNESCO, being the lead agency for ESD, is to integrate the principles, values, and practices of sustainable development into all aspects of education and training.

As a catalytic process for social change, ESD seeks to foster- through education, training, and public awareness- the values, behaviour and lifestyles required for a sustainable future. This means that ESD involves learning how to make decisions that balance and integrate the long term future of the economy/ natural environment/ peoples’ wellbeing now and in the future. As a visionary approach, ESD seeks to help people to better understand the world in which they live, and to face the future with hope and confidence.

In particular, ESD established linkages across poverty alleviation, human rights, peace and security, cultural diversity, biodiversity, food security, clean water and sanitation, renewable energy, preservation of

the environment and sustainable use of natural resources. Foremost, it views a better quality of life for everyone now and for the generations to come (ESD Primer).

Given this framework for “meaningful learning”, educational systems around the world may opt to start necessary transformations towards achieving environmental sustainability. Only after this shift of pedagogy, of curriculum, of organizational structure, of policy and of ethos, will “meaningful learning” may occur.

This important shift must happen immediately, no matter how difficult it will be. Cruz (as cited by Bo, 2010), emphasized the need to act and be decisive as “inaction now will be costlier and indecision now will mean harder decisions in the future”.

CONCLUSIONS

Data revealed that many educational institutions (low, middle, and tertiary schools) in highly developed countries such as the USA and European countries have started their “GO GREEN” campaigns for a decade or more. Their environmental sustainability initiatives are reflected in the institutions’ policies, programs and student activities in and out of the classroom. Led by the school administrators, faculty, personnel and students have been actively involved in these environmental initiatives. Clearly, they have been successful in arousing the interests of the stakeholders in loving and caring for the environment.

From the experiences of these educational institutions in developed countries, it can be deduced that the educational sector at any level (international, regional, national, and local) is an excellent avenue for the promotion of environmental sustainability among its stakeholders and even to others. The Education for Sustainability Development (ESD) framework promoted by UNESCO may be an appropriate means to the urgent need of paradigm shift and the integration of environmental sustainability in the educational system.

RECOMMENDATIONS

Based on the conclusions, the following are recommended:

1. Heads/managers of the educational sector must lead in the fight against climate change. A “pro-active” stance must be initiated more than a “reactive” stance. The ESD model of the UNESCO may be the guiding framework of the educational institutions in initiating steps towards a sustainable future. The educational institutions’ plan (short-term or long-term) for environmental sustainability must be reflected in the school or university policies and may even be integrated in the vision, mission, goals, and objectives (VMGOs) for better grounding. These policies will then be the basis for the integration of ecology lessons/activities in and out of the classroom. Aside from curriculum and instruction integration, related activities on exposure and risk reduction as well as development of coping capacity may also be integrated in student services and curriculum extension. Integration of environmental education may start from the earliest time a child enters school (preschool) up to graduate school. The earlier a child understands the relationship between man and environment, the better.
2. Both teaching and non-teaching personnel must undergo seminars and trainings related to environmental sustainability and climate change issues to better understand the problem and to facilitate change. The transformation process may not be as easy as it seems, therefore, advocacy and capability building are very essential. These education personnel have vital roles to influence both the students and community members.
3. School facilities (canteens, dorms, farms, gardens, etc.) and teaching laboratories may be renovated following the standards of energy and environment conservation, that is, if the school can afford. However, these standards for energy and environment conservation may be utilized for building of future teaching facilities.
4. Research is another significant area for the implementation of the environmental sustainability plan. First, the research unit of the school or university must adopt an ecology-friendly agenda

or must prioritized climate change issues in the research agenda. Secondly, research findings related to the environment should then be disseminated to the community and to the concern groups to facilitate utilization of research findings.

5. The academic institutions must partner, work hand in hand and collaborate with the local and national government in the fight for climate change. It is also essential to build partnership across sectors (civil society, media, business and industry, tourism, etc.). The educational sector has the potential to influence political leaders through lobbying in policy-making and decision-making regarding environmental issues.

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Relevance and Sustainability of “Project Pakigdait sa Sitio Kasagingan, Mananga” of the University of San Jose-Recoletos

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Abstract - This study sought to determine the program relevance and sustainability of the institutional community project called “Project Pakigdait sa Sitio Kasagingan, Mananga” of the University of San Jose-Recoletos as assessed by its department anchors, students and program beneficiaries. The respondents were the various stakeholders of the university who were involved in the implementation and supervision of the various programs coming from the different colleges and departments and some selected beneficiaries of the community extension program. The provisions of the program relevance for promoting community development among the community dwellers, promoting people empowerment among adopted community dwellers, and for the conduct of skills training among qualified community members were made to a very great extent. Likewise, the provisions for the sustainability of the project through capacity building were made to a very great extent; however, fund sourcing were made to a great extent.

Keywords – Program relevance, sustainability, people empowerment

INTRODUCTION

Institutions of higher learning today are not only focused on rendering quality education to its students, honing their skills and preparing them to enter the real business world, but also on promoting community building and change. The academe is no longer confined to providing curricular activities, but is more geared with instituting linkages with its external constituents. It directs its efforts to go beyond the narrow confines of its school premises to reach out its partner communities to improve the social climate, mitigate economic dislocation and become the catalyst for change in the country.

Schools of today take special cognizance in the community because of the awareness that someday, somehow, the graduates will assume their chosen roles in it and hopefully would apply what they have learned and experienced in school to a larger context. To ensure that there would be a continuity of their organized involvement in molding responsible future leaders and residents, schools undertake and spearhead community extension programs.

Through these activities, the goal of the academe to improve and create a positive change in the lives of the community members will be realized. Promoting community change can be manifested through development programs that are undertaken not only to equip the people with selected skills as technical or inter-personal, but ideally to develop them holistically to promote harmony and self-reliance among themselves so that they will become competent community builders and contributors.

To effect significant social transformation in terms of community building is a challenge for the different academic components of the University of San Jose-Recoletos. With a history of academic success to its credit, the institution focuses its efforts in achieving relevance in the community it serves by aiming for a sustainable outreach program. One of the activities initiated by the school to concretize this goal is the "Project Pakigdait sa Sitio Kasagingan, Mananga". This is spearheaded

by the university's Institute of Non-Formal Education and Community Outreach Program (INFECOP). Such scheme was designed to promote community oriented actions to alleviate the current economic and social conditions of the residents while at the same time seeking a relevant and sustainable cooperative life that serves the interests of people in Sitio Kasagingan, Mananga.

OBJECTIVES OF THE STUDY

The objectives of the study were as follows: (1) to determine the extent of the provisions for program relevance in the aspect of enhancing the qualities among the beneficiaries as community development, people empowerment and skills training; (2) to evaluate the extent of the provisions for program sustainability based on the following indicators: capacity building; and fund sources; and (3) to make a proposal for improvement of the project.

MATERIALS AND METHODS

This study utilized the descriptive survey method of research. Researcher- made questionnaire was used as the main instrument of data collection. Unstructured interviews were also conducted to clarify the answers given by some of the respondents.

The validity of the instruments was assessed by the panel of experts during the proposal hearing. Two sets of surveys were accomplished by the department anchors, student leaders and program beneficiaries. The features of each questionnaire are described hereunder:

The researcher made instrument sought to determine the extent of relevance of the projects implemented in the aspects of promoting people involvement and empowerment, skills training and community development. It was accomplished by the identified respondents of the study. Each question is followed by a number of possible responses. Corresponding to the responses in each item are four numeric scales with the following qualitative equivalents: 4 - Very Great Extent (VGE) – means that provisions are made in all cases to extend community extension services deemed useful to the community; 3 - Great Extent (GE) – means that provisions are made in the majority of the cases

to extend community extension services deemed useful to the community; 2 - Less Extent (LE) – means that provisions are made in a few cases to extend community extension services deemed useful to the community; and 1 - Never (N) – means that provisions are not made to render community extension services deemed useful to the community. The respondents were instructed to encircle the numeral which best represents their answers to each item.

The questionnaire was designed to determine the extent to which the community extension services of USJ-R was characterized by continued feasibility after the school has disengaged from the adopted community: 4 - Very Great Extent (VGE) – means that provisions are made in all cases for the readiness of the beneficiaries to continue the project after the university has detached itself from the program; 3 - Great Extent (GE) – means that provisions are made in many cases for the readiness of the beneficiaries to continue the project after the university has detached itself from the program; 2 - Less Extent (LE) – means that provisions are made in a few cases for the readiness of the beneficiaries to continue the project after the university has detached itself from the program; and 1 - Never (N) – means that no provisions are made for the readiness of the beneficiaries to continue the project after the university has detached itself from the program. The respondents were instructed to encircle the numeral which best corresponds to their assessment.

In order to determine the functionality of the questionnaires as the main data collection technique, the proponent conducted a dry run among three (3) professors who used to serve as coordinators of the program, six (6) officers from the various student organizations in the College of Commerce who have been exposed to the university's community extension projects. The researcher met the dry run respondents and asked them to accomplish the instruments. However, they did not participate in the actual conduct of the study.

Once these were done, the instruments were collected and the responses tallied. An item analysis of the answers was made. The proponent noted the incidence of response and non-response. Since the dry-run respondents were able to answer the queries in each instrument with a reasonable range of variation, the questionnaires were then finalized for administration.

Permission to conduct the study was secured from the administration in coordination with the Research Office. Once approval to conduct the study was granted, the proponent secured the assistance of the INFECOP coordinator in distributing the instruments to the identified respondents including those of the adopted community.

The proponent also conducted unstructured interviews from the various respondents to support the data gathered from the administration of the questionnaires. The accomplished questionnaires were collected and the responses tallied and tabulated. The weight assigned to the scales in the instruments were noted, and weighted the mean of each item was determine.

RESULTS AND DISCUSSIONS

Table 1 highlights the respondents of the study.

Table 1. Distribution of research respondents

Classification	F	%
Department Anchors	42	18.91
Students	145	65.32
Beneficiaries	35	15.77
TOTAL	222	100.00

Table 2 showed the data on the extent of provisions for promoting community development among the beneficiaries of Sitio Kasagingan, Mananga.

Table 2. Promoting community development

Dimensions	Department Anchors		Students		Beneficiaries		Item Average	
	μ	I	μ	I	μ	I	μ	I
1. Encouraging the various sectors of the community to function as a whole through meetings, discussions and others.	3.00	GE	3.25	GE	3.80	VGE	3.35	VGE
2. Helping the young members of the community in planning community related development programs.	3.13	GE	3.14	GE	3.89	VGE	3.39	VGE
3. Establishing cooperatives among the community members.	3.25	GE	3.00	GE	3.63	VGE	3.29	VGE
4. Facilitating activities to meet the basic needs of the community such as housing, community centers, health clinic and others.	2.97	GE	3.14	GE	3.60	VGE	3.24	GE
5. Encouraging the community members to make decisions concerning linkages for community development.	3.22	GE	3.12	GE	3.60	VGE	3.31	VGE
6. Ensuring the continuity of community development projects by developing future trainers within the community.	3.38	VGE	3.16	GE	3.83	VGE	3.46	VGE
7. Turning over the community extension program to competent community members.	3.47	VGE	3.23	GE	3.71	VGE	3.47	VGE
Factor Average	3.20	GE	3.15	GE	3.72	VGE	3.36	VGE

Legend:

Range

3.25 – 4.00

2.51 – 3.25

1.76 – 2.50

1.00 – 1.75

Interpretation

Very Great Extent (VGE)

Great Extent (GE)

Less Extent (LE)

Not Applicable (NA)

As shown by the factor average of 3.36 based on the group average of 3.15 from the students, 3.20 from the department anchors and 3.72 from the beneficiaries, provisions for community development were made to a great extent in this institutional community project of the university.

Specifically, as revealed by the item average of 3.35, provisions were made to a very great extent to encourage the various sectors of Sitio Kasagingan, Mananga to function as a whole through meetings, discussions and others. From this finding, it could be inferred that in majority of cases, the community dwellers were encouraged to use dialogues and assemblies to enhance participation among them which is a necessary ingredient of development.

The item average of 3.39 revealed that to a very great extent, provisions were adopted to help the young members of the area to plan community related development programs. It can be discerned from this information that the project provided the vehicle to involve the youth in community planning and participating in the various activities for community development so that they would achieve self-sufficiency and efficacy.

In the area of establishing cooperatives among the community members, provisions to achieve this goal were deemed to be done to a very great extent ($\mu=3.29$). This means that the program was able to imbue among the residents the importance of setting up cooperatives to create a community of mutual benefits.

Provisions were made to a great extent ($\mu=3.24$) in terms of facilitating activities to meet the basic needs of the community such as housing, community center, health clinic and others. It can be construed from this finding that the project encouraged and supported capable community dwellers to initiate projects focusing on the essential needs of the place in terms of shelter, health, social and other primary indigence.

In terms of encouraging the community members to make decisions concerning linkages for community development, provisions for the realization of this goal were observed to a very great extent ($\mu=3.31$). This means that the project supported the community residents to forge tie-ups with other communities through linkages and share their resources for their mutual benefits.

Lastly, provisions were also conceived to a very great extent ($\mu=3.43$) to turn over the community extension program to competent community members. This indicated that the project created conditions to enable and prepare the community dwellers to be competent and take control of their lives once the program ended.

From the findings, it can be construed that in majority of the areas, efforts were exerted to promote among the residents of the adopted community to develop their capacity to manage community life and realize their expressed needs and aspirations.

Table 3 shows the data on the extent of provisions to promote people empowerment among the beneficiaries of USJ-R's project in Sitio Kasagingan, Mananga.

Table 3. Promoting people empowerment

Dimensions	Department Anchors		Students		Beneficiaries		Item Average	
	μ	I	μ	I	μ	I	μ	I
1. Improving conditions that will free the community dwellers from the clutches of poverty.	3.09	GE	3.21	GE	3.71	VGE	3.34	VGE
2. Helping the community members to feel capable and in control in improving the quality of their lives.	3.25	GE	3.04	GE	3.74	VGE	3.34	VGE
3. Enabling the community members to accept responsibility to improve their standard of living.	3.19	GE	3.28	GE	3.74	VGE	3.40	VGE
4. Assisting the community dwellers to identify blocks that hinder their growth and development.	3.19	GE	3.31	VGE	3.69	VGE	3.40	VGE
5. Initiate people's involvement in problem solving and decision making.	3.38	VGE	3.19	GE	3.80	VGE	3.46	VGE
6. Helping the program beneficiaries to become self motivated.	3.31	VGE	3.14	GE	3.74	VGE	3.40	VGE
7. Encouraging capable community dwellers to initiate projects for the good of the community.	3.38	VGE	3.33	VGE	3.83	VGE	3.51	VGE
Factor Average	3.26	GE	3.21	GE	3.75	VGE	3.41	VGE

As manifested by the factor average of 3.41 derived from the group average of 3.26 from the department anchors, 3.21 from the students and 3.75 from the beneficiaries, provisions for people empowerment were made to a very great extent in the institutional project of Sitio Kasangingan, Mananga.

Specifically, the item average of 3.34 showed that provisions were made to a very great extent for improving the conditions of the beneficiaries that would free them from the clutches of poverty. This finding indicated that the extension program promoted activities to help generate income among the dwellers for their daily subsistence.

As demonstrated by the item average 3.34, provision was made to a very great extent for helping community members to feel capable and in control in improving the quality of their lives. It can be deduced from this finding that the program initiated efforts to help the residents of the adopted community to become independent and self-reliant.

Provision was made to a very great extent ($\mu=3.40$) in enabling the community dwellers to accept responsibility to improve their standard of living. The project carried with it several activities to assist the residents to have better lives and become positive contributors to society

The item average of 3.40 revealed that to a very great extent, provisions were made to assist the community dwellers to identify the blocks that hinder their growth and development. This information reinforced the notion that the project provided strategies to help the community residents overcome the problems which may have hindered their growth and development. Sufficient assistance was given to them so that they can transform their community life positively.

The program provided to a very great extent ($\mu=3.46$) some actions designed to initiate problem solving and decision making. This was not new as the project included an activity designed to help the residents solve problems amicably and effectively as well as making decisions which could lead to a better living environment among themselves.

Provision was also made to a very great extent ($\mu=3.40$) in helping the program beneficiaries to become self motivated. It can be inferred from this finding that the program included several activities intended to broaden their horizons, and their way of doing things for the better.

Lastly, the program to a very great extent ($\mu=3.51$) designed various sessions to encourage the community dwellers to initiate projects for the good of their place. The finding denoted that the project paved the way to help residents undertake economic and social movement in the community leading towards self sufficiency and independence.

Table 4 contains data on the extent to which provisions for skills training were provided among the community beneficiaries as assessed by the three groups of respondents.

Table 4. Provisions for skills training

Dimensions	Department Anchors		Students		Beneficiaries		Item Average	
	μ	I	μ	I	μ	I	μ	I
1. Training capable community members to formulate action plans for community service.	3.38	VGE	3.28	VGE	3.80	VGE	3.49	VGE
2. Providing technical training to capable female community dwellers like cooking, manicure, pedicure and others.	3.41	VGE	3.35	VGE	3.94	VGE	3.57	VGE
3. Providing health, sanitation and nutrition trainings to the community dwellers.	3.53	VGE	3.27	VGE	3.91	VGE	3.57	VGE
4. Training capable community dwellers to manage conflict and disagreements effectively.	3.19	GE	3.37	VGE	3.69	VGE	3.42	VGE
5. Providing short-term trainings to capable male dwellers like carpentry, plumbing, haircutting, welding and others.	3.28	VGE	3.45	VGE	3.77	VGE	3.50	VGE
6. Training capable community dwellers on basic financial activities as record keeping, bookkeeping, cash management and others.	3.16	GE	3.33	VGE	3.57	VGE	3.35	VGE
7. Providing services on how to form a cooperative among interested community members.	3.31	VGE	3.34	VGE	3.91	VGE	3.52	VGE
Factor Average	3.32	VGE	3.34	VGE	3.80	VGE	3.49	VGE

The factor average of 3.49 indicated that provisions for conducting skills training among the community members were made to a very great extent. This can be gleaned from the group average of 3.32 from the department anchors, 3.34 from the students and 3.80 from the beneficiaries.

Specifically, the item average of 3.49 showed that provision for technical training was made to a very great extent ($\mu=3.57$). These trainings were specifically addressed to the female community members, which included cooking, baking, dressmaking, manicure and a lot more.

In terms of providing health, sanitation and nutrition trainings, the activity registered an item average of 3.57 which means it was conducted to a very great extent. The program calls for these types of training to augment the meager income of the women residents.

The respondents also indicated that provisions were made to a very great extent ($\mu=3.42$) to train capable community dwellers to manage conflicts and disagreements effectively. This way, petty misunderstandings can be resolved quickly without going into messy arguments.

Providing short term trainings ($\mu=4.00$) were made to a very great extent to capable male dwellers like carpentry, plumbing, hair cutting and welding. These skills based training were implemented to make them more productive and generate more income for their families.

Provisions were made to a very great extent ($\mu=3.35$) in training capable community members on basic financial activities such as record keeping, bookkeeping, cash management, and others. This was done to ensure that the members would learn to maintain sound financial records and decisions for their household and business operations.

Lastly, the factor average of 3.52 revealed that provisions were made to a very great extent in providing services on how to form a cooperative among interested community members. This was done to instill among the minds of the community dwellers the importance of having a cooperative way of doing things.

The summarized data regarding the extent of provisions made for program relevance regarding the university's institutional project is shown in Table 5.

Table 5. Summarized data on the extent of provisions for program relevance

Dimensions	Department Anchors		Students		Beneficiaries		Item Average	
	μ	I	μ	I	μ	I	μ	I
1. Community Development	3.20	GE	3.15	GE	3.72	VGE	3.36	VGE
2. People Empowerment	3.26	VGE	3.21	GE	3.75	VGE	3.41	VGE
3. Skills Training	3.32	VGE	3.34	VGE	3.80	VGE	3.49	VGE
General Average	3.26	VGE	3.23	GE	3.76	VGE	3.42	VGE

As shown by the general average of 3.42, provisions were made to a very great extent to ensure program relevance of USJ-R's institutional community outreach program in Sitio Kasagingan, Mananga. The group average of 3.26 from the department anchors and 3.76 from the beneficiaries indicated their concurrence that such provisions were manifested to a very great extent. On the other hand, the group general average of 3.23 from the students belied that from their end, it was observed to be done to a great extent.

Provisions for community development among the beneficiaries were made to a very great extent as shown by factor average of 3.36. This means that the project was able to stir the community dwellers to initiate projects and mobilize their members to introduce self-help activities in the community to ensure its steady growth and development.

Provisions for people empowerment among the beneficiaries were made to a very great extent as revealed by the factor average of 3.41. Specifically, activities were undertaken to assist community dwellers to organize themselves and work as a team to solve problems in their community. The feeling of confidence is nurtured among the members to enable them to manage their own projects through participatory and consensual decisions and sharing of resources.

The factor average of 3.49 showed that provisions were made in the project to a very great extent in conducting skills training among the beneficiaries. The project aimed to provide various skills building activities among the dwellers to enable them to perform significant economic and social activities to improve the quality of their lives.

Table 6 contains data on the extent of provisions for program sustainability through capacity building among community members.

The factor average of 3.33 indicated that provisions for program sustainability toward capacity building were made to a very great extent. This is evidenced by the group average of 3.05 from department anchors, 3.25 from the students and 3.70 from the program beneficiaries.

Specifically as revealed by the item average of 3.36, provision for enabling community members to have their own goals was made to a very great extent. This finding signified the fact that the project was able to encourage the community members to set their direction through the formulation of meaningful goals which they could perform by themselves.

Actualizing the transfer of knowledge to as many members of the community as possible was also provided by the project to a very great extent ($\mu=3.38$). This information indicated that the developmental activities initiated by the project were not only enjoyed by a selected few community members, but rather, a lot of them were benefited by it leading to the attainment of their own self sufficiency.

Table 6. Promoting for capacity building

Dimensions	Department Anchors		Students		Beneficiaries		Item Average	
	μ	I	μ	I	μ	I	μ	I
1. Enabling community members to have their own goals.	3.03	GE	3.19	GE	3.86	VGE	3.36	VGE
2. Actualizing the transfer of knowledge to as many members of the community as possible.	3.03	GE	3.25	GE	3.86	VGE	3.38	VGE
3. Assisting the community members to choose partners or linkages for community outreach projects.	3.06	GE	3.22	GE	3.49	VGE	3.26	VGE
4. Encouraging the community members to formulate clear cut objectives, vision and mission for people's organization or cooperative.	3.09	GE	3.38	VGE	3.69	VGE	3.39	VGE
5. Enhancing the community members' capabilities to choose their own leaders.	3.06	GE	3.19	GE	3.74	VGE	3.33	VGE
6. Developing the community members' capabilities for interactive mechanism to strengthen their local organization.	3.00	GE	3.22	GE	3.49	VGE	3.24	GE
7. Developing the capacity of the local leaders to manage community life and self-reliant.	3.06	GE	3.32	VGE	3.80	VGE	3.39	VGE
Factor Average	3.05	GE	3.25	GE	3.70	VGE	3.33	VGE

The item average of 3.26 denoted the fact that provisions were made to a very great extent by the project to assist the community members in choosing partners or linkages for community outreach activities. It can be construed from this finding that the project helped developed the community members to make prudent decisions in selecting various agencies or organizations with whom linkages can be formed in its quest for community development.

Provision was also made to a very great extent ($\mu=3.39$) in encouraging the community members to formulate clear cut objectives, vision and mission for their people's organizations or cooperative. The finding signified that the residents were provided with adequate exposure in vision-mission statement formulation as well as goal setting practices as an essential part of the community organizing scheme espoused by the project.

The item average of 3.33 revealed that provision was made to a very great extent for enhancing the community members' capabilities to choose their own leaders. It can be inferred from the data that the project provided sufficient exposure among the residents in terms of scope and experience in choosing their own local leaders.

With regard to developing the community members' capabilities for interactive mechanism to strengthen their local organization, provision was made to a very great extent as shown by the item average of 3.24. This is one area where the project needs to reinforce this skill among the dwellers so that they will have the confidence to establish strategic alliances with other organizations for their mutual benefit.

Finally, the item average of 3.39 demonstrated that the project to a very great extent was able to develop the capacity of the local leaders to manage community life and be self-reliant. This information denotes the fact that the project made provisions to enhance the ability of the local community leaders to be capable in managing his/her constituents and improve their way of life.

Table 7 highlights the information on the extent of provision for program sustainability through fund sourcing as assessed by the department anchors, students and program beneficiaries.

Table 7. Provisions for fund sourcing

Dimensions	Department Anchors		Students		Beneficiaries		Item Average	
	μ	I	μ	I	μ	I	μ	I
1. Facilitating the formation of micro enterprise or entrepreneurial activities among qualified community members.	2.97	GE	3.39	VGE	3.80	VGE	3.39	VGE
2. Building connection or encouraging linkages with private or public agencies for possible funding sources.	2.97	GE	3.25	GE	3.14	GE	3.12	GE
3. Providing micro financing training among qualified community members.	3.00	GE	3.03	GE	3.46	VGE	3.16	GE
4. Encouraging the full use of indigenous resources for community development.	3.28	VGE	3.26	VGE	3.69	VGE	3.41	VGE
5. Providing access to markets for goods produced from the livelihood programs of the community members.	2.97	GE	3.12	GE	3.83	VGE	3.31	VGE
6. Facilitating the holding of bingos , raffles, benefit dances and others as alternative sources of funds.	3.16	GE	3.30	VGE	3.80	VGE	3.42	VGE
7. Creating agreements with financial institutions to provide special credit facilities to qualified community members.	2.19	LE	3.29	VGE	2.80	GE	2.76	GE
Factor Average	2.93	GE	3.23	GE	3.50	VGE	3.22	GE

The factor average of 3.22 taken from the group average of 2.93 from the department anchors, 3.23 from the students and 3.50 from the program beneficiaries indicated that provisions to sustain the program through fund sourcing were made to a great extent.

Specifically, the item average of 3.39 revealed that facilitating the formation of micro enterprises or entrepreneurial activities among qualified community members was provided to a very great extent. The finding unveils the fact that the project was able to generate useful information and practical guidelines to qualified members on the availability of micro and other entrepreneurial opportunities which can help improve their standard of living. As show by the item average of 3.12, provision for building connection or encouraging linkages with private or public agencies for possible funding sources was made to a great extent. This means that one of the notable goals of the project was

to give opportunities to the people to improve their quality of life by forging effective linkages with the various organizations and agencies to fund their projects.

Providing micro financing training among qualified community members was also done to a great extent as evidenced by the item average of 3.16. It can be construed from this information that the project included certain activities designed to enhance the skills of the dwellers to manage funds effectively and get themselves involved with micro or entrepreneurial endeavors.

Providing access to markets for goods produced from the livelihood programs of the community members were made to a very great extent ($\mu=3.31$). The project was able to broaden the market base of the products of the community by creating mechanisms for direct selling, thereby mitigating the interference of the middlemen.

The item average of 3.42 showed that provision was made to a very great extent in facilitating the holding of bingos, raffles, benefit dances and others as alternative sources of funds. The project was able to assist the community members in tapping external resources to finance the community's projects without involving financial public and private agencies.

Lastly, the project was able to provide to a great extent ($\mu=2.76$) the mechanism of creating agreements with financial institutions to provide special credit facilities to qualified community members. This means that the project aided those community members who were deemed competent to establish agreements with financial organizations in securing credit privileges to finance their economic activities.

As revealed by the general average of 3.28, provisions were made to a very great extent for the sustainability of the project initiated by the university in its adopted community in Mananga. The general average was obtained from the group average of 2.99 from the department anchors, 3.60 from the students and also from the beneficiaries.

The factor average of 3.33 denoted that provisions for program sustainability through capacity building among community members were made to a very great extent. In this factor, activities were provided in the various phases of the project to develop the dwellers' capacity to set their goals, make plans for community development, and establish

linkages with other public and private organizations to improve their way of life.

As shown by the factor average of 3.22, provisions were made to a great extent for program sustainability in terms of fund sourcing. The gathered data revealed that the project was able to assist the community members in identifying possible sources of funds both internal and external which were needed to undertake as well as finance community related programs. Forging linkages with external sources of funds were also provided to ensure the availability of resources when projects were initiated.

CONCLUSIONS

In the light of the foregoing findings of the study, the researcher concludes that program relevance and sustainability have been attained by the "Project Pakigdait sa Sitio Kasagingan, Mananga." However, there is a need to broaden the provisions for fund sourcing to ensure the sustainability of the community's development programs.

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Computer-Assisted Collaborative Learning and Academic Performance

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Abstract - For the continuing search for effective teaching methodology in Maritime English Instruction, this paper examines the effect of the Computer-Assisted Collaborative Learning (CACL) Method on the academic performance of maritime students in terms of their scores in the summative test, pretest and post test, and midterm examination. The study used the experimental design. A series of CACL-based modules covering the midterm topics which were enriched from the existing Instructor's Guide for Maritime English were tested with two experimental groups of students against two other classes who were exposed to the Traditional Method (TM) of instruction. The four groups of students were categorized into academic achievers and non-academic achievers. Findings revealed a significant improvement on the academic performance of all groups after their separate exposure to the two methods. Results from the midterm exam and the summative test further revealed that there is no significant difference on the academic performance of the groups of academically advanced students. For the groups of non-achievers, however, those who

were exposed to the CACL method had significantly scored higher than those who were taught using the Traditional Method.

Keywords - collaborative learning, computer-assisted instruction, academic performance

INTRODUCTION

The present era demands for a high degree of literacy on the diverse roles of the computer even in the field of education. Technological advancement and computer literacy were viewed as impediment to the role of manpower in the workplace and treated as a threat in learning institutions as they may have an adverse effect on the learning process and the study habits of learners. We have arrived at the period of technological evolution where computers are seen as a useful tool for learning and instruction. As we embrace the changes that go with time, so must we welcome new technology as a tool for learning and discover how we can maximize instruction by putting this technology into use.

For many years, teaching Maritime English has been a challenging task for language teachers. Acquiring a high level of expertise in language teaching is not really as difficult as getting adequate knowledge of the complexities of seafaring and the realities in the field. Issues on expertise in language teaching was always with authenticity of the content of instruction. Language teaching is not anymore treated as acquiring language skills in isolation but as a tool for bringing out the best in the learner in his chosen field by using language skills that are relevant to his own needs as a future seafarer. For a Maritime English teacher, it is an added challenge to teach the course with limited resources and instructional materials; more so, because teaching the course requires a high degree of authenticity as students need to be exposed to learning materials and experiences which are very close to realities on board.

FRAMEWORK

Johnson and Smiths (1991) framework of Collaborative Learning as well as those of De Corte's (1996); Lehtinen, Hakkarainen & Lipponen's (1998); Verschaffel, Lowyck, De Corte, Dhert & Vandepuut's (1998) framework on Computer-Supported Collaborative Learning provide support to the concept of this paper. Collaborative or cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. Students in a cooperative or collaborative atmosphere work in teams to accomplish a common goal, under conditions that include the following elements: *positive interdependence, individual accountability, face-to-face promotive interaction, social skills, and group processing.*

Positive interdependence is the perception that a student is linked with others in a way so that he/she cannot succeed unless they do (and vice versa), that is, their work benefits him/her and his/her work benefits them. It promotes a situation in which students work together in small groups to maximize the learning of all members, sharing their resources, providing mutual support, and celebrating their joint success. Individual Accountability exists when the performance of each individual student is assessed and the results are given back to the group and the individual. It is important that the group knows who needs more assistance, support, and encouragement in completing the assignment. It is also important that group members know that they cannot "hitch-hike" on the work of others.

The purpose of cooperative learning groups is to make each member a stronger individual in his or her right. Students learn together so that they can subsequently perform better as individuals. Once teachers establish positive interdependence, they need to maximize the opportunity for students to promote each other's success by helping, assisting, supporting, encouraging, and praising each other's efforts to learn through face-to-face promotive interaction. Accountability to peers, ability to influence each other's reasoning and conclusions, social modeling, social support, and interpersonal rewards all increase as the face-to-face interaction among group members increase. Persons must also be taught the social skills for high quality cooperation and be motivated to use them.

Leadership, decision-making, trust-building, communication, and conflict-management skills have to be taught just as purposefully and precisely as academic skills. Group processing exists when group members discuss how well they are achieving their goals and maintaining effective working relationships. Groups need to describe what member actions are helpful and unhelpful and make decisions about what behaviors to continue or change. Students must also be given the time and procedures for analyzing how well their learning groups are functioning and the extent to which students are employing their social skills to help all group members to achieve and to maintain effective working relationships within the group.

Computer-assisted instruction, on the other hand, refers to the form of instruction where a wide extent of computer-generated materials is used to enhance instruction. According to Slavin (2003), computers are being used to expand the learning experience in different subjects in classrooms. They can be used to teach new skills or to help improve comprehension of subjects that students have difficulty learning.

Using both frameworks as a point of reference, this study proposes an instructional model which illustrates how Computer-Assisted Collaborative Learning can be integrated in the Instructor's Guide of Activities in Maritime English. The proposed format maximizes the use of teacher and student-made computer-generated materials as a tool for instruction. These materials are enriched with computer-generated audio-visual attachments such as pictures, animated diagrams, audio-recorded materials, and other varied graphic aids such as tables/matrices and different types of graphs and charts referred to by Burton, Moore, and Holmes (2001) as "hypermedia", the term which involves the use of animation, sound, or video which is added to the text. Hypermedia systems are constructed in a way to represent how a human thinks (Kearsley 1998). Burton et al. (2001) found hypermedia systems well suited to support problem-solving efforts. The proposed instructional format comprises the following steps: (1) Warming Up; (2) Introduction of the Topic; (3) Objective Setting; (4) Vocabulary Input; (5) Collaborative Activity; (6) Production Phase; (7) Output Presentation; and (8) Evaluation. The following diagram illustrates the concept of the study:

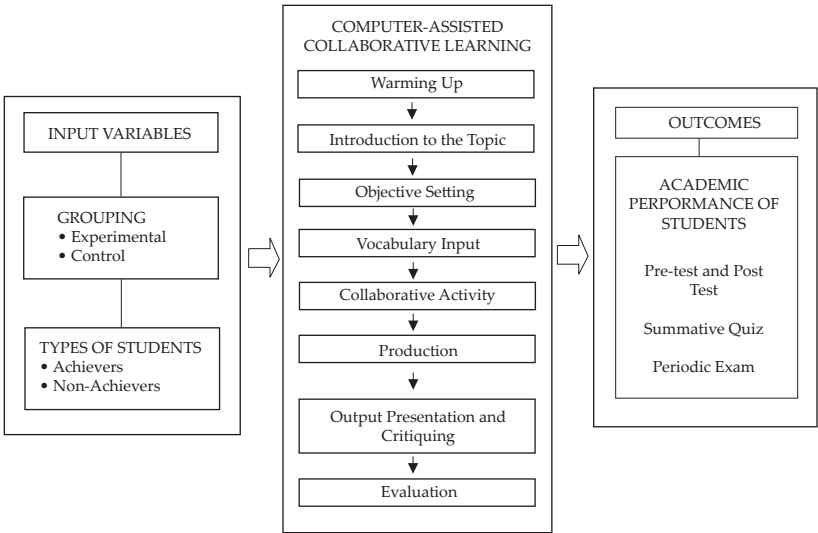


Fig 1. Schematic diagram of the conceptual framework

OBJECTIVES OF THE STUDY

The study aims to look at Computer-Assisted Collaborative Learning Model within the perspective of a classroom in a teaching-learning environment where the teacher and the students perform their respective roles in a collaborative atmosphere. Moreover, the study seeks to offer a possible solution to certain difficulties encountered by the Maritime English teacher in the classroom, specifically on instruction and acquisition of instructional materials. Hence, its main purpose is to propose a format which illustrates how the Computer-Assisted Collaborative Learning Model can be applied in the Instructor's Guide of Activities in the Maritime English Course. This study also aims to find out if, when tested, if this model can be a useful method in teaching Maritime English.

MATERIALS AND METHODS

The quasi-experimental method was used in this study. Specifically, this study used the nonequivalent control group design which involves two groups: control group and experimental group. For the purpose of this study, two experimental groups who were exposed to the Computer-Assisted Collaborative Learning (CACL) Model and two control groups who were taught using the Traditional Method of Instruction (TM) were selected. All groups were given a pretest and a posttest. Since the study is classroom-based, the groups were not randomly assigned. The main objective of the experiment was to find out whether or not the CACL model will make a significant improvement in the performance of students and whether or not there would be a significant difference between the academic performances of those who were exposed to the model and those who remain to be taught using the traditional method of instruction.

A series of modules was designed based on the existing Instructor's Guide on Maritime English prepared prior to the conduct of the study. The strategies/instructor's guide of these modules were patterned based on the proposed Computer-Assisted Collaborative Learning Model which is composed of the following steps: 1) Warming up, 2) Introduction of the Topic, 3) Objective Setting, 4) Vocabulary Input, 5) Collaborative Activity, 6) Production, 7) Output Presentation and Critiquing, and 8) Evaluation. A total of five modules were prepared and used in the study.

To determine the students' scores in the pretest and post test, a 50-item multiple choice test was used. The instrument covered the following topics: ship movements, types of marine engines, ship's maintenance, auxiliary machinery, and maritime safety. Also included in the questionnaire were certain language topics like causal verbs, compound nouns, infinitives, and gerunds.

Another instrument used in the study was the summative test. It is a compilation of tests given at the end of every week. These tests were taken from the Manual of Exercises for Maritime English, a compiled set of exercises authored by the teachers in the Languages Area of JBLCF-Bacolod. These tests had been critiqued and validated by experts teaching the same subject. The entire test was equivalent to 80 points.

The last instrument used in gathering the data for this study was the Mid-term Exam questionnaire. This was a 50-item multiple-choice test on the topics covered for the Mid-term. Like the other instruments, this questionnaire was also edited, validated, and approved by the Subject Area Head for Languages prior to its administration.

To find out if there had been a significant improvement on the academic performance of the control groups who were exposed to the Traditional Method (TM) and the experimental groups who were exposed to the Computer-Assisted Collaborative Learning (CACL) after the experiment, the t-test for dependent means was used. To test if there had been a significant difference on the academic performance of the two groups after their separate exposure to the two methods, the t-test for independent means was applied. Both statistical analyses were done with the help of a statistician through the computer-based SPSS program.

The Computer-Assisted Collaborative Learning Model

The Computer-Assisted Collaborative Learning (CACL) Model can be applied as a useful method of instruction in Maritime English. This model has been designed based on an intensive review of related studies and literature. The prepared design was then integrated into the column for Strategies/Instructor's Guide for Maritime English and was tested with two classes which were assigned as the Experimental Groups of this study. The proposed format is composed of the following:

Step 1: **Warming Up.** The first step allows the students to tune themselves in to the activities that are set ahead. A warm-up activity may include a game, a discussion of a related past or recent incident or report, a picture description, or a provoking question for a brainstorming exercise which is appropriate to or which could create a smooth connection to the topic that will be presented next. The materials needed as "warmers" are all prepared in advance and presented as computer-generated audio-visual materials. This part of the format may take 5-10 minutes. To illustrate this point, a vocabulary game is shown on the following pages:

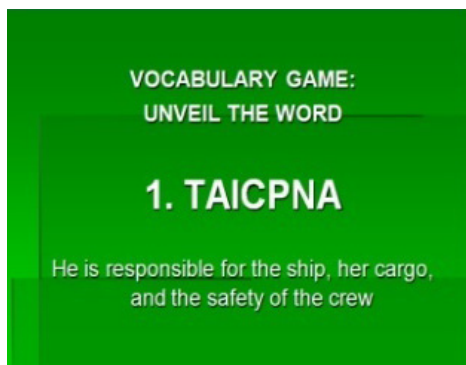


Fig 2. Example Step 1: Warming-up Activity

Step 2: *Introduction of the Topic*. This is the second step in the procedure. Here the teacher spells out the target language lesson in relation to a content topic. For example, the use of Personal Pronouns in relation to Ship's Organization. A smooth transition from the "warmer" used in the first step to this step must be ensured by the teacher.

Step 3: *Objective Setting*. In the third step, the teacher introduces the objectives of the lesson. It is to be remembered that these objectives coordinate with the objectives specified in the Instructor's Guide for Maritime English. The next slide (Figure 3) shows how Step 2 and Step 3 can be done.

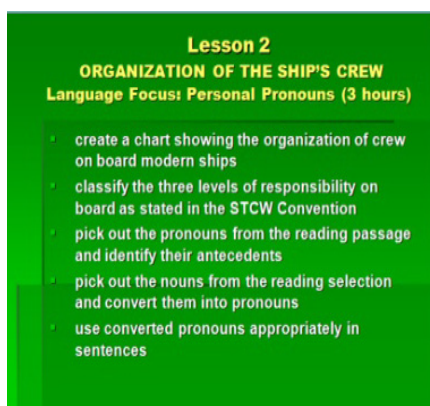


Fig 3. Example of step 2 and 3: introducing the topic

3. He did not notify the coastguard when he left the **traffic separation scheme**, diverted the tanker and passed through the **inbound traffic lane**.

4. The coastguard on duty did not monitor the progress of Exxon Valdez by radar and of the **impending danger**.

5. Capt. Hazelwood could not tell from the radar screen whether there are growlers and they discussed of **skirting** some ice.

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Fig 4. Example of step 4: vocabulary input

Step 4: **Vocabulary Input**. This step introduces salient terminologies related to the content (maritime) topic. Examples for the language input can be extracted from these terms. This step can be done by using varied vocabulary building strategies such as using context clues, word puzzles, question and answer activity, and many others. The slide on the next page (Figure 4) illustrates how this step could be done. As seen on the example, the terms were unfolded using context clues as a strategy in building up vocabulary.

Step 5: **Collaborative Activity**. This step is the heart of the process. Instead of the usual board-talk and lecture method, the students, having been divided into small groups, are given activities to read and discuss within their groups. The activities given to the groups may be varied based on the topics that need to be covered for a certain period of time. In grouping, students are classified according to their mental capacity and are equally distributed. In each group, a leader and a scribe are assigned. The leader facilitates the discussion and sees to it that every member is given equal chance to share his ideas. The scribe takes note of everything that transpires during the discussion. The following pictures show the students in their collaborative activity:



Fig 5. Pictures of students in their collaborative Activity

Step 6: **Production**. Prior to the group activity, each group is instructed to bring their own laptops which they should use during the production phase. In this phase, each group was required to produce a computer-generated presentation of the topic/activity assigned to them. A computer-generated presentation, in this context, is a simple output in Power-point form with attachments downloaded from online sources such as pictures, videos, animated diagrams, graphs, charts, or any form of graphic aid which can help “visualize” the concepts covered in their topic assignment. After the actual preparation of the initial work in the classroom, the group may be given two more days to prepare their outputs and to have them ready for presentation the following meeting. It is to be emphasized that in this phase, the students work closely with the subject instructor in case assistance and advice is needed. In the conduct of the group activity, the subject instructor goes around to check on the initial outputs of the different groups. Should more time be needed, s/he should be ready and open to entertain the students for professional advice. She may offer his/her suggestions for a better output. The following pictures show some samples of the students’ outputs:

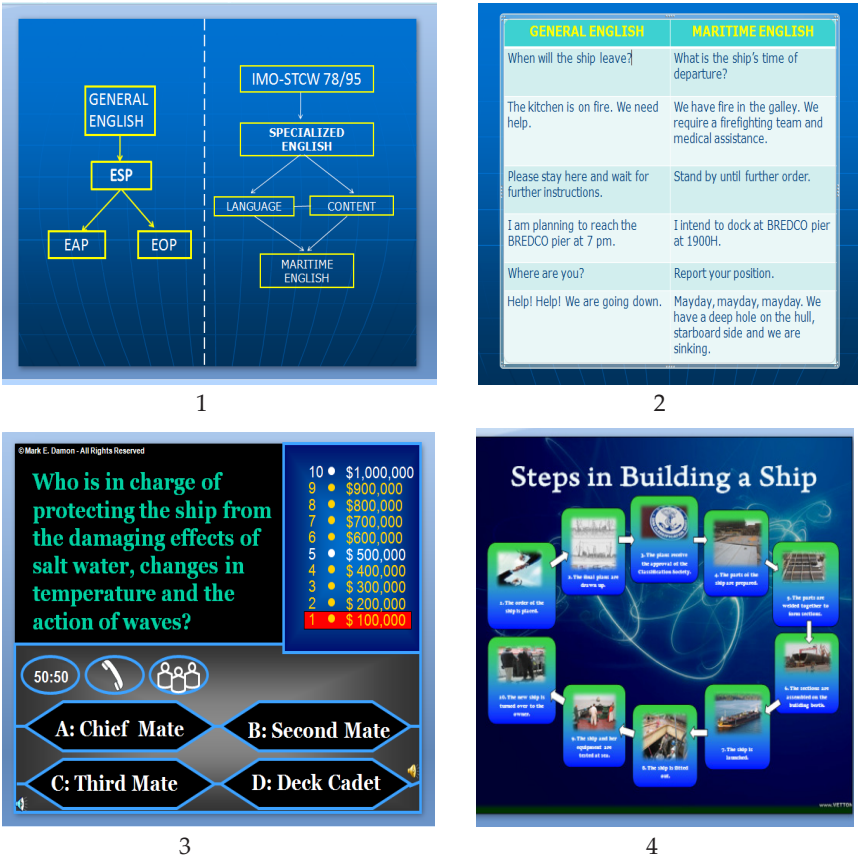


Fig 6. Sample Outputs of Students after the Collaborative Activity

Slide 1 of Figure 6 shows a sample output of one group given this problem: “Create a graphical presentation showing how Maritime English has evolved. Use the notes provided on page 6 of your handout.” Shown on slide 2 is another group’s presentation of the difference in the use of terms and phrases between General English and Maritime English. On Slide 3 was a game created by another group in line with their assigned topic, “Ship’s Maintenance”. The game, as seen on Slide 3 of Figure 6 is inspired by the famous television game show “Who Wants to be a Millionaire.” This output is interesting because it was created complete with sound and visual effects. Finally, Slide 4 is another

group's visualization of the "Steps in Building a Ship". This output presents the steps in the form of a flowchart.

Step 7: *Output Presentation and Critiquing.* In this step, all groups are tasked to present their group outputs in front of the class using their own laptops. For this purpose, an LCD projector and auxiliary sound device can be set up in advance. These devices will project all added materials the students may have added in their presentation.

A conducive venue and atmosphere must be set for this purpose. Critiquing may be done by the entire class. Comments, questions, and reactions will be facilitated by the subject instructor. Contents of the presentations will also be confirmed based on the handout given out to the entire class prior to the activity. Moreover, the subject teacher as well as the whole class should provide suggestions for the improvement of the outputs presented. All groups will be asked to revise and improve their computer-generated outputs based on the suggestions made and to submit these materials at a specific deadline.

Figure 7. below shows the students in their output presentation. All groups are given a fixed time allotment to present their work.

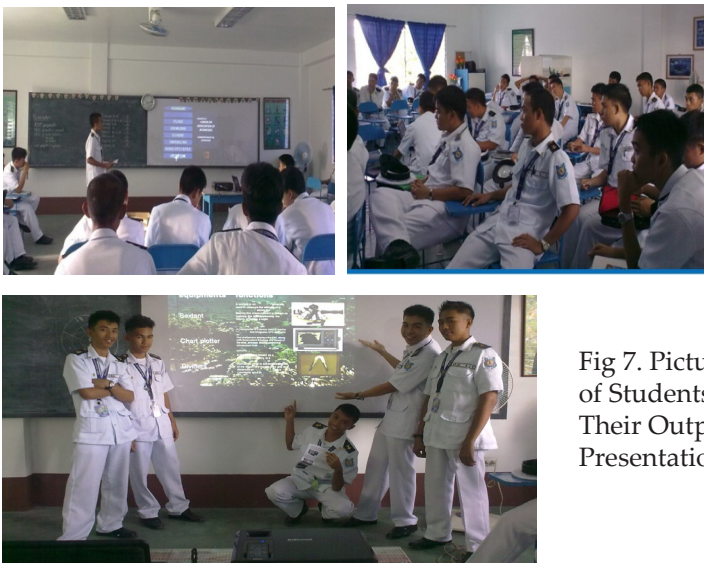


Fig 7. Pictures of Students in Their Output Presentation

Step 8: *Evaluation*. The final step of the proposed format is done to test or evaluate the extent of understanding of the entire class on the topics presented. This can be done by giving varied types of evaluative activities such as short quizzes, summative tests, quiz bees, oral recitation, or interactive discussion with the subject instructor.

RESULTS AND DISCUSSION

Academic Performance Before and After the Intervention

The first aim of the study was to find out if there had been a significant improvement on the academic performance of the students after their exposure to the Computer-Assisted Collaborative Learning (CACL) Model in comparison with those classes taught using the traditional approach to teaching. Table 1 below shows the data for the groups of achievers (BSMT 1-Polaris and BSMT 1-NSA) and non-achievers (BSMT 1-Half Hitch and BSMT 1-Marline Spike).

Table 1 Pretest and post test results

Group	N	Mean		SD	Sig. (2-tailed)	Interpreta- tion
BSMT 1-POL (CACL)	38	Pre	39.6053	.73	.000*	Significant
		Post	47.4211	.57		
BSMT-NSA (TM)	19	Pre	43.4211	1.23	.000*	Significant
		Post	51.5263	.86		
BSMT 1-HH (CACL)	40	Pre	34.5263	5.53	.000*	Significant
		Post	42.2105	6.36		
BSMT 1-MS (TM)	42	Pre	31.9250	6.31	.000*	Significant
		Post	38.7250	6.63		

Data shown in Table 1 reveal a significant improvement on the academic performance of the students in terms of their pretest and post test for both control and experimental groups. The mean score of BSMT 1-Polaris in the pretest was 39.6053 which significantly

increased to 47.4211 in the post test. Moreover, the mean score of BSMT 1-Half Hitch which was 34.5263 in the pretest increased to 42.2105 in the post-test. Both groups were exposed to Computer-Assisted Collaborative Learning Model before they were given the post test. Meanwhile, BSMT 1-NSA and BSMT 1-Marline Spike also showed a significant improvement in their mean scores after they were exposed to the Traditional Method of instruction. It can be surmised then that while the CACL Model had significantly improved the academic performance of the experimental groups after the intervention, the traditional method had also significantly improved the academic performance of the control groups in the traditional setting.

Traditional Method (TM) vs. Computer-Assisted Collaborative Learning (CACL)

The second concern of this paper was to determine if there had been a significant difference between the academic performance of the experimental groups and the control groups of students classified as achievers and non-achievers after their separate exposure to the two methods. To find out which method has more significantly improved the academic performance of students, data from the results of the Mid-term Examination, the summative test, and the post test were further analyzed using the t-test for independent means. Results of these analyses are shown in Table 2, 3, and 4 respectively.

Table 2. Examination results of the control and experimental groups

Group	N	Mean	SD	Sig. (2-tailed)	Interpretation
BSMT 1-POL (CACL)	38	39.9211	4.78952	.194	Not Significant
BSMT 1-NSA (TM)	19	41.3158	3.14559		
BSMT 1-HH (CACL)	40	36.7632	4.98882	.000*	Significant
BSMT 1-MS (TM)	42	32.4500	4.83550		

Data from Table 2 reveals that the difference in the scores of the academic achievers (BSMT 1-NSA and BSMT 1-Polaris) in the control and experimental groups was not significant. The data indicates that BSMT 1-Polaris had performed as better as the BSMT 1-NSA group in terms of their scores in the mid-term exam.

Table 2 further reveals a significant difference on the academic performance between the groups of non-academic achievers (BSMT 1-Half Hitch and BSMT 1-Marline Spike) in terms of their mid-term examination results. Students from BSMT 1-Half Hitch who were exposed to the CACL method showed a significant advantage in terms of their mean score over those from BSMT 1-Marline Spike who were exposed to the Traditional Method of instruction. Based on this evidence, we can then say that the CACL method has been found more effective than the TM method in terms of the students' academic performance of the groups of non-achievers as measured by their examination results. This could mean that exposing the students who are not academically advanced to computer-generated materials and providing them opportunity to work collaboratively with their classmates and their teacher could significantly improve their ability to score in the exam. The same case can be observed in Table 3 below on the basis of the students' summative test results.

Table 3 Summative test results of the control and experimental groups

Group	N	Mean	SD	Sig. (2-tailed)	Interpretation
BSMT 1-POL (CACL)	38	66.8158	5.20839	.983	Not Significant
BSMT 1-NSA (TM)	19	66.8421	4.03131		
BSMT 1-HH (CACL)	40	58.0526	6.97465	.000*	Significant
BSMT 1-MS (TM)	42	51.2500	7.63847		

An extended analysis of the post test results revealed a significant difference between the academic performance of the experimental group and the control group of students classified as achievers and non-

achievers. Between the groups of academic achievers (BSMT 1-Polaris and BSMT 1-NSA), students who were exposed to the Traditional Method (BSMT 1-NSA) significantly performed better than those who were exposed to the Computer-Assisted Collaborative learning (BSMT 1-Polaris). A possible explanation for this was the disadvantage on the latter in terms of number of students in the class. BSMT 1-Polaris was composed of 38 students while BSMT 1-NSA only had 19 cadets. The lesser number of students in the BSMT 1-NSA group could have favored them to focus more on the lesson and to be given adequate time to individually interact with the teacher who provided most of the instruction. Data for this are shown in the following table.

Table 4. Post test results of the control and experimental groups

Group	N	Mean	SD	Sig. (2-tailed)	Interpretation
BSMT 1-POL (CACL)	38	47.4211	3.533080	.000	Significant
BSMT 1-NSA (TM)	19	51.5263	3.74712		
BSMT 1-HH (CACL)	40	42.2105	6.35507	.020	Significant
BSMT 1-MS (TM)	42	38.7250	6.62933		

This was not the case, however with the two other groups of non-academic achievers (BSMT 1-Half Hitch and BSMT 1-Marline Spike). Although the difference in their academic performance as measured by their post test results was found to be significant, this significant difference worked in favor of BSMT 1-Half Hitch who were exposed to the CACL Model of instruction. It seems to tell that the CACL method appeared to be more effective to classes composed of non-achievers rather than those who are already academically advanced.

To sum up, findings from the study revealed that the control groups for both academic achievers and non-achievers have significantly benefited from the Traditional Method. Moreover, both classes of achievers and non-achievers who were exposed to the CACL method have also significantly improved in their academic performance.

Results from the mid-term examination and the summative test revealed a non-significant difference on the academic performance of academically advanced students after their separate exposure to the Traditional Method and the Computer-Assisted Collaborative Learning Method. For the groups of non-achievers, however, it was revealed that the students who were exposed to the CACL method have significantly scored higher than those who were taught using the Traditional Method.

Data from the post test, on the other hand, revealed a significant difference on the academic performance between the groups of academic achievers and between the groups of non-achievers after their separate exposure to the Traditional Method and the Computer-Assisted Collaborative Learning method. The significant difference on the ability to score in the post test between the groups of academic achievers worked in favor of those in the control group who were exposed to the Traditional Method. This finding was attributed to the lesser number of students in the control group which made the instruction more accessible and interactive. The ideal number of students in the control group also favored the students in that they could discuss more closely with the teacher who provided most of the clarifications through the prevailing use of the lecture-discussion method which characterizes the traditional method of instruction.

On the contrary, the significant difference on the ability to score in the post test between the groups of non-achievers worked in favor of those who were exposed to the Computer-Assisted Collaborative Learning Model (Experimental Group). From this finding, it could be derived that less proficient students in terms of their academic performance could benefit more from instruction if they are made to work and learn cooperatively with their classmates through a computer-assisted form of instruction. The use of graphically presented materials could also improve their ability to understand the lessons well rather than when these materials are presented to them in pure textual form.

CONCLUSIONS

Teaching is a continuous journey for discovering new methods or a combination of methods that could work best with the kind of learners

that we have in class. As there is no exact prescription for what could work best with our students, teachers should continuously find ways to make learning as effective as possible. As Landow (1999) has put it, “educators are required to incorporate new methods of teaching in the classroom in order to properly challenge and stimulate students”.

Technology has been widely accepted as a useful tool in the teaching and learning process. There has been a growing need for customizing learning in a specific area, enriching learning with communication and connections with others beyond the classroom, offering new learning opportunities, and helping students experience the main value of learning by using knowledge and abilities in real-world situations to improve the future of technology in the classroom. Computer-based or computer-assisted instruction plays an extremely important role in the students’ lives. It may not be able to solve all learning problems, but it could make learning more interactive, it could improve the learning atmosphere, and it could develop social roles as the learners are made to work and learn collaboratively with the rest of the students in class and with the teacher.

McGrath, et al. (2007) pointed out that introducing hypermedia into the collaborative learning environment may lead to improve attitudes, motivation, understanding, and responsibility for one’s own learning. It could also enhance their awareness of the realities of life in which they will find themselves later. Computer-based education has clearly enhanced the classroom environment through extensive technological opportunities that provide students with a wealth of information on particular topics, while instantly examining students’ feedback and establishing areas requiring improvement.

Computer-Assisted Collaborative Learning is not something that we should refuse because it is expensive for the administration and requires a higher level of computer literacy among the teachers. Even with limited resources, teachers could make a difference in their students’ academic performance if they could devote extra time to “befriend the net” and look for interesting materials which could be useful for him/her. We have come to an era when everything is so advanced and where information can be accessed with just a push of a button or by just pressing a few keys on the keyboard. It would be a lot of waste if we allow ourselves to be held back just because we refuse

to embrace technology with an open mind or just because we think it entails a lot of work and we are constrained with time. Landow (1997) points out a good argument for this: "The way teachers are taught to use computer to facilitate learning determines if technology will be a success in the students' achievements." Quality instruction always entails a lot of hard work. We cannot just sit comfortably and let the usual routine take its course and expect for a miracle to work overnight with our students because it really does not work that way. As teachers, we need to advance as the world around us rapidly progresses with our students keeping pace with it.

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Reactions of the Ballast Booster End-Users Toward Filipino Technology and its Implication to Education

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Abstract - The study determined the reactions of Ballast-Booster end-users towards Filipino technology and its implication to education. Specifically, it assessed the demographic profile of Ballast-Booster end-users; evaluated the reactions of ballast-booster end-users; and determined whether their reactions depend on demographic profile. For one-year period, experimental method was applied; the latter part was descriptive method. The findings: majority were of ages 25-52; male; married with children of 1-4; involved in farming; college graduate; refrained from revealing their income; had an annual income of 121,000-240,000 pesos; had extra income in farming; owned some appliances; bought one piece to test whether the product can save money and energy; majority had positive outlook on Filipino inventive products with pro-foreign inclination; cared for the effects of foreign products on national economy; and praised the government with the support program; reactions of respondents did not depend on demographic profile using chi-square test. The study left vital question unanswered. Where did the reactions of respondent

end-users really depend on? Was it innate and naturally cultural? The study implied that national consciousness should be nurtured in Filipino psyche in all levels of Philippine educational systems toward Filipino Technology i.e. the key to national economic productivity.

Keywords - ballast booster, Filipino technology

INTRODUCTION

There is no such term as Filipino Technology but German Technology, American Technology, Japan Technology, etc. However there were and are many Filipino inventors and scientists claiming to have invented something in the field of science and technology. But they are sporadic and undefined. Hence, the coined term Filipino Technology exists. And it must exist to represent the ingenuity and creativity of the Filipino minds especially in the world of technology and product competition.

World War II was already a war in terms of technology and eventually economics. The war between America and Japan was a war over technology and economics ever since. Americans had warplanes, warships, rifles, cannons and so with Japan being known for their "Tora-Tora." When Americans bombed the cities of Nagasaki and Hiroshima, Japan realized a new kind of war. After the World War II, Japan won the new battle in the arena of technology and ultimately economics. Japan today is known globally for their products in motors and cars, agricultural equipments and machineries and almost in every facet of global economics.

The range of education is wide. But its real and practical arena resides and happens ordinarily in the economic life of society. Research in education should not only be confined in the classroom nor in school. It would be significant and full of meaning whenever we deal with people in their everyday living, workshop, office, fields and homes. Then and there, we study how they would use their educational attainment and background with spontaneity. We can assess how deep really the effectiveness of schooling has crept in their

minds and veins; how education has affected their attitudes, thinking and way of life.

In the Philippine setting, there is nothing more problematic for Filipinos than their economic way of life. The representatives of then Second Plenary Council of the Philippines expressed this condition, to quote ...

"Appalling mass poverty is undoubtedly the most tragic aspect of Filipino life. It is the social problem. In part, this poverty is attributed to a sheer lack of productivity in our economy."

Schooling and education has many things to say in the poverty of majority of Filipino people as well as the richness of the few and the overall poverty of the nation. Beneath this phenomenon, it would be great to focus our attention with the present attitude of modern Filipinos. In the present attitude of modern Filipinos, deep seated are the influences of their previous and background of education.

Today in fact there are many factors affecting the economic attitude of the present time Filipinos. The Philippine Constitution for those who are familiar basically speaks of National patrimony which promotes love for the country by giving priority for Filipinos over the foreigners and boosting the Filipino spirits for productivity. The Department of Education and Commission on Higher Education make as their mission to promote in the hearts and spirits of Filipino students the values of nationalism and patriotism.

But there are discrepancies. In the Philippine schools and its systems, proper education as to the right knowledge of developed Philippine economics is lacking and missing, so much a paper mission. In the governance of the State, the present administration as well as lots of previous administrations has no clear vision of effective and productive national economics. If it were so, national poverty could not be felt for so long a time. Majority of Philippine presidents had mistaken democracy away from patriotism and independence. Foreign investment has become the solution for the poverty of the nation. And what is prevailing in the Philippine market for so long is but the clear dominance of foreign products, foreign owned manufacturers, foreign

investors and their investments. In short the prevailing practice is pro-foreign rather than nationalist and patriotic.

The economic practice and system in the Philippine setting is depicted thus in a diagram.

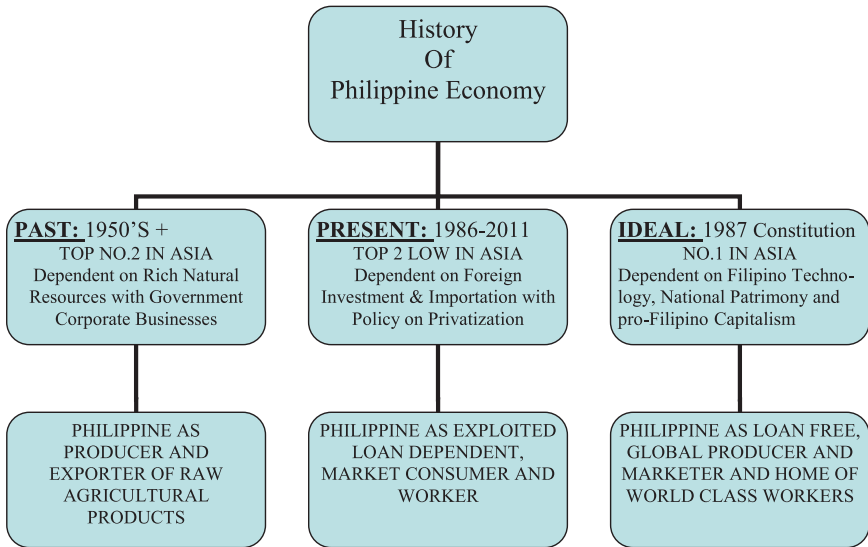


Fig. 1. A diagram on the history of Philippine economy

To exert our effort with research on companies promoting pro-foreign products like what is happening in typical and stereo-typical Economics, Marketing, or Business Management courses is so much. Now, it is time to deal with research dealing with the attitudes of Filipino end-users of a particular Filipino product. It is very exciting to know from them why of all products, they had chosen locally made one. It is very unpopular from them to choose Filipino products over imported ones. We do not know what is in their mind and where they get such an attitude, hence this study.

OBJECTIVES OF THE STUDY

This study determined the reactions of Ballast Booster end-users of Central Isabela residents towards Filipino technology and its implication to education.

MATERIALS AND METHODS

Research Design

The research method applied in this study is a novelty for the early period of the process of the study; the middle and concluding part are conventional. Since the product or specimen used for research study was not yet functional in the local market, the researcher himself actively joined in promoting the product. After more than a year of marketing and having sufficient and enough end-user respondents, the research study had resumed. There was a kind of experimentation since a year of observation with the product was needed before any research exploration took place. As defined by Chaplin (1975) "Experimental Method is the technique of discovering information by means of experimentation."

In gathering data, the researcher employed descriptive-normative survey method as the requirement of one-year of observation with the experimental object was met. According from Good and Scates (1972), this method is used for organizing, interpreting, and reporting the present status of certain events and actual systems as well as structures prevailing at the moment. It concerned itself with cross-examining the present situation necessary for closer study. It delves itself determining the conditions that prevail in group of cases and type of people chosen for study. It is also a method in getting the quantitative description of the general characteristics of the group. They claimed that this type of research is helpful in giving pertinent information to persons/researchers who are interested in finding the present trends and tendencies. Similarly, Best (1963) remarked that "descriptive research describes and interprets what is. It is concerned with conditions of relationships that exist; practices that prevail; beliefs that persist, processes that are going on; effects that are being felt and trends that are developing."

Questionnaire

The paper questionnaire was the primary instrument for gathering data. It was intended to have information about the personal profile of the end-user respondent. The check-response type was used to make it convenient in the part of the respondents with the aim of getting

their actual and practical knowledge and internal attitude. Interview was used after the questionnaire was answered during retrieval.

Exhibits and Demos

Even before the questionnaires were floated, the researcher himself experienced giving demonstrations and joining in exhibits in trade-fairs an occasion whereby people ask questions about the product and being informed about the product. For a new product to be patronized in the market a lot of explanations were needed and lots of questioning were thrown.

Locale of the Study

The venue of the research was in Central Isabela which consisted of the towns of Cauayan (now a city), Luna, Cabatuan, Reina Mercedes and Naguilian. These towns have people of different cultures and mind sets. From these various end-user respondents, it was good to get how they valued or what really was their basic attitude towards Filipino Technology and national patrimony based from their attitudes with the product, an invention of a Filipino Inventor.

Respondents of the Study

With limited consumers of Ballast Booster product, at least seventy-two persons were end-user respondents. The study made use of total enumeration as statistical basis.

Instruments Used in the Study

The questionnaire and interview techniques were used to gather the data needed.

The researcher first asked permission from the authorities concerned before floating questionnaires. After permission was granted, he distributed questionnaires to the respondents. Distribution of questionnaires was done only after a year of observation with the product. Upon retrieval, interview took place. Information about the

marketed product and its impact on them was discussed. The gathered data and subsequent responses from the respondents will be tallied, tabulated and analyzed to answer the specific questions of the study.

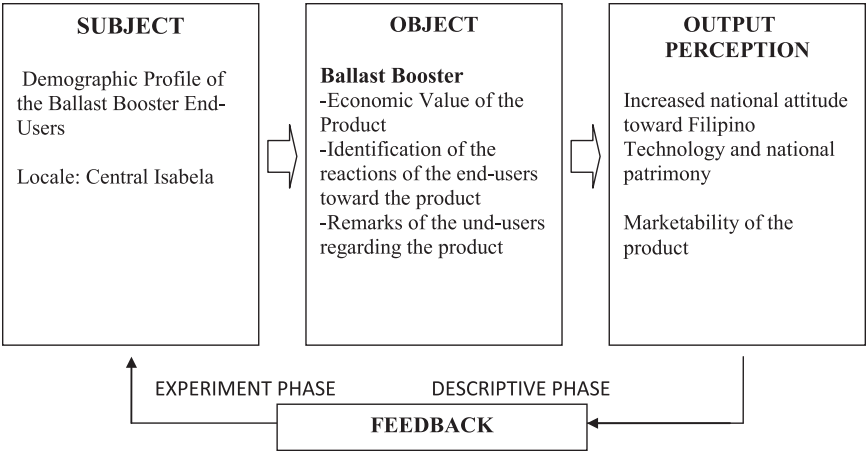


Fig. 2. Conceptual Framework

Statistical Treatment of Data

In the analysis of the data gathered, the researcher made use of the following statistical tools: Frequency and Percentage Distribution and Analysis; Ranking (Ranking proceeded from the most to the least when three or more brackets or ranges were there. Plurality was acknowledged to represent majority especially when there were more end-user respondents abstained from answering the given questions. However, there were trends of similarity; these were taken as signs to represent the majority; and Chi-square was applied in testing the hypothesis

RESULTS AND DISCUSSION

1. Demographic Profile of the Respondents

As to the demographic profile of the end-user respondents, majority were: of ages from 25 to 52; male; married with children of 1

to 4; involved in farming; college graduate; refraining from revealing their income; having an annual income of 121,000 to 240,000 pesos; having an extra income out of farming activities; owned appliances like Cable T.V., stereo/radio/ karaoke, refrigerator and electric fan; buying only one piece; and wanting to test the product whether they can save money and energy.

Table 1. Frequency and percentage distribution of the reactions of respondents according to 3 Variables/Issues

A. Knowledge and awareness of the existence of the product	Yes	%	No	%
1. Know the product purchased is a Filipino invention.	70	97	2	3
2. See the products in hardware or electrical supply.	20	28	52	72
3. Aware something about Filipino inventions.	60	78	11	22
4. Believe to such thing as "Filipino Technology".	64	88	8	12
5. Care if the product bought is made in the Philippines or not.	63	87	9	13
6. Convince local product is not classy and lesser in quality vs. imported.	30	42	42	58
7. Accept if product is local, it is lesser in quality and durability	30	42	42	58
8. If the product is imported, it is original.	30	46	42	58
9. Importing technology from abroad like Japan, USA and Europe is good.	33	46	38	53
10. Become classy when one buys imported goods.	52	72	20	28
11. Know the inventor of Fluorescent light is a Filipino, Agapito Flores.	58	80	14	20
12. Trust in Filipino (inventor).	72	100	0	0
13. Mind to know the inventor of the product and its origin.	63	87	9	13
14. Care to know the Capitalist who backed up the production.	63	87	9	13

Continuation of Table 1

15. Conscious to differ between Filipino and Chinese as product distributor.	57	79	15	21
16. Trust if a product is made and produced by Filipinos.	68	94	4	6
17. Acknowledge the new product is better of service than the old one.	65	90	7	10
18. Understand new technology is costly but durable and saver.	50	69	12	31
19. Learn a new product has advantage and solution left undone by old.	68	94	4	6
20. Aware of the warranty and guarantee trademark of the product.	70	97	2	3
21. Read the warranty and guaranteed life span of the product is long.	54	75	18	25
22. Care for the accessibility of outlet even if the product is disposable.	30	42	42	58
B. Economic Global Issues	Yes	%	No	%
1. Care if product has patent, national or international	58	80	13	18
2. Understand issues on APEC and its effect on Philippine economy.	58	80	14	20
C. Government Economic Program and Support for Filipino Technology	Yes	%	No	%
1. Acknowledge the value of Government support to Filipino inventors.	67	93	5	7
2. Realize the government support to the production of national products.	53	74	19	26
3. Aware of the Phil. Govt. priority on pro-foreign investment/industry.	58	81	14	19
4. Thank the government for putting up Duty-free Philippines.	65	90	7	10
5. Remember mention of Filipino inventors in Science classes in school.	50	69	20	28
6. Reminisce schools to teach something on National/Filipino Technology.	59	82	12	17

As to knowledge and awareness of the existence of the Filipino product, majority or more than 50% of the respondents had a positive outlook with pro-foreign inclination as regards quality, durability, originality and classy and accessibility i.e. 44%; as to knowledge of

economic global issues; majority or 58% cared for the effects on national economy; and as to government economic program and support for Filipino technology, majority or 55% praised the government with pro-foreign inclination to the establishment however of Duty-Free Philippines i.e. 65%.

3. Chi-Square Results on the reactions of the end-users of Ballast Booster according to three categories

Table 2. Chi-Square Analysis between the Respondent's Reaction and the Different Variables

Variables (Demographic Profile)	Chi-Square Value (with and without continuity correction factor)		Degree of Freedom	Tabular Value	Decision	Interpretation
1. Age						
A. Existence of Filipino Technology	0.000		2	5.59	Accept Ho	Reaction does not depend on age
B. Global issues	0.292					
C. Government support for Filipino Technology	0.338					
2. Sex						
A. Existence of Filipino Technology	0.058	0.002	1	3.84	Accept Ho	Reaction does not depend on sex
B. Global issues	0.021	0.213				
C. Government support for Filipino Technology	0.005	0.065				
3. Occupation						
A. Existence of Filipino Technology	2.630		3	7.82	Accept Ho	Reaction does not depend on occupation
B. Global issues	2.933					
C. Government support for Filipino Technology	0.772					

Continuation of Table 2

4. Civil Status						
A. Existence of Filipino Technology	0.047	0.025	1	3.84	Accept Ho	Reaction does not depend on civil status
B. Global issues	0.006	0.101				
C. Government support for Filipino Technology	0.149	0.001				
5. Number of Children						
A. Existence of Filipino Technology	0.052	0.374	1	3.84	Accept Ho	Reaction does not depend on number of children
B. Global issues	0.375	1.056				
C. Government support for Filipino Technology	0.375	1.056				
6. Educational Attainment						
A. Existence of Filipino Technology	0.001	0.080	1	3.84	Accept Ho	Reaction does not depend on educational attainment
B. Global issues	0.313	0.081				
C. Government support for Filipino Technology	0.035	0.288				
7. Income						
A. Existence of Filipino Technology	0.013	0.117	1	3.84	Accept Ho	Reaction does not depend on income
B. Global issues	0.008	0.248				
C. Government support for Filipino Technology	0.008	0.248				

Continuation of Table 2

8. Number of product's bought						
A. Existence of Filipino Technology	0.027	0.398	1	3.84	Accept Ho	Reaction does not depend on the no. of products' bought
B. Global issues	0.005	0.297				
C. Government support for Filipino Technology	0.050	0.084				
9. Purpose						
A. Existence of Filipino Technology	0.169	0.001	1	3.84	Accept Ho	Reaction does not depend on the purpose for buying
B. Global issues	0.072	0.510				
C. Government support for Filipino Technology	0.005	0.065				

As to the reactions of the Respondents regarding the existence of Filipino technology, economic global issues, and government economic program and support towards Filipino Technology when grouped according to demographic profile such as age, sex, civil status, occupation, number of children, educational attainment, income, quantity of product bought, and purpose in buying the product; using the chi-square test, the result was: the chi-square value of all the data of different variables were very much lower than the tabular value; hence, the respondents' reactions did not depend on demographic profile.

CONCLUSIONS

The following are the conclusions:

The personal variables have no bearing on the perceptions of the respondents on Filipino technology. The study therefore left a vital question unanswered i.e. where did the reactions of respondent end-users really depend on? Were those reactions innate and naturally cultural? This study therefore implied that a national consciousness

should be conceived, implanted and nurtured in Filipino psyche in all levels of the Philippine educational systems toward Filipino Technology which is the key toward national economic productivity.

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Occurrence of Soft and Hard Corals at Igang Bay and Villa Corazon, Nueva Valencia, Guimaras, Philippines

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Abstract - The distribution of soft and hard corals is due to prevailing environmental conditions, coral anatomical features and structural composition and presence or absence of predators and competitors. The study determined the occurrence of soft and hard corals in Igang Bay, Nueva Valencia, Guimaras, Philippines. Ocular survey was conducted at front beach of Villa Igang and transect – quadrat sampling was carried out. . The results showed that soft corals found in Igang Bay include the genera *Lobophytum*, *Radianthus*, *Sarcophyton*, *Sinularia* and *Xenia* and hard corals include those that belong to *Acropora*, *Coeloseris*, *Coscinaraea*, *Favia*, *Favites*, *Fungia*, *Lonophyllia*, *Millepora*, *Montipora* and *Porites* genera. Hard corals had a greater cover with a total of 38.94% while soft corals had 3.33%. In each transect, hard corals occupied more space than soft corals. There were 6 colonies for hard corals and none for soft corals. Physico – chemical conditions, particularly the salinity did not vary between three sampling points with a value of 29 ppt. and the temperature between surface and bottom had an average of 31°C and 31.7°C. The water depth ranged

from 0.9 to 1.1 meters. Generally, the substrate type was rocky and sandy with presence of some coral rubbles in some portions along the transect lines.

Keywords – hard corals, soft corals, salinity, temperature, Igang Bay

INTRODUCTION

The distribution of soft and hard corals vary from place to place due to several factors including the prevailing environmental conditions, coral anatomical features and structural composition and presence or absence of predators and competitors. Because they both require about the same environmental conditions to survive, soft and hard corals are competitors for space on the reef.

Environmental factors like temperature, water velocity, water depth, water transparency and the shape of the shoreline or coast were observed to have an effect on coral cover and number of colonies of both hard and soft corals (White, 1987; Veron, 1986).

Hard corals usually thrive in an area where there is good illumination and water clarity. Good illumination is necessary because hard corals harbor photosynthetic algae that incidentally also gives color to the coral tissues. These algae, called zooxanthellae, provides up to 98% of coral nutrition and would allow faster deposition of calcium carbonate (CaCO_3) in hard coral skeletons (Chalker et. al., 1986).

Soft corals are usually found in deeper waters, in low intertidal rocks, under ledger or in crevices (White, 1987; Thurman and Weber, 1984). Hard corals have calcium carbonate exoskeleton which effectively protects the polyps. When retracted, the polyps project little above the skeletal platform and are thus difficult for most fishes and other predators to remove (Barnes, 1980).

Soft corals which are also called leather corals because of the leathery texture of their colonies, may resemble hard corals with the fleshy coenecyme mass acting as substrate for the colony instead of calcium carbonate that hard corals have (Barnes, 1980).

Although both possess certain defense mechanisms in competing for space, they can not always protect themselves against their predators. Predators of hard and soft corals have adapted themselves to

the harmful or toxic effects of those coelenterates. Common predators of hard corals are parrotfish, crowns of thorns starfish, mollusks and crabs. Soft coral predators include the egg cowrie (*Ovula ovum*) and the aeolid nudibranch *Phyllodesma longiciera* (on *Sarcophyton*).

Soft corals kill hard corals by simple overgrowth (Nishihira, 1981) or through chemical substances which are believed to be toxic (Coll and Sammarco, 1986). On the other hand, hard corals are observed to cause tissue lesions on soft corals (Coll and Sammarco, 1986).

Despite the similar environmental requirement of hard corals, there may be certain environmental conditions that favor the proliferation of one over the other. This is coupled with their defense mechanisms, particularly against one another; may bring about the dominance of one against the other in a site.

FRAMEWORK

Although soft and hard corals require relatively the same physico-chemical parameters (White, 1987), it has been found that each (soft or hard corals) has certain mechanisms for survival and defense over the other. These mechanisms may directly and/or indirectly determine the soft and hard coral cover and number of colonies in an area.

Competition for Space. Studies have shown that soft corals and hard corals inhibit the growth of one another through certain mechanisms.

The studies of Nishihira (1981) revealed that soft corals kill many species of hard corals by simple overgrowth. Conducted after the devastation of a coral community by the crown of thorns starfish *Acanthaster planci*, the study intended to observe interspecific interactions between soft and hard corals in recolonizing the community. The presence of hard corals overgrown by soft corals like *Sinularia*, *Lobophytum* and *Sarcophyton* was observed.

Soft corals are also known to kill, retard growth and cause tissue necrosis in hard corals through secretion of terpenoid toxins (Coll and Sammarco, 1986). Most of the soft corals affected were *Pavona*, *Porites* and *Acropora*. Studies showed that pure terpenoid compounds from soft corals killed both *Porites andrewsi* and *Acropora formosa* at very low concentrations of less than or equal to 10ppm (Coll and Sammarco, 1986). Another study conducted by Coll and Sammarco (1986) showed that terpenoid toxins secreted by soft corals affect the recruitment rate of

hard corals. They observed that hard corals have different recruitment responses with respect to the location of soft corals and wave current. Hard corals growing down current from soft corals have lower recruitment or survival rates than if the water direction is vice versa.

Hard corals, on the other hand, have elaborate mechanisms against their competitors like soft corals (Coll and Sammarco, 1986) an even other hard corals (Lang and Chornesky in Dubinsky, 1990). Some hard corals, e.g. *Pectinia* have long filaments that are capable of extracoelenteric digestion, while some possess sweeper tentacles e.g. *Goniopora* that can extend up to 15 cm. (Lang and Chornesky in Dubinsky, 1990). These mechanisms kill neighboring sessile organisms such as soft corals and even other species of hard corals.

Although soft corals have none of these hard coral apparatus, other mechanisms protect them from hard coral tentacles, a soft coral may secrete a polysaccharide layer which can overgrow living hard coral tissue. When a soft coral is in contact with another coral whether hard or soft, it bends away from this potential space competitor (Coll and Sammarco, 1986).

Reproduction, Dispersal and Survival

Soft and hard corals have a diverse set of reproductive options, both sexual and asexual. According to Sammarco (1986), their propagules-body parts capable of growing into a new organism have different dispersal capabilities. The settlement and growth of *Acropora* propagules are affected by physical (e.g. strong water current and illumination) and predation and competition factors.

Soft corals reproduce sexually in two ways: (1) as externally fertilized on the surface of the coral, and (2) as externally fertilized eggs developed planktonically in the water column. Asexual reproduction is via colony growth, fragmentation, or formation of stolons or runners. A stud has showed that soft corals ensure the survival of their propagules by first secreting toxic metabolites prior to ovation (Coll and Sammarco, 1986). These toxic metabolites were found in high concentrations in the eggs of soft corals *Sinularia* sp. and *Lobophytum crassum*. Brooding, reproduction of sticky eggs, toxic young and rapid growth all help to restrict predation on the settling and recently settled young of sessile soft forms (Lang and Chornesky in Dubinsky, 1990).

Hard corals reproduce sexually by external fertilization followed by brooding of larvae within polyps. Both external and internal fertilization of propagules pose a major problem for organisms attached to reefs. Where currents are strong, gametes disperse quickly and this inhibits fertilization of gametes.

According to Sammarco (1986), patterns of coral distribution is genus-specific and based on reproductive modes but the actual dispersal distances of larvae is still unknown. He has also observed that the mortality rate of hard corals were higher inshore due to high sedimentation rates and salinity variation and also in shallow water on the outer shelf where wave action inhibits planulae or planktonic larvae settlement. According to Veron (1986), the fates of planules depend on the prevailing currents and their ability to find unoccupied substratum. Planulae of hard corals may drift for days, weeks or months and cover great distances searching for unoccupied space before they detect (probably by chemical means) the proximity of substrate.

Predation

Soft corals have defense mechanisms against predators which are absent in hard corals. Chemical analysis showed that soft corals are nutritionally rich enough in proteins, fats and carbohydrates to serve as food for other organisms but studies have shown that incidence of predation is lower in soft corals than in hard corals. This is traced to the ability of Alcyonarians to secrete terpenes which are volatile toxic substances. Less toxic soft corals bear physical defenses against predators: Sarcophyton can retract its polyps completely inside the surface layer of the colony. Others like *Sinularia dura* bear spicules aside from being retractile (Coll and Sammarco, 1986).

These physical and chemical defenses as some specialized predators feed on highly toxic species of soft corals. The egg cowrie *Ovula ovum* feeds exclusively on Sarcophyton. This gastropod is capable of transforming highly toxic Sarcophyton into less toxic compounds without ill effects. The aeolid nudibranch *Phyllodesma longicirra* stores toxins from Sarcophyton trocheliophorum in long, tubular projections on its back, called cerata. This voluntarily autotomized appendage is used to ward off predatory fish by being used as toxic projectile (Coll and Sammarco, 1986).

Hard coral polyps which seem invincible due to their ability to retract into their calcareous skeletons are not free from predators. Parrot fishes have teeth adapted to biting off and then crushing pieces of hard corals or scraping off polyps. The *Acanthaster planci* and the gastropod destructive outbreaks on some reefs as record in several such incidents in the Great Barrier Reef of Australia (Endean and Jones, 1976).

There is a stiff competition for survival between soft and hard corals as both organisms have relatively the same environmental recruitments. Soft and hard corals have other as well as unique mechanisms to adapt themselves to the prevailing environmental conditions and protect themselves against predation. Reports have shown that soft corals seem superior over hard corals in competing for space, reproduction and in deterring predation, yet soft corals do not dominate the whole area due to their specialized predators (Coll and Sammarco, 1986) and shorter lifespan (Nishihira, 1981). Like any other sessile organisms, corals are subject to environmental and other conditions and according to whether these are favorable or not, may either proliferate to dominance, compete in order to survive, or by larval or other types of propagation, wait to be resettled in another site.

OBJECTIVES OF THE STUDY

The main objective of this research was to compare the cover of soft and hard corals at Igang Bay and Villa Corazon, Nueva Valencia, Guimaras. The specific objectives are: (1) To determine if there is a difference between the cover and number of colonies of soft and hard corals in the study sites; (2) To compare the difference between coral cover and colony between the two sites; and, (3) To determine the physico-chemical condition of the sampled areas.

The results of this study may serve as baseline information for future coral researches, by pinpointing a site at Igang Bay, where hard or soft corals predominate. This may also give useful data for future studies regarding hard and soft coral interaction.

MATERIALS AND METHODS

The Study Sites

The study sites were located at the Igang Bay and Villa Corazon, Villa Igang, Nueva Valencia, Guimaras. Igang Bay, with a total area of approximately 200 and 250 square meters, respectively (Figures 1A-C). Igang Bay is located at the front beach of Villa Igang Beach Resort bounded by land on northern, eastern and western sides and open on southern (Figure 1A) while Villa Corazon is located at the southeastern part of Villa Igang and bounded by land on northern side and open sea on eastern, southern and western sides (Figures 1B and C).



Figure 1. Igang Bay (A); Villa Corazon (B & C) sampling areas

Sampling Procedure

Ocular surveys were conducted at Igang Bay and Villa Corazon where Transect – quadrat sampling was carried out on July 24, 2009 and October 24, 2009, respectively. Physico – chemical factors such as temperature, salinity and water depth were obtained. Coral cover and colony were determined through the line transect – quadrat method. A 1m x 1m quadrat divided into 25 squares with each square covering 4% of the total quadrat surface was placed in such a way that one side of the quadrat aligned with the transect line (Figure 2C).

Three 50-meter transect line were laid in each sampling site (Figures 2A-F). The 0-point of each transect line was the point nearest the shore where corals are present. Five quadrats placed at 10-meter intervals were taken n each line, thus a total of 15 quadrats were taken in each site.

Distinguishing between soft and hard corals

Field identification of soft and hard corals was based mainly on touch and feel method. The absence of a hard skeleton and the presence of a fleshy base distinguish a soft coral from a hard coral. The polyps of hard corals have tentacles in factors of 6 while soft corals have tentacles in factors of 8 (Thurman and Webber, 1984). Other characteristics of soft and hard corals (e.g. size, shape and color) described by Thomson (1931) and Vernon (1986) were also used.

Computation of percent (%) cover

Descriptive statistical methods was used to get % cover.

$$Cs = (qns \times 0.04) / 15 \times 100$$

$$Ch = (qnh \times 0.04) / 15 \times 100$$

Where : qns = number of grids occupied by soft corals
 qnh = number of grids occupied by hard corals

0.04 = given value for each grid

15.0 = given value in 15 quadrats

25	grids / quadrat
x15	quadrats / area
375	grids in 15 quadrats

375 grids x 0.04 given value = 15 given value in 15 quadrats

The physico – chemical parameter

With a laboratory thermometer, surface and bottom temperatures were taken at the 25meter mark of each transect line, during the sampling period (Figure 4).

Other physico – chemical conditions like salinity, water depth and type of substratum were determined with the use of a hand refractometer and visual feel.

Sampling Procedures

Three transect lines were used in each site, perpendicular to the shore and a 25-meter distance from each other. The 0 meter mark of the 50 meter transect line was placed at the distance of approximately 150 meters at Igang Bay and about 5 meters at Villa Corazon from the shore where corals were first observed. At every 10 meter interval, a 1m x 1m quadrat divided into 25 squares covering 4% was positioned in such a way that the spaces occupied by hard and soft corals found inside the laid quadrat was recorded. One-half colony to one whole found within the quadrat was counted as 1 colony and less than half of the colony included in the quadrat was not counted as a colony (Odum, 1971).

Temperature was determined using the thermometer. Surface temperature was taken submerging the thermometer at horizontal position for 2 minutes. Bottom temperature was taken directly and read under water.

Salinity was measured with a hand refractometer calibrated to 0 ppt. by rinsing with distilled water, before and after use.

Substratum type was determined by touch and feel method.

Water depth was noted using a meter stick. Depth at 25 meter point of the transect line was taken. Depth was determined during low tide while sampling was conducted.

RESULTS AND DISCUSSIONS

Soft corals found at Igang Bay and Villa Corazon include the genera Lobophytum, Radianthus, Sarcophyton, Sinularia and Xenia. Hard corals that belong to Acropora, Coeloseris, Coscinaraea, Favia, Favites, Fungia, Lonophyllia, Millepora, Montipora and Porites genera. Almost all genera were observed in Villa Corazon except the genus Fungia. On the other hand, the genus Goniopora and Pocillopora were observed in Villa Corazon which was not found at Igang Bay (Table 1).

Table 1. List of hard and soft corals found at Igang Bay and Villa Corazon, Nueva Valencia Guimaras

soft corals	site		Hard corals	site	
genera	Igang Bay	Villa Corazon	Genera	Igang Bay	Villa Corazon
Lobophytum			Acropora		
Radianthus			Coeloseris		
Sarcophyton			Coscinaraea		
Sinularia			Favia		
Xenia			Favites		
			Fungia		
			Lonophyllia		
			Millepora		
			Montipora		
			Porites		
			Goniopora		
			Pocillopora		

Hard corals had a greater cover in two sampling sites with an average of 12.98% at Igang Bay and 46.13% in Villa Corazon. However, comparing between sites, Villa Corazon has a higher percentage of coral cover in both categories with 3.47% soft coral and 46.13% hard corals as opposed to 1.11% soft corals and 12.98% hard corals at Igang Bay (Table 2 and Figure 5). The number of colonies gives the same picture with an average of 0.4 colonies for hard corals in both sites. No

colony has been found to be exhibited by the soft corals at Igang Bay and Villa Corazon (Table 2 and Figure 6).

Table 2. Hard and soft corals percent cover and colony sampled at Igang Bay and Villa Corazon, Nueva Valencia, Guimaras.

Site	Soft corals		Hard corals	
	% cover	colony	% cover	Colony
Igang Bay	1.11	0	12.98	0.4
Villa Corazon	3.47	0	46.13	0.4

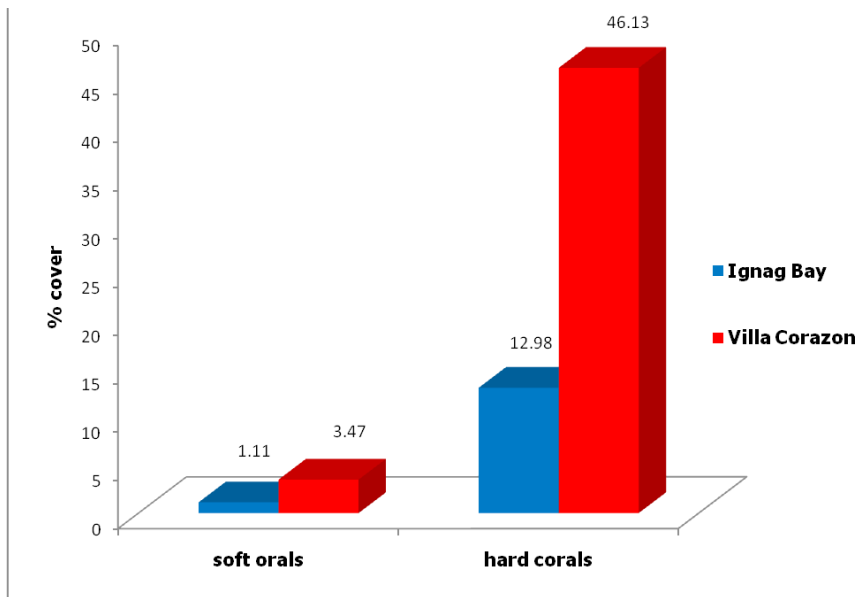


Figure 3. Percent cover of soft and hard corals at Igang bay and Villa Corazon, Nueva Valencia, guimaras

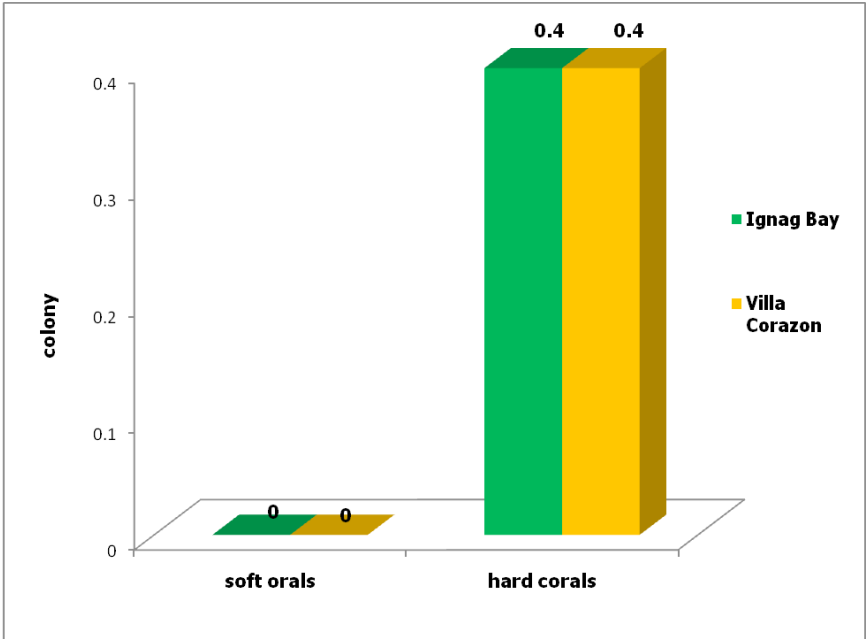


Figure 4. Colony of soft and hard corals at Igang Bay and Villa Corazon, Nueva Valencia, Guimaras.

Physico-chemical conditions, particularly the temperatures varied between two sampling sites exhibiting higher values at Igang Bay with 31oC surface and 31.7 °C bottom over 29 °C surface and 29.3 °C bottom in Villa Corazon. The salinity was not relatively varied with higher value in Villa Corazon with 29.7ppt. (Table 3). The water depths recorded were 1 meter at Igang Bay and 0.59 meters in Villa Corazon. Generally, the substrate type was rocky and sandy with presence of some coral rubbles in some portions along the transect lines at Igang Bay (Figure 7A-D) while presence of coral rubbles was relatively higher in Villa Corazon (Figure 8A-D).

Table 3. Physico – chemical parameters and general observation of the substratum in Igang Bay, Nueva Valencia Guimaras

	Igang Bay	Villa Corazon
Temperature (°C)		
a) Surface	31	29
b) Bottom	31.7	29.3
Salinity (ppt)	29	29.7
Average depth (m)	1	0.59
Type of substratum	rocky and sandy	rocky, sandy, rocky, presence of a lot coral rubbles

In comparing the sampling sites, Villa Corazon exhibited a higher percentage of both hard and soft corals. Hard corals were found to have a greater percentage cover of 46.19% than the soft corals with an average of 12.98%. In terms of number of colonies of hard and soft corals, there was no difference between the two sites but in terms of coral category, the hard corals were found to have higher number of colonies with an average of 0.4 in both sites than the soft corals. This explains the dominance of hard corals in terms of colonies since there was no soft coral colony being observed during the sampling and also the higher composition of hard corals with 9 genera found at Igang Bay and 11 genera in Villa Corazon than 5 genera of soft corals in both sites.

The distribution of the soft and hard corals in an area may be due to the physical environment (Veron, 1986) or determined to an appreciable extent by chemical compounds secreted by soft corals (Coll and Sammarco, 1986). Higher number of genera was observed in Villa Corazon perhaps due to the less anthropogenic disturbance as Igang Bay is directly located in front of the Villa Igang Beach Resort which makes them more vulnerable and accessible to human destruction. It was also observed that higher sedimentation rate seem relatively lower in Villa Corazon. This promotes the growth and survival of the soft and more especially the hard corals which tend to survive in shallow waters. Villa Corazon also exhibited a relatively wider coral reef area since the site is facing more towards open sea promoting higher rate of

dispersal of the juveniles. The physico-chemical parameters recorded in the two sites did not greatly vary with each other.

The positions of islands, islets and coast in the Philippines may slow down the water current approaching the shore. Land masses may shade the area or part of an area (White, 1987), thus affecting the location, size and composition of coastal communities which include the intertidal coral reef community. The distinctive characteristic of an area is due to particular combinations of environmental factors such as wind, waves, current and coastal shape. It has also been observed that the current coming into the Igang Bay was moderate upon high tide which may affect the occurrence of hard corals more than the soft corals. On the other hand, because of varying effects of shading, wind and current direction and intensity, the abundance or diversity, composition and dominance of soft and hard corals vary (White, 1987).

Shallow water (Table 3) allows good illumination for zooxanthellae metabolism that in turn enhances the hard coral growth (Chalker and Dunlap, 1986). In the presence of light, hermatypic corals grow faster than they are eroded by physical and biological agents like the action of waves and predation or effects of interaction with soft corals (Chalker and Dunlap, 1986).

Also, the sites have rocky and sandy substratum, which is very conducive for hard coral growth than for soft corals. In addition, it was observed that the hard coral genus *Acropora* seemed prevalent in the site. The said genus is known to thrive in areas with low sedimentation that is more apparent in a sandy-rocky type of substrate, good illumination, shallow water and moderate wave action (Veron, 1986; Endean, 1976).

Low soft coral cover and colony counts in the said sites (Table 2 and Figures 5 and 6) may be attributed to the shallowness of water and frequent exposure of the sites. High illumination is not favorable for soft corals that can only withstand short and infrequent exposures to light and atmosphere, and commonly thrive in areas that are shaded by cliff overhangs (White, 1987). Yet some soft corals like *Lobophytum* and *Sarcophyton* were observed to be present more individually than hard corals but were not included along the transect line during the sampling period.

Coral rubbles were also observed in portions along the transect lines with greater degree observed in Villa Corazon (Figure 7 and 8).

Endean (1976) observed that corals growing in a wave-stressed area especially near islets are prone to breakage, and the resulting coral rubble may abrade and bury other corals. Also, there were more rubbles observed in Villa Corazon because the area is more open seaward where wave action is greater compared to Igang Bay.

The rocky sandy type of substratum is devoid of organic components thus this site has relatively clear water. The absence of seagrass may be basically due to wave stress that inhibits seagrass growth and maybe also due to the poor organic content of the substratum since wave action does not allow detritus to stay. Although few patches of seagrass were observed occasionally along transect 1 nearest the 0 meter point since the northern side of the sampling site is said to be the site of the seagrass assessment project.

The exposure of this site to the open sea at the southern and wave shock, limited the distribution of many species (White, 1987) and the dominance of hard corals over soft corals in both percentage cover and number of colonies. The shading effect of the surrounding area may consequently affect the water temperature both at the surface and bottom. Table 3 shows that the temperatures did not vary much. Hard corals seem to prefer higher temperatures. Although more hard corals were observed in Villa Corazon despite the lower temperatures recorded mainly because it was raining during the sampling time.

Aside from physico-chemical factors, hard corals can also be influenced by interaction with soft corals as characterized by the presence of unoccupied substratum and dead portions of hard corals near soft coral colonies (Nishihira, 1981; Coll and Sammarco, 1986). Soft corals can also inhibit the growth or recruitment of hard corals and they also secrete compounds which belong to the chemical class terpenes which serve as defense against predators or weapons for space competition and in reproduction (Sammarco, 1986).

CONCLUSIONS

Survival and competition for space between soft and hard corals seems to be a natural part of coral life but the dominance of one over the other can be enhanced or hampered by the topography and such environmental factors such as amount of illumination, water depth,

wave action and temperature. These factors were found to contribute to the dominance of hard corals at Igang Bay and Villa Corazon, Guimaras, Philippines.

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Macrobenthic Composition of Sea Water Associated with Seagrass in East and West Portions of the Igang Bay, Nueva Valencia, Guimaras

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Abstract - The macrobenthic invertebrates are associated with seagrass communities in East and West at the Igang Bay, Nueva Valencia, Guimaras. Seven groups were found in West Igang which includes the hard coral, gastropod, bivalve, soft coral, starfish, limpet, hermit crab and cowrie while eight groups composed of bivalve, gastropod, snail, cowrie, hard coral, hermit crab and sponge were found in the seagrass community of East Igang. Results show that gastropod was the dominating group in both sites. The hard coral group was the most frequent to occur in West Igang while the gastropod in East Igang was frequently observed. Common groups in both sites were hard coral, gastropod, bivalve, and cowrie. West Igang had higher diversity of macrobenthos ($H' = 0.608$) than the East Igang with ($H' = 0.513$). Both sites have sandy, silty-muddy type of substrates although some portions of West Igang were rocky. Salinity ranged

from 28 to 30 parts per thousand and temperature from 20.67 to 32.67 degrees Celsius. Water depth recorded ranged from 0.43 to 0.60 meters. The higher variability of substrates in West Igang probably promoted the higher diversity of macrobenthic groups in the area suitable for different attachments and mobility along with denser growth of seagrass in the said site.

Keywords - Seagrass, Igang Bay, Macrobenthic invertebrates, hard corals, gastropod, bivalve

INTRODUCTION

Macrofauna or macrobenthos are the largest benthic animals associated with the marine water bottom sediment. Benthic animals are classified into three ecological categories, viz., infauna and epifauna, based on where they thrive relative to the substrate. The infauna are those that live wholly or partly within the substrate which includes many clams and worms polychaetes as well as other invertebrates which usually dominate communities in soft substrates and are most diverse and abundant in subtidal regions. Few are found in hard substrate communities with rock-boring clams being one example. The epifauna are those animals living on or attached to the seafloor which encompass about 80% of the larger zoobenthos. Epifauna include corals, barnacles, mussels, many starfish and sponges. These animals are present on all substrate types but are particularly richly developed on hard substrates and are most abundant and diverse in rocky intertidal areas and coral reefs. A third category includes animals that live in association with the seafloor but also swim temporarily above it and include prawns and crabs and flatfish such as sole (Parsons and Lally, 1997).

The macrobenthic composition of a particular area traditionally gives baseline information along with valuable insights on the interaction between the biotic and abiotic components of a benthic community. As concerns on the consequences of effluent discharges heighten, the benthos are now looked upon as probable indicators of environmental changes (Rees et al. 1991).

The balanced ecological conditions with a diverse flora and fauna characterize a pristine environment. In such an environment of stable condition, conservative species are traditionally regarded as the competitive dominant and are usually the first ones affected by perturbation. Benthic community assemblages are composed of organisms with diverse functional groups defined by feeding types, mobility and method of food capture, reproductive modes, life history patterns and physiological adaptations to environmental conditions (Kennish, 1994). This diversity along with limited mobility, close association with the sediment substrate and ease of quantitative sampling are all good indicators of healthy habitat to benthic organisms.

Information from macrobenthic studies, i.e., shifts in population and community parameters has a history of use in monitoring programs (Kemp et al., 2005), assessment of water quality (Che and Morton, 1991) and pollution effects (Grizzle and Penniman, 1991) provide baseline information on impacts of human associated activities such as fishing activities (Thrush and Dayton, 2002), dumping of sewage sludge (Lopez Gappa et al., 1990) and recovery after cessation of dumping (Moore and Rodger, 1991).

Studies on benthos in the Philippines are expanding in scope, these studies focus on associated fish and/or characteristics of certain islands or reefs (Estacion et al., 1993) to taxonomy (Palpal-Latoc 1996), community assemblages (Mequila et al., 2004) and oil spill impacts.

FRAMEWORK

Benthic fauna in the world contain cosmopolitan genera and species occupy similar ecological niches. Their distribution is affected by various physical factors. No single variable is controlling, rather influence can be heightened or lessened depending on their combination (Maurer et al., 1978). It has been shown that the substratum is a significant factor influencing benthic diversity (Li and Gao, 1989). At the Berg River estuary, distribution and seasonal abundance of invertebrate macrofauna was closely tied to sediment characteristics and vegetation cover (Kalejta and Hockey, 1991). The benthos of gastropod group at the Berg River estuary were restricted to certain sediment types favouring a coarse sediment. Salinity can be

factor in determining the distribution of benthic organism. Freshwater, marine and estuarine benthos all play similar ecological function, but the composition can be quite different (Coumo and Zinn 1997). As a response of stenohaline species to reduce salinity, a reduction in the number of marine macrofauna toward the estuaries can be expected. Gage, 1972 in Maurer et al., 1978 concluded that salinity was more influential in controlling the distribution of brackish macrofauna than sediment type in shallow water but at greater depths, the reverse was true.

Waves are the main reason for water movement (Levinton, 2001), especially in the intertidal area of the sea. Its effect can reach up to a maximum depth of 10-20 meters wherein sand is moved. These vertical disturbances to the water surface can cause resuspension of the fine-grained sediments, extend the intertidal zone and influence mixing of atmospheric gases and penetration of light (Li and Gao, 1989). In shallow, enclosed inlets, the tides play role in the periodic movement of water. The dynamic physical environment is rarely considered in relation to faunal community despite the role played by tidal currents in influencing the nature of the bottom substrate. Warwick and Uncles, 1980 in their work on the Birstol Cahnnel, were able to directly correlate faunal type and tidal stress. Frascari et al., (2002) attributed the dominance of mollusks and a polychaete in the shallow areas of the Fattibelo Lagoon to continue oxygenation of tidal currents and wave motion. Such findings are relevant to initial understanding of physical control of community structure and function. Biotic predations, such as predation and competition can also play a role in controlling community structure.

It has been reported that in eutrophical site, predation is not A major controlling factor of community structure. However, in non-eutrophicated site, it could be an important factor controlling abundance at least of some faunal components. Berge and Valderhaug (1983) studied the effect of epibenthic macropredators in a low-energy subtidal eutrophicated habitat of the Oslofjord, in an attempt to verify and elucidate previous findngs and concluded that macropredators are not important in determining community structure in sediments, exerting a small controlling effect on the densities of the macrofauna. Their conclusion was contrary to findings of Alongi and Christofferson (1992) who concluded that epibenthic predation, along with several

other factors such as low food availability, periodic disturbance by tidal effects, etc. to be one of the major regulators in the distribution, abundance and structure of benthic infaunal assemblages in the Great Barrier Reef.

OBJECTIVES OF THE STUDY

The present study aims to investigate the macrofauna composition associated with seagrass communities in west and east portions of Igang Bay Nueva Valencia, Guimaras. A monitoring study of the seagrass communities in the said sites started on April 2008 and is still ongoing until April 2010. However, a faunal composition associated on east and west Igang Bay seagrass communities has never been conducted. This study will provide insights on the habitat health of the seagrass communities in Igang Bay. Specifically, the determination of faunal composition of the macrobenthos in east and west Igang Bay seagrass communities and the physical factors like the substrate type, temperature, salinity, and water depth will be addressed.

MATERIALS AND METHODS

The study was conducted in the seagrass communities of east and west Igang Bay where the monitoring study is conducted. Three 50-meter transects with a distance of 50 meters from each transect were laid in each site. From each transect, 3 points at 5, 25 and 45 were sampled by placing 1 m x 1 m quadrat in each point. The macrobenthic animals found inside the quadrat was recorded and the numbers were counted. The physico-chemical parameters were noted such as the temperature at each point at the mid-water depth. Water samples were taken for salinity and substrate types were characterized and noted. The degree of vegetation was described and recorded.

The macrobenthic animals present in every quadrat were identified and recorded according to their groups (i.e., bivalves, corals, gastropods, starfish, sea urchin, sea cucumbers, crabs, shrimps, sponges). The relative abundance, frequency, dominance and important values of every group of macrobenthos and the indices of diversity and similarity of macrobenthos of one site to the other were

determined using the following formulas (Odum, 1971):

Relative density = $\frac{\text{number of individual organism per group} \times 100}{\text{Total sampled area (9 square meter)}}$

Relative frequency = $\frac{\text{number of occurrence of each group} \times 100}{\text{Total number of occurrences of all groups}}$

Relative Dominance = $\frac{\text{number of individual organism per group} \times 100}{\text{Total number of all individuals}}$

Importance Value = Relative density + Relative frequency + relative dominance

Index of diversity (Shannon index of general diversity H') = $-\sum (n_i/N) \log (n_i/N)$

Where: n_i = importance value for each group

N = total of importance values

Index of similarity (S) = $2C / A + B$

Where: A = number of groups in east Igang

B = number of groups in west Igang

C = number of groups common to both sites

RESULTS AND DISCUSSION

Eight groups of macrobenthos were found to occur in the seagrass community of West Igang which include the hard coral, gastropods, bivalves, soft coral, starfish, limpet, hermit crab and cowrie (Table 1) while only seven groups were recorded in East Igang that include the bivalves, gastropods, snail, cowrie, hard coral, hermit crab and sponge (Table 2). Common to both sites were bivalves, gastropods, hard coral, hermit crab and cowrie while soft coral, starfish and kimpet were observed in West Igang and but not found in East Igang. On the other hand, snail and sponge were not sampled in West Igang which were not observed in West Igang (Table 4).

Table 1. Macrobenthic components found associated with seagrass community in West Igang, Villa Igang, Nueva Valencia, Guimaras

Groups	Rel. Density	Rel. Frequency	Rel. Dominance	Importance Values
hard coral	31.85	29.67	31.84	93.369
gastropod	36.96	21.34	36.94	95.241
bivalve	24.53	24.37	24.52	73.419
soft coral	2.40	7.20	2.40	11.995
starfish	1.89	7.20	1.89	10.985
limpet	0.51	3.03	0.51	4.040
hermit crab	0.51	3.03	0.51	4.040
cowrie	1.39	4.17	1.39	6.944

Among groups in West Igang, the gastropods were found to be most abundant and dominant with a relative density of 36.96% and relative dominance of 36.94% while hard coral was most frequent to occur in sampled points with relative frequency of 29.67%. Least abundant, frequent and dominant groups were exhibited by the limpet and hermit crab with values of 0.51%, 3.03% and 0.51%, respectively. Most important group observed was the gastropod with importance value of 95.241 while limpet and hermit crab with 4.040 were least important groups in West Igang (Table 1).

In East Igang, the bivalve was found to be the most abundant group with 55.28% while most frequent and dominant group was gastropod with values of 40.00% and 40.39%, respectively. Sponge was found to be the least important group observed in East Igang with a value of 4.046 while the gastropod was the most important group of all with value of 106.997 (Table 2).

Table 2. Macrobenthic components found associated with seagrass community in East Igang Bay, Villa Igang, Nueva Valencia, Guimaras

Groups	Rel. Density	Rel. Frequency	Rel. Dominance	Importance Values
bivalve	55.28	24.44	36.03	99.402
gastropod	21.13	40.00	40.39	106.997
snail	2.90	8.89	2.90	18.335
cowrie	4.94	8.15	4.94	19.845
hard coral	7.04	8.89	7.04	26.610
hermit crab	7.96	8.89	7.96	24.758
sponge	0.74	0.74	0.74	4.046

Comparing the indices of sites, West Igang was found to be relatively more diverse in terms of macrobenthic organisms associated with seagrass community with an index of 0.608 than East Igang with 0.513 (Table 3, Figure 1). Index of similarity of these macrobenthos between the two sites is relatively high with a value of 0.667 (Table 3).

Table 3. Indices of diversity and similarity of macrobenthic components associated with seagrass communities in West and East Igang Bay, Villa Igang, Nueva Valencia, Guimaras

Indices	West Igang	East Igang
Diversity Index H'	0.608	0.513
Similarity Index (S)	0.667	

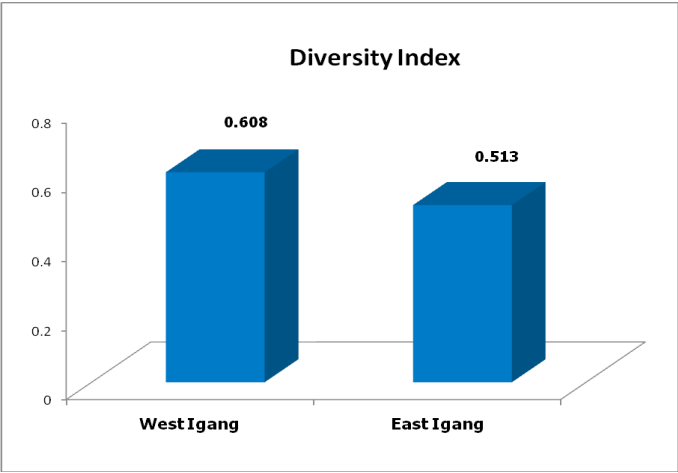


Figure 1. Index of diversity of macrobenthos associated with seagrass communities in West and East Igang Bay, Villa Igang, Nueva Valencia, Guimaras

Table 4. Groups of macrobenthos associated with seagrass communities in West and East Igang Bay, Villa Igang, Nueva Valencia, Guimaras

groups	West Igang	East Igang
hard coral		
gastropod		
bivalve		
soft coral		
starfish		
limpet		
hermit crab		
cowrie		
sponge		
snail		

The physico-chemical parameters were observed to be variable between two sites especially in temperatures. However, higher salinity was recorded in West Igang. Type of substrates was relatively similar between sites with occurrence of occasional rocky bottom in West Igang (Table 5).

Table 5. Physico-chemical parameters recorded in West and East Igang Bay, Villa Igang, Nueva Valencia, Guimaras

Physico-chemical factors	West Igang	East Igang
Temperature (°C)		
Surface	30.67	32.67
Bottom	31.00	30.83
Salinity (ppt.)	30.00	28.67
water depth (m)	0.43	0.60
substrate	rocky, sandy, silty-muddy in transect 1	sandy, silty-muddy

CONCLUSIONS

Some of the macrobenthos observed in West Igang but were not included in the sampled points were the sea cucumbers, sea urchins, sand dollar, sponges and snail. Starfish, brittle stars, sea urchins, sea cucumbers and soft corals were observed in East Igang. Degree of vegetation was relatively high in both sites. Starfish was observed to be relatively more abundant outside the sampled points in West Igang than East Igang. The same observation was inherent in sponges, soft and hard corals.

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Attitudes of High School Students Towards Sex: Implications to Sex Education and Guidance

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Abstract - A major source of sexual learning is sex education classes in school (Levy 1992). In the absence of effective sex education, the immature adolescent must make major decisions without adequate knowledge (Bjorklund 1998). This descriptive survey-correlation method of research was undertaken to come up with findings on attitude towards sex of Villaba National High School students. It was also its purpose that this study may be instrumental in the proper guidance of the said students particularly in the area of adolescent sexuality. Simple frequency counts were used to determine their Attitude towardss the various aspects of sexual relationships and average scores determined their Attitude towards the ten aspects of sexual relationships. Z-test was used to test the null hypothesis which states that, "there is no significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships," at the significance level of 0.05. This research finally concluded that there are differences between the attitudes of boys and girls

towards the various aspects of sexual relationships particularly on courtship, petting, pre-marital sex, and trial marriage or live-in. Z-test established a significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships.

Keywords - attitude towards sex, sex education, instruction and guidance, adolescent sexuality, sexual relationships.

INTRODUCTION

Current issues on sex behavior are drawing interest and curiosity from among the present generation, especially among those who claim to be "liberated" people. The subject is almost in every issue of mass media and communication either in print, in picture, or over the air. Most adolescents are capable of and quickly become curious about the physical aspects of sex but few of them achieve the degree of emotional maturity that keep indulgence in the physical aspects of sex from causing them serious anxieties and conflicts (Gallagher 1983).

The adolescent-youth period is critical in the field of sexual adjustments because it is at this period that the initial venture in forming emotional attachments to the opposite sex begins. The adolescent's first love may be intense, consuming, almost overpowering; no doubt its intensity is in part a matter of lack of experience. The conflict between organic drives and the sex mores is not confined to the adolescent period. It is a lifelong struggle. In the absence of effective sex education, the immature adolescent must make major decisions without adequate knowledge (Bjorklund 1998).

A major source of sexual learning is sex education classes in school and the problem of sex instruction is made doubly difficult because on one hand so many adults are not sufficiently well adjusted sexually themselves to talk objectively and unemotionally about sex; on the other hand, there is even at the adult level a great amount of ignorance of even the simplest facts of sexual functioning (Levy 1992).

The Department of Education of the Philippines is mandated by Republic Act 9155, otherwise known as the "Governance of Basic

Education Act of 2001," that the principals, school administrators and teachers-in-charge (collectively referred to as school heads) must exercise instructional leadership and sound administrative management of the school.

As an instructional leader, therefore, the researcher believes that the school has a great and challenging role in the clarification of values to help clear out the haze of confusion and doubts, particularly on sexual relationships as this touches the core of individual's personality.

The youth of today needs information as they go through formation, particularly on matters of sex. Data on their Attitude towards sexual relationships would be a great help in diagnosing weaknesses and strengths on the subject of sex.

This study was undertaken in order to come up with findings on attitude towards sex of junior and senior students of Villaba National High School (VNHS), Division of Leyte, Region VIII (Eastern Visayas), of the Department of Education. Hopefully the results of this study may be instrumental in the proper guidance of the said students particularly in the area of adolescent sexuality.

The findings in this study may guide students on how to deal with problems concerning sex, particularly the juniors and the seniors of VNHS. With it, the writer hopes to provide the school with some data on the attitude towards sex of the students, thus helping the teachers, the guidance counselor, and parents diagnose youngsters in order to guide them properly.

OBJECTIVES OF THE STUDY

1. To determine the attitudes of junior and senior students of VNHS toward the following aspects of sexual relationships which are courtship, going steady, dating, passionate kissing, necking, petting, pre-marital sex, free love or promiscuity, trial marriage or living-in, and extra-marital affairs; and,
2. To determine whether there exists a significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships.

MATERIALS AND METHODS

The respondents of this study were the third year and the fourth year students of VNHS during school year 2008 – 2009. There were 73 boys and 99 girls or a total of 172 students.

A data-gathering questionnaire which was adapted from the instrument used by Sister M. Carmela (1981) was prepared by the writer. It contained fifty (50) items divided equally into ten (10) aspects of sexual relationships which are courtship, going steady, dating, passionate kissing, necking, petting, pre-marital sex, free love or promiscuity, trial marriage or living-in, and extra-marital affairs.

Each question asked for a feeling or belief about a particular behavior in certain situations involving sexual relationships. The respondents indicated their answers by writing the appropriate letter from the set of responses provided according to what they honestly feel or believe in as follows: **A** (ALL RIGHT), **D** (Dangerous), or **W** (Wrong).

[In interpreting the respondents' responses, codes were utilized. Coding was done to facilitate the analysis of the data.] A scale value of the preferred responses was established. The following were the scale value for each item:

- 4 - Permissive (the attitude that puts no restrictions to any sexual behavior).
- 3 - Liberal (the attitude that considers sex as something to be enjoyed as long as it does not put one into trouble).
- 2 - Healthy (the attitude that considers sex as a vital part of being a human being which may enhance or distort the personality of an individual depending on the kind of relationship he/she has with others).
- 1 - Conservative (the attitude that considers sex as something tolerated with uncomfortable feelings.).
- 0 - Scrupulous (the attitude that considers sex bad or dirty).

The descriptive survey-correlation method of research was used in this study. The questionnaire was used to gather the data. Data collection was undertaken personally by the researcher using the instrument adapted for the study. The distribution of the questionnaires

was made on March 10 – 14, 2009 during the Health Education classes of the respondents. The retrieval was done at the end of their class sessions.

Simple frequency counts were used to determine their Attitude towards the ten aspects of sexual relationships. [Courtship, going steady, dating, passionate kissing, necking, petting, pre-marital sex, free love or promiscuity, trial marriage or living-in, and extra-marital affairs.]

Average scores determined their Attitude towards the ten aspects of sexual relationships. Since each of the fifty (50) items in the questionnaire contained a healthy answer, and that the healthy answer had a value of 2, so respondents with a total score near 100 or an average score near 2 was considered to have more or less a healthy attitude towards sex. The following limits were established to classify the average scores:

2.46 – above	Permissive
2.16 – 2.45	Liberal
1.86 – 2.15	Healthy
1.56 – 1.85	Conservative
1.55 – below	Scrupulous

In testing the null hypothesis which states that, “there is no significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships,” the Z – Test was used that was tested at the significance level of 0.05

RESULTS AND DISCUSSION

On Attitude towards the Various Aspects of Sexual Relationships

Tables 1.1 to 1.10 present the attitude of junior and senior students of VNHS towards the various aspects of sexual relationships.

Table 1.1: Attitude towards courtship

Statements	Responses	ATTITUDES	
		Boys	Girls
If those involved are unmarried persons who exercise precautions so as not to lead each other into sexual intimacies.	ALLRIGHT	Healthy	Healthy
If those involved persons exercise no restrictions on sexual intimacies.	WRONG DANGEROUS	Healthy	Liberal
If unmarried persons spend it in secluded and dimly lit places where they could be alone with each other.	DANGEROUS	Healthy	Healthy
If the unmarried persons spend it in the company of a number of people.	ALLRIGHT	Healthy	Healthy
If it is showered over/by a person who is married to somebody else.	WRONG	Healthy	Healthy

It can be gleaned from table 1.1 that boys have healthy Attitude towards all of the situations involving courtship while girls have liberal attitudes if those involved persons exercise no restrictions on sexual intimacies by indicating a dangerous answer to that particular situation.

Table 1.2: Attitude toward going steady

Statements	Responses	ATTITUDES	
		Boys	Girls
If those involved are unmarried persons who exercise precautions so as not to lead each other into sexual intimacies.	ALLRIGHT	Healthy	Healthy
If those involved unmarried persons exercise no restrictions on sexual intimacies.	DANGEROUS	Liberal	Liberal
If being done by/with a person married to somebody else.	WRONG	Healthy	Healthy
If being done by unmarried persons looking for a life partner.	ALLRIGHT	Healthy	Healthy
If being done by adolescents who desire to be alone with each other.	DANGEIOUS	Healthy	Healthy

Table 1.2 shows that both boys and girls have indicated a dangerous answer if those involved persons exercise no restrictions on sexual intimacies. The classified attitude for such an answer is liberal. Their Attitude towards going steady in the other situations are healthy.

Table 1.3: Attitude towards dating

Statements	Responses	ATTITUDES	
		Boys	Girls
If those involved are unmarried persons who exercise precautions so as not to lead each other into sexual intimacies.	ALL RIGHT	Healthy	Healthy
If those involved unmarried persons exercise no restrictions on sexual intimacies.	DANGEROUS	Liberal	Liberal
If the unmarried persons spend it in secluded and dimly lit places where they could be alone with each other.	DANGEROUS	Healthy	Healthy
If the unmarried persons spend it in the company of a number of people.	ALL RIGHT	Healthy	Healthy
If it is done with/by a person who is married to somebody else.	WRONG	Healthy	Healthy

Table 1.3 shows that both boys and girls have indicated a dangerous answer if those involved persons exercise no restrictions on sexual intimacies. The classified attitude for such an answer is liberal. Their Attitude towards dating in the other situations are healthy.

Table 1.4: Attitude towards passionate kissing

Statements	Responses	ATTITUDES	
		Boys	Girls
If done by unmarried persons.	DANGEROUS	Healthy	Healthy
If done by husband and wife.	ALL RIGHT	Healthy	Healthy
If done with/by a person married to somebody else.	WRONG	Healthy	Healthy
Between steadies.	DANGEROUS	Healthy	Healthy
Between persons who have officially arranged to get married to each other.	ALL RIGHT	Healthy	Healthy

As shown in table 1.4, the attitudes of the respondents toward passionate kissing are healthy in all of the situations.

Table 1.5: Attitude towards necking

Statements	Responses	ATTITUDES	
		Boys	Girls
Between persons not married to each other.	DANGEROUS	Liberal	Liberal
If done by/to a person married to somebody else.	WRONG	Healthy	Healthy
If done by husband and wife.	ALL RIGHT	Healthy	Healthy
Between steadies.	DANGEROUS	Liberal	Liberal
Between persons who have arranged to get married to each other.	ALL RIGHT	Liberal	Liberal

Table 1.5 shows that the respondents have liberal Attitude towards necking if it is done between persons not married to each other and between steadies by indicating dangerous answers, and between persons who have officially arranged to get married to each other by indicating an ALL RIGHT answer. If necking is done by/to a person married to somebody else, the respondents indicated a wrong answer which is a healthy attitude. Also, the indicated ALL RIGHT as an answer if necking is done between husband and wife is a healthy attitude.

Table 1.6: Attitude towards petting

Statements	Responses	ATTITUDES	
		Boys	Girls
If done by person not married to each other.	WRONG	Healthy	Healthy
If done by husband and wife.	ALL RIGHT	Healthy	Healthy
If done by/to person who is married to somebody else.	WRONG	Healthy	Healthy
Between steadies.	DANGEROUS	Healthy	Liberal
Between persons who have arranged to get married to each other.	ALL RIGHT	Liberal	Liberal

Table 1.6 illustrates that boys have healthy attitudes in the first four situations involving petting but they have a liberal attitude if it is done between persons who have arranged to get married to each other by indicating an ALL RIGHT answer. In addition to the liberal attitude of girls toward the same situation, they have indicated a dangerous answer if petting is done between steadies which is also a liberal attitude.

Table 1.7: Attitude towards pre-marital sex

Statements	Responses	ATTITUDES	
		Boys	Girls
If done by person not married to each other.	WRONG	Healthy	Healthy
If done by husband and wife.	ALL RIGHT	Healthy	Healthy
If done by/to person who is married to somebody else.	WRONG	Healthy	Healthy
Between steadies.	WRONG	Healthy	Healthy
Between persons who have arranged to get married to each other.	ALL RIGHT	Permissive	Healthy

As shown in table 1.7, the boys have a permissive attitude towards pre-marital sex if it is done between persons preparing for marriage by indicating ALL RIGHT as an answer while they have a healthy attitude towards the other situations. Meanwhile, the girls have healthy Attitude towards pre-marital sex in all of the situations.

Table 1.8: Attitude towards free love

Statements	Responses	ATTITUDES	
		Boys	Girls
For those not ready for marriage.	WRONG	Healthy	Healthy
If one wants to do so as he/she pleases.	WRONG	Healthy	Healthy
If one does it for fun.	WRONG	Healthy	Healthy
If it is for financial/economic reason.	WRONG	Healthy	Healthy
If one is searching for the right marriage partner.	WRONG	Healthy	Healthy

As shown in table 1.8, the attitudes of the respondents toward free love are healthy by indicating wrong answers in all of the situations.

Table 1.9: Attitude towards trial marriage or live-in

Statements	Responses	ATTITUDES	
		Boys	Girls
For those not ready for marriage.	WRONG	Healthy	Healthy
If one wants to be free in case he/she does not want the partner anymore.	WRONG	Healthy	Healthy
If those involved want to test each other.	DANGEROUS WRONG	Liberal	Healthy
If there is intention to marry each other later.	ALL RIGHT	Permissive	Permissive
If it is for fun.	WRONG	Healthy	Healthy

It can be gleaned from table 1.9 that the respondents have healthy Attitude towards trial marriage or live-in for those not yet ready for marriage, if one wants to be free in case he/she does not want the partner anymore, and if it is for fun by indicating wrong answers to the situations. They have a permissive attitude if there is intention to marry each other by indicating an ALL RIGHT answer to the situation. However, if those involved want to test each other, the boys have liberal attitudes by indicating a dangerous answer while the girls have healthy attitudes by indicating a wrong answer to the situation.

Table 1.10: Attitude towards extra-marital affairs

Statements	Responses	ATTITUDES	
		Boys	Girls
If it is for financial/economic reason.	WRONG	Healthy	Healthy
If husband and wife agree on it.	WRONG	Healthy	Healthy
If one wants to have a child.	WRONG	Healthy	Healthy
If it is for fun.	WRONG	Healthy	Healthy
If it is to satisfy an emotional/psychological need	WRONG	Healthy	Healthy

Table 1.10 illustrates that the attitudes of the respondents toward extra-marital affairs are healthy by indicating wrong answers to all of the situations.

On Attitude towards the Ten Aspects of Sexual Relationships

Shown in table 2 are the attitudes of junior and senior students of VNHS toward the ten aspects of sexual relationships.

Table 2: The attitudes of junior and senior students of VNHS toward the ten aspects of sexual relationships

Attitudes	Boys		Girls		Difference
	Frequency	Percentage	Frequency	Percentage	
Healthy	15	20.55	31	31.31	(10.76)
Liberal	34	46.57	51	51.52	(4.95)
Permissive	24	32.88	17	17.17	15.71
TOTALS	73	100	99	100	

The data shows that 15 or 20.55 percent of boys and 31 or 31.31 percent of girls have healthy Attitude towards the ten aspects of sexual relationships. Thirty-four or 46.57 percent and 51 or 51.52 percent of boys and girls, respectively, have liberal attitudes. There are 24 or 32.88 percent boys and 17 or 17.17 percent girls who have permissive attitudes. The overall pattern so far indicates that the liberal attitude has the highest frequency and/or percentage for both boys and girls respondents.

On Differences between the Attitudes of Boys and Girls on the Ten Aspects of Sexual Relationships

Table 3 presents the differences between the attitudes of boys and girls on the ten aspects of sexual relationships.

Table 3: Differences between the attitudes of boys and girls on the ten aspects of sexual relationships

Data	Boys	Girls
Mean scores	2.38	2.26
Standard deviations	0.26	0.21
Number of cases	73	99
Z – Test	3.24	
Interpretation	Significant	

The data suggest that there is a significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships since the absolute value of computed Z at the significant level of 0.05 is greater than the critical region Z , which is 1.64.

The null hypothesis which states that, "there is no significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships," is therefore, rejected.

CONCLUSIONS

As established by the results of the study, this research finally concluded that the following are the differences between the attitudes of boys and girls toward the various aspects of sexual relationships.

On courtship, boys have healthy attitudes, if those involved persons exercise no restrictions on sexual intimacies, while girls have liberal attitudes. If petting is done between steadies, boys have healthy attitudes while girls have liberal attitudes. Boys have permissive Attitude towards pre-marital sex, if it is done between persons preparing for marriage, while girls have healthy attitudes. On trial marriage or live-in, boys have liberal attitudes while girls have healthy attitudes if those involved want to test each other.

The significant difference between the attitudes of boys and girls on the ten aspects of sexual relationships is on the ranking of the different attitudes in terms of frequency or percentage. Liberal attitude has the highest number for the boys, followed by permissive attitude, and healthy attitude. For the girls, on the other hand, the liberal attitude is followed by healthy attitude, then, permissive attitude.

The difference in terms of percentage is also significant with permissive attitude in favor of the boys. Healthy attitude are in favor of the girls and liberal attitude.

The researcher recommends that further investigation be made particularly on the following: (1) The causes of less shared sex attitudes in comparison to more shared sex attitudes; (2) The factors that may have caused prevailing sex permissiveness; and, (3) The factors that may have caused a significant difference of sex attitudes between boys and girls.

IMPLICATIONS TO SEX EDUCATION AND GUIDANCE

The findings of this study seem to imply certain directions for sex education and guidance for the junior and senior students of Villaba National High School, which are the following:

1. Since 24 or 32.88% of boys and 17 or 17.17% of girls were considered having permissive attitudes which the researcher considers as far from being healthy, there is a need to guide and instruct them religiously towards healthy sex values.
2. Since there is a difference of 15.71% on the permissive attitude in favor of the boys, therefore they need more attention than the girls on the areas of sex values.
3. Effective school year 2009 – 2010 the researcher will designate two Guidance Counselors a male teacher for the boys and a female teacher for the girls.

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Aristotle as an Idealist

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Abstract - The ancient Greek philosopher Aristotle is widely known as a realist in believing that the real exists in the sensible world and can be known through sense of perception or observation. But, there are others who would claim that he is a moderate realist in believing that the essences are one with physical objects but are known universally and immaterially. Contrary to these popular beliefs, this paper discussed that Aristotle is neither a realist nor a moderate realist but an idealist. The study utilized descriptive critical analysis as its method. The author explained the basic principles and teachings of Aristotle on metaphysics, epistemology and dwelt on these basic principles and teachings as bases of criticism. This article presented Aristotle's belief that the true essences of things which he referred to as forms, essences or substance are metaphysical or universal which is beyond the physical and therefore beyond the grasp of sensation and observation. In other words, reality for him is only logical or mental in nature for it is not tangible. This also explained that Aristotle's theory of knowledge (epistemology) which employed the senses to grasp the essences of things is not possible.

Keywords - realism, idealism, metaphysics, epistemology, ethics, hylemorphism, essence, form, substance and nature.

INTRODUCTION

In the painting of Rafael “the School of Athens” one finds Plato walking side by side with his student Aristotle. The former was pointing up while the latter is pointing down. These gestures indicate the difference of their thoughts. Plato was pointing up because he believed that reality is in the world of ideas-a supersensible world found outside the material universe. The world we are living according to him is not real but merely a copy of the World of Ideas. The Ideas also known as Forms are the real entities that serve as prototypes of all the things in the sensible world. In contrast, it is a common belief that Aristotle was pointing down because he believes that reality is this world and not in the world which his teacher proposes. The real world is the sensible world that can be perceived by sense and experience (Soccio, 2007, 171-172).

However, the author of this article would like to explain that Aristotle does not really consider reality as one with the sensible world as what most scholars and readers believe. The author would like to elucidate that Aristotle is an idealist- a person who believes that reality is reducible to ideas or mental entities that do not have concrete existence and therefore not observable by sense and experience (Blackburn, 1996, 184).

The author was inspired by deconstructionism which posits that within the text there are inconsistencies that deconstruct the text itself. Hence, there is no single and absolute meaning and interpretation of a text (Mautner, 2005, 138). Therefore, the works of Aristotle are not exemptions to this. His philosophy is worth reexamining, reevaluating as well as reinterpreting.

This article made use of the descriptive analysis as its method. It is descriptive in the sense that it defined and explained the different metaphysical and epistemological principles of Aristotle. It is analytic for it showed to the readers the reasons why Aristotle is an idealist and

not a realist which most people think he is.

The article is significant for it provides students and mentors of philosophy another perspective of Aristotle's thought that might be worth exploring, reviewing, and questioning. The philosophies of erstwhile thinkers are themselves products of the imperfect intellects of men. They are not free of error and doubt and therefore not absolute. The role of philosophers and students of philosophy in the present is not merely to adopt and accept the thoughts of erstwhile thinkers totally but rather to review, reflect, verify, test and even question and improve them. It is only through this that Philosophy will live on.

FRAMEWORK

Manuel T. Pinon (1983), in his work *Being and Reality: the Philosophy of Contingent Being and Contingent Reality* said that Aristotle is a realist because he believed that the different categories of things are known through experience. However, he also admitted that metaphysics is not an empirical study of the nature of things.

Metaphysics is considered as the first philosophy for it deals primarily with the first principles of reality. When one speaks of first principles they are the most fundamental constitutions, causes or elements that compose all things. They are the reasons behind the existence of things (Wardman and Creed, 1963, 43). One cannot understand things without understanding these reasons first.

Philip Stokes (2002) considered Aristotle as the father of empiricism and scientific method because he investigated things by taking into account the opinion of experts and laymen altogether.

Ronald Hoy and Nathan Oaklander (2005) stated that Aristotle repudiated the main thought of his Master Plato. While Plato emphasized the reality of the forms, Aristotle, on the other hand, spoke greatly about particular things. For Aristotle, primary substances are the individual things and not the Platonic Forms.

Mary Lousie Gill (2005) said that as to the status of the form, Aristotelian scholars were even divided among themselves. Some referred to form as universal, while others consider it particular. Some scholars would identify form with substance and others would say that form is not substance for a substance is already the combination

of matter and form. Still others believed that a universal cannot be a substance. Even on the status of matter, scholars are divided and the debate continues whether or not matter is pure potency or whether matter is a substance in itself.

There are apparent contradictions and inconsistencies in Aristotle's metaphysics that lead to varying and even conflicting views on Aristotle's thought among scholars and experts of his philosophy.

Regarding epistemology, Travis Butler and Eric Rubenstein (2004) said that in Aristotle's works, his works, the *Metaphysics* and *On the Soul* (De Anima) mentioned that his epistemological concern centered on the metaphysical nature of the objects of knowledge.

Frederick Copleston (2003) said that Aristotle's thoughts and works are to be divided into three categories or segments. The first is the Aristotle of the Academy who is very Platonic. The second is the Aristotle during his departure from the Academy, the time he went to Asia Minor. Here Aristotle already started to depart from Platonism. The third is the Aristotle of the Lyceum. Here Aristotle is already very scientific and empirical.

To understand Aristotle is to understand him in the three different segments of his life. It is important to note that some of Aristotle works were done within the transitions of these three segments. Thus, it is not surprising that in one work, Aristotle seemed to be both platonic and empirical. Besides, most of his works were compilations of his students and it is very possible these were misedited or misinterpreted or miscompiled. In fact, there is no single interpretation on Aristotle's thought. Since medieval times, there had been manifold interpretations already on Aristotle and his work.

RESULTS AND DISCUSSION

Aristotle is the father or author of the work *Metaphysics* (Glenn, 1937, 2). Etymologically, *Metaphysics* comes from two Greek words: *Meta* (beyond or after) and *Phusis/physics/Physika* which means the physical/material or natural (Vesey and Foulkes, 1999, 192). Literally it means beyond, behind or after physics. It is named so because it was believed to have been written after the work *Physics*; and also it deals with realm beyond or behind the physical. It is the study of

being or reality (anything that exists or may exist) in its most general or universal characteristics (Rowan, 1961, 17). It is also the study of the ultimate causes and first principles of reality which according to Aristotle exist beyond or behind the concrete, tangible, particular features and properties of things or of anything physical (Warrington, 1961, 115&50). Thus, metaphysics is the highest form of abstraction (Stumpf, 1975, 87).

There are four major reasons why Aristotle is an idealist. First, If Aristotle were a realist he would have not spoken of a realm beyond or behind the physical. He could have simply said that the physical is real and what one sees is reality, nothing more and nothing less. The fact that he believes and is an advocate of metaphysics makes him an idealist.

Second, Aristotle said that metaphysics is the study of the being or reality in its general and most universal characteristics. This is contrary to reality because what exists in the world are particular or individual things and not universals. Therefore, one cannot study a particular thing universally because universality is not a property of an individual physical entity.

Third, Aristotle considers the ultimate causes and first principles of things which are the very explanation and the most fundamental component of things to exist beyond or behind the physical. This simply means that reality according to Aristotle is not one with the physical but one which transcends it. So, there is no big difference between Plato and Aristotle.

Fourth, the ultimate causes and first principles of reality are metaphysical and metaphysics is the highest form of abstraction. Then it would mean that reality is only an abstraction/ideal and never physical or concrete. Therefore, Aristotle is an idealist.

The Doctrine of Hylemorphism/Hylomorphism

To be more specific with the discussion, the author would like to delve into one of the main teachings in Aristotle's *Metaphysics* which is the doctrine of *hylemorphism* or *hylomorphism* which states that all bodily entities or material things are basically composed of two elements namely: material cause or matter (*hyle*) and formal cause or

form (*morphe*). Matter is what a thing is made of, while the form refers to what a thing is (Moore and Bruder, 2005, 64-65). For example, the table is made of wood. The wood is the matter of the table while its form is its “tableness” or its being a table. Another example: the matter of the car is what the car is made of such as metal, steel, plastic, paint, rubber, etc., while form or essence of car is its “carness,” its being a car.

The form is what things are in themselves or what is called reality of things or simply the real (Kiernan, 1962, 267). The form is used by Aristotle synonymously with essence, nature, and substance (Migill, 1990, 68). Forms are metaphysical and whatever is metaphysical is universal, abstract, and intangible (Warrington, 1961, 50).

The fact that Aristotle considers forms and essences to be metaphysical is tantamount to saying that reality is universal, abstract, and intangible. Besides, how can he speak of form and essence when it cannot be experienced in real world? Nobody has actually seen or heard or touched the “bananeness” of a banana or the “treeness” of a tree. All these are just mental constructs. Therefore, Aristotle is an idealist.

Speaking of matter, there are actually two types of matter. The first is prime matter which Aristotle defines as pure potency- the absence of form, essence or determination. Another is secondary matter which is already an “informed matter” -the union of form and prime matter or this is the matter referred to as what a thing is made of (Alvira et al., 1991, 195).

The problem is how Aristotle arrived at the notion of prime matter when it is pure potency or it has no form and determination, in other words it is nothing. Nothing is unthinkable. What can be thought of or spoken of are only beings-those that exist or may exist. Again, Aristotle is speaking of things not grounded on experience and observation. Therefore, he is an idealist.

It is important to note that according to Aristotle, what exists in the sensible world is the individual thing (secondary matter) which is already the combination of prime matter and form. Form and prime matter cannot and do not exist separately in the real order of things (Kolak, 2011, 104).

How did Aristotle arrive at the knowledge of the existence of prime matter and form and that they are different from each other, when

what one can experience or observe in reality is the composite of the two which is secondary matter? Aristotle actually could not and did not observe the existence of form and prime matter. His knowledge and discussion of the existence of prime matter and form are without basis in experience. Therefore, he is an idealist.

Consequently, prime matter and substantial form or form cannot be the principle or cause of secondary matter because prime matter and form are metaphysical while secondary matter is physical. The metaphysical cannot beget something physical. Therefore, hylemorphism is impossible. Coming up with a concept of *hylemorphism* will make Aristotle an idealist.

Furthermore, if prime matter is pure potency or nothing then it cannot be combined with form in order to produce secondary matter which is physical. Again, this would prove the impossibility of hylemorphism. Therefore, hylemorphism is not based on experience and observation. By thinking and speaking of hylemorphism as true makes Aristotle is an idealist.

Aristotle's Epistemology/Theory of Knowledge

In Aristotle's epistemology or theory of knowledge, it was also explained that the forms/essences/substances are actually one with the objects or things, and are known by the intellect/mind through sense of perception. After sense perception, the active/agent intellect grasps the essence by removing the individuating notes or particular characteristics of a thing such as color, shape, size, quantity, and quality etc. and what remains in the intellect is pure essence or form which is universal and immaterial which is called idea. This process is known as abstraction (Glenn, 1933, 19-26).

Aristotle in his theory of knowledge did not explain how the senses are able to grasp the essences/forms of substance of things. This remains to be a gray area or vacuum because again the senses are physical and the form/essence and substance is metaphysical. The physical has no capacity to reach or come into contact with the metaphysical. If the essences of things are known as universals then they can only be known by intellection/reason/thinking. Therefore, sensation and observation have nothing to do with knowing the

essences of things. Knowledge is only accessible to reason and not through sensation. This makes Aristotle an idealist.

If the metaphysical realm cannot be reached by sensation and observation then metaphysics itself is not a science if one defines science as a discipline that makes use of observation as a method. Metaphysics is non verifiable and falsifiable for it has no concrete evidence and basis. Nobody has seen or touched form or substance, nature or essence. Aristotle's metaphysics is only an opinion or an idealistic interpretation of what is real without empirical evidence.

If metaphysics cannot be grasped by the senses or by observation then it is tantamount to say that Aristotle never really utilized induction as method but rather deduction. Deduction is reasoning from general to particular (Martin, 1994, 63).

Aristotle's concept of abstraction as a process of knowledge is not possible and even not practical because a person who never really knows about a particular thing cannot know that thing as it is by simply perceiving the thing by his/her five senses. He or she needs to be told or informed by somebody else who already knows what it is. For example, Tarzan goes to the city and it is his first time to see a computer, no matter how hard Tarzan would look at the computer, touch the computer, listen to its sounds and even taste it, he would never come to know that it is a computer unless somebody educates him.

Aristotle's Theory of Truth

Aristotle in his theory of truth postulates that truth or logical truth is basically the conformity/correspondence of thought to thing. This means that the intellect is able to grasp the essence of a thing in the form of an idea (universal) and this idea (universal) truly represents the thing as it is (Bittle, 1939, 169-170). For example, if one thinks of a ball pen as ball pen then that is truth. Falsity on the contrary is disconformity. It happens when one thinks of a thing as ball pen when in fact it is a pencil.

If an idea is universal then it has nothing to do with individual things. Knowledge or ideas cannot truly represent or has nothing to do with individual things. Therefore, Aristotle is an idealist and that true

knowledge of things as they are in themselves is not possible.

If ideas are universal then they are even unthinkable because they do not have thought contents. One cannot think of a universal. When one thinks, one always thinks of a particular object or person. To think of a tree without shape, color, quantity and quality is impossible. Therefore, universals are unthinkable.

CONCLUSIONS

Aristotle in his search for the ultimate causes and principles of reality went beyond the physical and arrived at metaphysics where he found his answers. In his search for true knowledge, Aristotle arrived at the universals/ideas. Because of this, he is an idealist.

RECOMMENDATIONS

The author recommends that other students of philosophy and scholars revisit the teachings of Aristotle and find out what new interpretation or understanding can be made on his thoughts and works. Further study on this matter is needed.

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Collaborative Learning in Small Group Discussions and Its Impact on Resilience Quotient and Academic Performance

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Abstract - This paper is a quasi-experimental investigation on the impact of Collaborative Learning (CL) in Small Group Discussions (SGD) on the development of the eight components of Resilience Quotient (RQ) and the Academic Performance (AP) of students in Maritime English classes. Using different statistical tools such as *mean* and *standard deviation* and *t-test for dependent and independent means*, the study revealed that students who have a higher academic performance tend to also have a higher RQ. Evidence also showed that a high level of RQ could enhance academic performance and that RQ could be developed through constant exposure to small group discussions at a certain period of time. Evidence in the study also showed that too much dependence on the teacher as the main source of learning in the traditional approach could lead to some regression or decline on the students' personal vision thereby lowering their level of resilience. There was also some evidence that

the improvement in the level of RQ can also be a teacher factor. Moreover, it was noticed that working in small groups could give students the opportunity to affirm their personal beliefs and individual capabilities in accomplishing their tasks in the teaching and learning process.

Keywords - collaborative learning, small group discussion, Resilience Quotient, academic performance

INTRODUCTION

Pedagogical institutions point to a high degree of academic performance as the ultimate goal of education. Over the years, continuous experiments on the use of different teaching strategies have been explored, but as there is no prescriptive method tailored to different groups of students, teachers and those in the academe continue to investigate on what conditions could work best to enhance their students' academic performance.

Corollary to this notion, research experiments have revealed strong evidence connecting resilience and academic success. Resilience is believed to be a key component of social emotional learning and as being a critical facet of education. This term refers to one's ability to succeed in school despite adverse conditions such as poverty or abuse. Resilience includes components such as confidence, a sense of well-being, motivation, an ability to set goals, relationships/connections, and stress management. Research shows that resilience can significantly affect school and life outcomes for youth, including academic success, even for students who are faced with great adversity. Furthermore, these skills can be learned, measured, and have lasting effects on academic performance.

Waxman and Huang (1997) found out that students who ranked in the 90th percentile on the standardized tests in mathematics were highly resilient, reporting significantly higher levels of task orientation and satisfaction, social self-concept, achievement motivation, and academic self-concept than their counterparts who ranked below the

10th percentile. In another study by Scales et al. (2003), it was found out that higher levels of resiliency traits are strongly correlated with higher grade point averages (GPAs) among middle and high school students. Moreover, in a study on probable candidates for drop outs, Reyes and Jason (1993) discovered that low risk students reported strong resiliency, an attribute that the high risk students were significantly lacking. Hanson and Austin (2003), in their own investigation, gathered that nearly every measure of resilience was positively related to concurrent test scores. The highest increases in test scores occurred in schools where the students reported high levels of resilience.

Considering that resilience is a significant factor in enhancing academic performance, several proponents like Scales (2003), Waxman and Huang (1997), Reyes and Jason (1993), and Hanson and Austin (2003) believe that this ability can be learned, measured, and have lasting effects on academic performance. Supporting this notion, Rutter (1990) tries to propose a connection between collaborative learning and resilience. He claims that students learn best when they are actively involved in the process of learning. In addition, researches made by Beckman (1990); Chickering and Gamson (1991); Cooper and Associates (1990); Goodsell, et al. (1992); Johnson and Johnson (1989); Johnson, Johnson, and Smith (1991); McKeachie, et al. (1986); Slavin (1980;1983); and Whitman (1988) report that, regardless of the subject matter, students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional formats. Students who work in collaborative groups also appear more satisfied with their classes.

The theory of collaborative learning (also referred to as cooperative learning) assumes that learning is facilitated when direct instruction is removed from the classroom and when students are placed in small groups to work as a team on an assignment or project. Collaborative learning changes the traditional classroom structure by reducing competition and increasing cooperation among students. Tension and possible hostility between students is diminished, thus raising academic achievement (Ornstein & Levine, 2007). Bernard (1991), in his own investigation, concluded that that classrooms in which students are given an opportunity to respond, engage in cooperative learning environment, and participate in setting goals are more likely to learn and achieve better. All of these characteristics help students

develop a sense of belonging and involvement and help reduce the feelings of alienation and disengagement. With that kind of connection in the school, students will have more of a protective shield against the adverse circumstances that life throws at them.

OBJECTIVES OF THE STUDY

The present study advances the use of collaborative learning in small group discussions as an intervention to develop resilience among students in order to improve their academic performance specifically in Maritime English. Specifically the study was conducted to pursue the following objectives:

1. To describe the performance of the control group and the experimental group in the eight components of Resilience Quotient before and after the intervention;
2. To determine the existence of a significant difference in the scores of the control group and experimental group in the eight components of Resilience Quotient **before the intervention** on the basis of the same groupings (as a whole, between groups of scholars, and between groups of non-scholars);
3. To find a significant difference in the scores of the control group and experimental group in the eight components of Resilience Quotient **after the intervention** on the basis of the same groupings (as a whole, between groups of scholars, and between groups of non-scholars);
4. To determine the level of Resilience Quotient of the control group and experimental group before and after the intervention;
5. To find a significant difference in the mean scores of the control group and experimental group in the pretest and posttest and in the summative test on the basis of the same groupings (as a whole, between groups of scholars, and between groups of non-scholars).

MATERIALS AND METHODS

The present investigation anchors itself on the framework of Collaborative Learning (CL) (Johnson and Smith, 1991) particularly in using small group discussions (SGD) as a useful tool in promoting resilience which is believed to be a significant factor in enhancing academic performance.

The teaching and learning environment in the present study is seen as a process or strategy which shows the input variables on one end and the output variables on the other. The input variables are composed of grouping where the classes are divided into the experimental group which was exposed to the CL in SGD environment and the control group which was taught using the traditional method of instruction; the type of students categorized as scholars and non-scholars; and their Resilience Quotient which was determined before the experiment. With these input variables, the intervention, when administered, is deemed to promote better learning. In this intervention, the collaborative learning environment characterized by the use of small group discussions is implemented with the experimental group while the usual traditional method is to be used with the control group. As an outcome, the intervention is expected to create an impact on both the cognitive and non-cognitive aspects of their learning skills. The following diagram illustrates the schematic framework of the concept of this study:

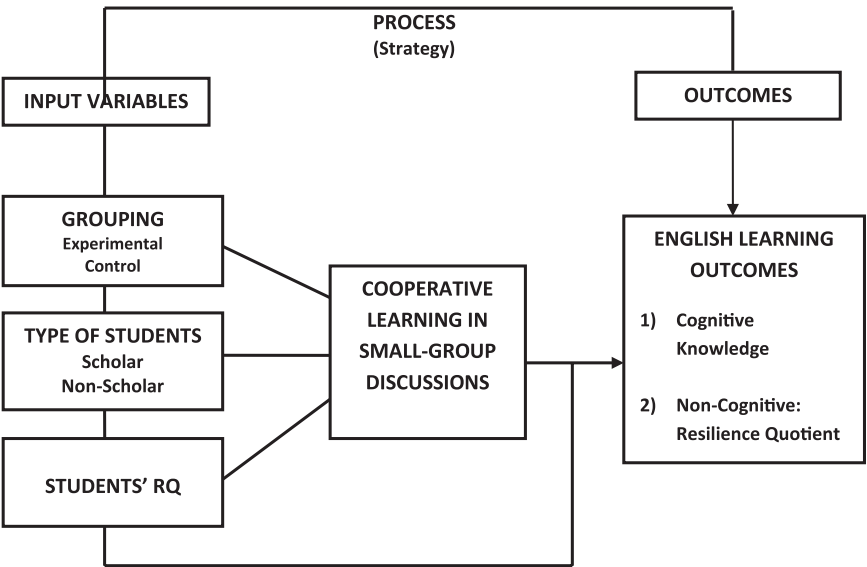


Fig. 1 The research paradigm showing the input, process, and outcome variables

The participants in this study were first year students enrolled in the Bachelor of Science in Marine Transportation Program of JBLCF-Bacolod for the Second Semester of SY 2009-2010. Four intact sections were selected prior to the experiment where two were randomly assigned as the control groups representing both scholars and non-scholars. The control groups were the classes of BSMT 1-NSA composed of 19 students (scholars) and BSMT 1-Granny Knot composed of 38 students (non-scholars). Another two classes were assigned as the experimental groups. These were BSMT 1-Polaris composed of 36 students (scholars) and BSMT 1-Fisherman's Bend having 38 students (non-scholars). The selection was made in such a way that the experimental groups match with their control group counterparts in terms of mental ability. This was done on the basis of their weighted average during their first semester with the school.

This study employed the quasi-experimental method using the pretest-posttest control group design. All four groups were given the RQ Test and the pretest prior to the experiment. The experiment lasted eight (8) weeks during which the experimental groups were taught using cooperative learning in small group discussion while the control groups were taught following the traditional strategy. After the 8-week intervention, the same groups were given the post test using the same instrument used in the pretest with some modifications. The RQ test was again administered to record their scores in the eight components after the experiment. Scores taken from the summative test were also used to further describe the impact of the intervention on the students' cognitive skills.

The instrument on Resilience Quotient was used (with permission from Russell and Consulting) to determine the initial RQ of the respondents. The instrument has eight components namely: self assurance, personal vision, flexible and adaptable, organized, problem solver, interpersonal competence, socially connected, and proactive. The maximum score for each of the components of RQ is 24. The instrument used for the pretest and posttest was a form of an achievement test prepared by the experimental teacher and validated by three other experts in the field. It was intended to measure the academic performance of the participants before and after the intervention. The other instrument used was a summative test consisting of a total of 60 multiple-choice items.

Mean was used to determine and compare the scores of the students in the eight components of RQ as well as their performance in the pretest, post test, and summative test. Frequency and percentage were used to determine how many of the respondents were very resilient, resilient, somewhat resilient, and not very resilient. To compare the scores of the experimental and control groups in the eight components of resilience, the t-test for independent samples was used.

RESULTS AND DISCUSSION

Scores of the Control Group and the Experimental Group in the Eight Components of RQ before and after the Intervention

Table 1.a Means and standard deviation in the eight components of RQ of the experimental group and control group before and after the intervention (as a whole)

Components of Resilience Quotient (RQ)	Experimental				Control			
	PRE		POST		PRE		POST	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Self Assurance	19.41	2.22	20.14	2.27	18.54	2.70	19.11	2.76
Personal Vision	20.88	2.14	21.01	2.14	20.38	2.69	19.70	3.35
Flexible and Adaptable	18.99	1.65	19.69	2.21	18.61	2.62	18.81	2.92
Organized	17.25	2.57	18.45	2.85	16.35	3.07	17.04	3.40
Problem Solver	18.93	2.60	19.53	2.83	18.42	3.12	18.63	2.85
Interpersonal Competence	18.64	3.07	19.47	2.34	18.11	2.76	18.72	3.22
Socially Connected	20.10	2.66	20.38	2.09	19.12	2.71	19.18	2.86
Proactive	20.03	2.31	20.05	2.28	19.67	2.37	18.88	2.69

Table 1.a shows that before the intervention, both the experimental and control groups scored highest in the following components: personal vision, socially connected, and proactive. However, both groups scored lowest in the following components: interpersonal competence, organized and problem-solver. For both groups, their low score in the said components could mean that even if they have

a high degree of personal vision, social connection, and proactive characteristic, they have not fully adopted a system in accomplishing their tasks and are simply accustomed to receiving lessons as taught to them in a teacher to student routine type of learning. It also appeared that they have not fully developed the skill to work with others as they appeared to be used to learning on their own.

Data after the intervention reveals that both groups have shown progress in their scores for all the eight components of resilience quotient except for personal vision and proactive in the case of the control group. This could mean that with the intervention, the students in the experimental group have all progressed in all the eight components and have shown a remarkable improvement especially on the three components where they used to have the lowest scores. In other words, they have become more organized, more of a problem-solver, and could now work better with others. In the case of the control group, however, the regression in personal vision and being proactive could be due to their dependence on the teacher as the main source of learning in the traditional environment.

Table 1.b Means and standard deviation in the eight components of RQ of the experimental group and control group before and after the intervention (between groups of scholars)

Components of Resilience Quotient (RQ)	NSA (Control Group)				Polaris Experimental Group			
	PRE		POST		PRE		POST	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Self Assurance	20.37	2.01	20.58	2.36	19.47	2.26	20.22	2.33
Personal Vision	21.79	1.27	21.32	2.43	21.28	1.98	21.08	2.22
Flexible and Adaptable	19.74	2.90	20.11	2.13	19.22	1.71	20.16	2.25
Organized	16.74	3.23	16.42	2.99	17.42	2.82	18.22	2.94
Problem Solver	20.58	2.19	19.74	2.70	18.86	2.88	19.54	2.95
Interpersonal Competence	19.47	2.37	20.26	2.23	19.36	2.31	19.92	2.17
Socially Connected	20.32	2.69	20.79	2.42	20.03	2.58	20.46	1.95
Proactive	21.11	1.63	20.00	2.29	20.25	2.43	20.49	2.12

It could be gleaned from Table 1.b that before the intervention, the groups of scholars appeared to have a high level of personal vision and social connection. They are also both proactive in their way of dealing with things. However, both groups show the lowest score on organization. Also worth-mentioning is that the NSA group appeared to be better problem solvers than the Polaris group.

Data after the intervention reveals that both groups of scholars appeared to have scored well in all the other six components of RQ. It can also be observed though that they remained to have a lower score for being organized and being problem-solvers. This could probably mean that these components of the RQ are skills that require a longer time to acquire and develop. It could be possible that given a longer span of time for the intervention, they could also hone these skills to a higher level. Comparatively looking at the scores between the two groups, the NSA group appeared to score slightly higher than the Polaris group in terms of self-assurance, personal vision, problem solver, interpersonal competence, and socially connected. It is interesting to note, however, that the Polaris group (experimental group) scored higher than the NSA group in terms of flexibility and adaptability, and being organized and proactive. This could have resulted from their exposure to collaborative learning in small group discussions where they were made to face adjustments with their peers as they planned and organized their outputs before they were turned over to the teacher or before they are presented and critiqued in front of the class.

Table 1. b.1 Comparative results of the scores of the groups of scholars on the eight components of RQ in the pretest and the posttest

Components of Resilience Quotient (RQ)	NSA (Control Group)		POLARIS (Experimental Group)	
	Pretest	Posttest	Pretest	Posttest
Self Assurance	20.37	20.58	19.47	20.22
Personal Vision	21.79	21.32	21.28	21.08
Flexible and Adaptable	19.74	20.11	19.22	20.16

Continuation of Table 1. b.1

Organized	16.74	16.42	17.42	18.22
Problem Solver	20.58	19.74	18.86	19.54
Interpersonal Competence	19.47	20.26	19.36	19.92
Socially Connected	20.32	20.79	20.03	20.46
Proactive	21.11	20.00	20.25	20.49

Table 1.b.1 shows the scores of the groups of scholars on the eight components of the RQ before and after the intervention. Among the eight components, it can be seen that the NSA group who were taught using the traditional method improved their scores in only four components: self assurance, flexible and adaptable, interpersonal competence, and socially connected. Their scores for personal vision, organized, problem-solving, and proactive declined after the intervention. It can be suspected that since they were taught using the teacher-dominant mode of instruction where the teacher dominated the floor for most of the activities, their skills on these aspects were not maximized and not used actively. Too much reliance and dependence on the teacher could have created a passive attitude on their part in the teaching-learning process thereby affecting their level of resilience especially on the said components. The group of Polaris students, on the other hand, revealed interesting results. It can be seen on the table that except for personal vision, the Polaris group (experimental group) showed improvement in all the other seven components of the RQ after the experiment. This could mean that the intervention has created a positive impact on their level of resilience. The decline in their score for personal vision could possibly be due to their experience in working with their groups. As they began to work as a team, their perspective could have changed in that they were thinking more in line with their group's goals rather than just their personal interest in the learning process.

Table 1.c Means and standard deviation in the eight components of RQ of the experimental group and control group before and after the intervention (between groups of non-scholars)

Components of Resilience Quotient (RQ)	Granny Knot (Control Group)				Fisherman's Bend Experimental Group			
	PRE		POST		PRE		POST	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Self Assurance	17.63	2.55	18.37	2.67	19.35	2.21	20.05	2.24
Personal Vision	19.68	2.94	18.89	3.48	20.49	2.24	20.95	2.08
Flexible and Adaptable	18.05	2.30	18.16	3.07	18.76	1.59	19.22	2.08
Organized	16.16	3.02	17.34	3.59	17.03	2.32	18.68	2.79
Problem Solver	17.34	2.97	18.08	2.79	19.00	2.33	19.51	2.74
Interpersonal Competence	17.42	2.72	17.95	3.38	17.95	3.56	19.03	2.46
Socially Connected	18.53	2.54	18.37	2.75	20.16	2.77	20.30	2.23
Proactive	18.95	2.37	18.32	2.73	19.81	2.20	19.62	2.38

For the groups of non-scholars before the intervention, it can be seen that except for personal vision and being socially connected, both groups of non-scholars appeared to have lower scores in all six other components of the RQ. If compared with those classified as scholars, the results seemed to point out that students who have a higher academic performance tend to also have a higher RQ. It is also worth-mentioning that the groups of non-scholars appeared to have the lowest score on being organized and on interpersonal competence.

After the experiment, the experimental group scored higher in all aspects compared to the control group. It is obvious to say then that the group which was exposed to the intervention has completely shown a higher level of resilience than those who were exposed to the traditional method of instruction.

It was also interesting to compare the scores of each group in the eight components of RQ while looking at their scores in the pretest and posttest. The following table has this data.

Table 1.c.1 Comparative results of the scores of the groups of non-scholars on the eight components of RQ in the pretest and the posttest

Components of Resilience Quotient (RQ)	GRANNY KNOT (Control Group)		FISHERMAN'S BEND (Experimental Group)	
	Pretest	Posttest	Pretest	Posttest
Self Assurance	17.63	18.37	19.35	20.05
Personal Vision	19.68	18.89	20.49	20.95
Flexible and Adaptable	18.05	18.16	18.76	19.22
Organized	16.16	17.34	17.03	18.68
Problem Solver	17.34	18.08	19.00	19.51
Interpersonal Competence	17.42	17.95	17.95	19.03
Socially Connected	18.53	18.37	20.16	20.30
Proactive	18.95	18.32	19.81	19.62

It can be gathered from the Table 1.c.1 that both groups of non-scholars have declined in their level of proactive involvement after the intervention. This lower level of assertiveness could be due to their not being scholarly. In the classroom, whatever the teaching method is, low-performing classes are normally quiet and dependent on the cues given by the teacher especially when exposed to very challenging tasks, so in the present study, the intervention did not really effect a positive change in this aspect. It is interesting to note, however, that the experimental group showed improvement in all the other seven components. In the control group, on the other hand, a decline can also be observed for personal vision and social connectivity. This could again be attributed to too much dependence on teacher instruction and individual responsibility of each student to respond in the learning process.

Difference in Scores of the Control Group and Experimental Group in the Eight Components of RQ before the Intervention (as a whole, between groups of scholars, and between groups of non-scholars)

Table 2.a t-test showing the means and standard deviation in the eight components of RQ of the control group and experimental group before the intervention (as a whole)

Components of Resilience Quotient	N	Mean	SD	t	df	Sig. value
Expt. Self Assurance Control	73 57	19.41 18.54	2.22 2.70	2.01	128	.047*
Expt. Personal Vision Control	73 57	20.88 20.39	2.14 2.69	1.16	128	.249
Expt. Flexible & Adaptable Control	73 57	18.97 18.61	1.65 2.62	.938	89.61	.351
Expt. Organized Control	73 57	17.25 16.35	2.57 3.07	1.81	128	.073
Expt. Problem Solver Control	73 57	18.93 18.42	2.60 3.12	1.02	128	.311
Expt. Interpersonal Competence Control	73 57	18.64 18.11	3.07 2.76	1.04	128	.302
Expt. Socially Connected Control	73 57	20.06 19.12	2.66 2.71	2.05	128	.042*
Expt. Proactive Control	7 57	20.03 19.67	2.31 2.37	.874	128	.384

$\alpha < .05$, significant *

Table 2.a reveals that before the intervention, there is a significant difference on the aspect of self assurance and socially connected between the experimental and control group in favor of the experimental group. The scores in the rest of the components are comparable for the two groups.

Table 2.b t-test showing the means and standard deviation in the eight components of RQ of the control group and experimental group before the intervention (between groups of scholars)

Components of Resilience Quotient	N	Mean	SD	t	df	Sig. value
Polaris Self Assurance NSA-1	36 19	19.47 20.37	2.26 2.01	1.45	53	.153
Polaris Personal Vision NSA-1	36 19	21.28 21.79	1.98 1.27	1.161	50.76	.251
Polaris Flexible & Adaptable NSA-1	36 19	19.22 19.74	1.71 2.90	.710	24.76	.484
Polaris Organized NSA-1	36 19	17.47 16.74	2.82 3.23	.874	53	.386
Polaris Problem Solver NSA-1	36 19	18.86 20.58	2.88 2.19	2.27	53	.027*
Polaris Interpersonal Competence NSA-1	36 19	19.36 19.47	2.31 2.37	.171	53	.865
Polaris Socially Connected NSA-1	36 19	20.03 20.32	2.58 2.69	.388	53	.700
Polaris Proactive NSA-1	36 19	20.25 21.11	2.43 1.63	1.38	53	.175

$\alpha < .05$, significant *

Table 2.b shows that before the intervention, the NSA group significantly appeared to be better problem-solvers than the Polaris group. For the rest of the components, the two groups showed comparable results.

Table 2.c t-test showing the means and standard deviation in the eight components of RQ of the control group and experimental group before the intervention (between groups of non-scholars)

Components of Resilience Quotient	N	Mean	SD	t	df	Sig. value
Fisherman's Bend	37	19.35	2.21	3.11	73	.003*
Self Assurance Granny Knot	38	17.63	2.55			
Fisherman's Bend	37	20.49	2.24	1.33	73	.189
Personal Vision Granny Knot	38	19.68	2.94			
Fisherman's Bend	37	18.76	1.59	1.55	65.86	.127
Flexible & Adaptable Granny Knot	38	18.05	2.30			
Fisherman's Bend	37	17.03	2.32	1.40	69.24	.166
Organized Granny Knot	38	16.16	3.02			
Fisherman's Bend	37	19.00	2.33	2.68	73	.009*
Problem Solver Granny Knot	38	17.34	2.97			
Fisherman's Bend	37	17.95	3.56	.719	73	.474
Interpersonal Competence Granny Knot	38	17.42	2.72			
Fisherman's Bend	37	20.16	2.77	2.66	73	.010*
Socially Connected Granny Knot	38	18.53	2.54			
Fisherman's Bend	37	19.81	2.20	1.64	73	.106
Proactive Granny Knot	38	18.95	2.37			

$\alpha < .05$, significant *

Data between the groups of non-scholars as revealed in Table 2.c showed a significant difference in scores on the following aspects: self-assurance, problem-solver, and socially connected. The significant difference was seen in favor of the experimental group.

Difference in Scores of the Control Group and Experimental Group in the Eight Components of RQ after the Intervention (as a whole, between groups of scholars, and between groups of non-scholars)

Table 3.a t-test showing the means and standard deviation in the eight components of RQ of the control group and experimental group after the intervention (as a whole)

Components of Resilience Quotient	N	Mean	SD	t	df	Sig. value
Self Assurance	74	20.14	2.27	2.34	129	.021*
Expt. Control	57	19.11	2.76			
Personal Vision	74	21.01	2.14	2.58	89.83	.011*
Expt. Control	57	19.70	3.35			
Flexible & Adaptable	74	19.69	2.21	1.90	101.03	.060
Expt. Control	57	18.81	2.92			
Organized	74	18.45	2.85	2.58	129	.011*
Expt. Control	57	17.04	3.40			
Problem Solver	74	19.53	2.83	1.79	129	.076
Expt. Control	57	18.63	2.85			
Interpersonal Competence	74	19.47	2.34	1.55	129	.124
Expt. Control	57	18.72	3.22			
Socially Connected	74	20.38	2.09	2.67	98.56	.099
Expt. Control	57	19.18	2.86			
Proactive	74	20.05	2.28	2.71	129	.008*
Expt. Control	57	18.88	2.69			

$\alpha < .05$, significant *

The results appearing in Table 3.a show that after the intervention, the experimental group performed significantly higher in self assurance, personal vision, organized, and in being proactive. This can be considered as a remarkable progress because before the intervention, the significant difference was only for the aspects of self-assurance and socially connected. It appears that the intervention has significantly

improved the personal vision, organization, and being proactive of the experimental group. It is noted however, that in socially connected, the experimental and control group have similar performance. It is very apparent that the intervention improved students' performance on self assurance, personal vision, organized and proactive. The difference in flexibility and adaptability was almost significant (sig. value is .060) in favor of the experimental group. This significant increase in score for self-assurance of the experimental group could mean a higher level of confidence which could be attributed to their improved social connections. Working with the group could have given them the opportunity to affirm their personal beliefs and individual capabilities in terms of accomplishing their tasks. Moreover, the collaborative environment could have improved their skill to organize and plan their tasks ahead of time.

Table 3.b t-test showing the means and standard deviation in the eight components of RQ of the control group and experimental group after the intervention (between groups of scholars)

Components of Resilience Quotient	N	Mean	SD	t	df	Sig. value
Self Assurance						
Polaris	37	20.22	2.33	.548	54	.586
NSA	19	20.58	2.36			
Personal Vision						
Polaris	37	21.08	2.22	.363	54	.718
NSA	19	21.32	2.43			
Flexible & Adaptable						
Polaris	37	20.16	2.25	.091	54	.928
NSA	19	20.11	2.13			
Organized						
Polaris	37	18.22	2.94	2.15	54	.036*
NSA	19	16.42	2.99			
Problem Solver						
Polaris	37	19.54	2.95	.242	54	.809
NSA	19	19.74	2.70			
Interpersonal Competence						
Polaris	37	19.92	2.17	.558	54	.579
NSA	19	20.26	2.23			

Continuation of Table 3.b

Socially Connected	Polaris	37	20.46	1.95	.552	54	.583
	NSA	19	20.79	2.42			
Proactive	Polaris	37	20.49	2.12	.793	54	.431
	NSA	19	20.00	2.86			

$\alpha < .05$, significant *

In Table 3.b, it can be observed that after the intervention, there is a significant difference in the scores of the groups of scholars in terms of organization. This significant difference is seen in favor of the experimental group which means that their exposure to the intervention has significantly improved their ability to organize their tasks. Another interesting observation is that before the intervention, it was found out that the NSA group (control group) significantly appeared to be better problem-solvers than those in the Polaris group (experimental group). After the intervention, the difference is not anymore significant. This is a remarkable progress because it appears that as problem-solvers, the experimental group has leveled up with the control group where before they appeared inferior to the control group in terms of this component.

Table 3.c t-test showing the means and standard deviation in the eight components of RQ of the control group and experimental group after the intervention (between groups of non-scholars)

Components of Resilience Quotient	N	Mean	SD	t	df	Sig. value
FB Self Assurance	37	20.05	2.24	2.96	73	.004*
	38	18.37	2.67			
FB Personal Vision	37	20.95	2.08	3.09	73	.003*
	38	18.89	3.48			
FB Flexible & Adaptable	37	19.22	2.08	1.75	65.26	.085
	38	18.16	3.07			

Continuation of Table 3.c

FB Organized GK	37	18.66	2.79	1.79	73	.077
	38	17.34	3.59			
FB Problem Solver GK	37	19.51	2.74	2.24	73	.028*
	38	18.08	2.79			
FB Interpersonal Competence GK	37	19.03	2.46	1.58	73	.119
	38	17.95	3.38			
FB Socially Connected GK	37	20.30	2.23	3.33	73	.001*
	38	18.37	2.75			
FB Proactive GK	37	19.62	2.38	2.20	73	.031*
	38	18.32	2.73			

$\alpha < .05$, significant *

Table 3.c shows interesting results. It can be observed that after the intervention, there is a significant difference in the scores of the groups of non-scholars in terms of personal vision, problem-solver, socially connected, and proactive. For the rest of the components their scores are comparable. It should be remembered that before the intervention, the experimental group of non-scholars significantly appeared to be better than the control group in terms of self-assurance, problem-solving skills, and social connection. After the intervention, they did not only maintain this edge in the said components but also in terms of personal vision and being pro-active. It is clear that the intervention has improved the scope of their resilience.

Level of Resilience Quotient (RQ) of the control group and experimental group before and after the intervention

To determine the level of resilience of the students in the experimental group and the control group, the following descriptions were used: VR (very resilient), R (resilient), SR (somewhat resilient), and NVR (not very resilient).

Table 4.a Level of RQ of the control group and the experimental group before the intervention

	NVR		SR		R		VR		Total	
	Pretest		Pretest		Pretest		Pretest		Pretest	
Group	f	%	f	%	f	%	f	%	f	%
Control	1	.77	3	2.30	51	39.23	2	1.55	57	43.85
Experimental	0	0	2	1.54	67	51.54	4	3.07	73	56.15
Total	1	.77	5	3.84	118	90.77	6	4.62	130	100
Scholars(Polaris)			1	2.6	33	86.8	2	5.3	36	94.7
Non-Scholars(FB)			1	2.6	34	89.5	2	5.3	37	97.4
Total			2	5.2	67	88.15	4	5.3	73	96.05
Scholars(NSA-1)					17	89.50	2	10.5	19	100
Non-Scholars (GK)	1	2.5	3	7.5	34	85.00			38	95
Total	1	2.5	3	7.5	51	86.44	2	3.39	57	96.61

Note: 4 data are missing in the posttest of the experimental and control and 2 missing data for scholars and non-scholars

The result in the pretest reveals that two respondents (1.55%) of the control group are very resilient and 4 (3.07%) of the experimental group are very resilient. Majority of the respondents are resilient. These majority is composed of 51 (39.23%) from the control group and 67 (51.54 %) from the experimental group. There are 3 or (2.30%) who are somewhat resilient from the control group and 2 or (1.54%) who are somewhat resilient from the experimental group. Only one or (.77%) is not very resilient from the control group and there is none from the experimental group. Moreover, it can be observed that for the groups of scholars, two students (5.3%) from Polaris appear to be very resilient, 33 (86.8%) are resilient, and one (2.6%) is somewhat resilient. For the NSA group, two (10.5%) appears to be very resilient and 17 (89.50%) are resilient.

For the groups of non-scholars, on the other hand, two (5.3%) appear to be very resilient, 34 (89.5%) are resilient, and one (2.6%) is somewhat resilient in the Fisherman's Bend group. In the case of Granny Knot, nobody appears to be very resilient, 34 (85%) are

resilient, three (7.5%) are somewhat resilient, and one (2.5%) appears to be not very resilient. Figures appearing in this set of data would be compared later with those gathered after the intervention.

Table 4.b Level of RQ of the control group and the experimental group after the intervention

	NVR		SR		R		VR		Total	
	Posttest		Posttest		Posttest		Posttest		Posttest	
Group	f	%	f	%	f	%	f	%	f	%
Control	1	.77	5	3.85	44	33.59	7	5.34	57	43.51
Experimental	0	0	1	.77	63	48.09	10	7.64	74	56.49
Total	1	.77	6	4.62	107	81.68	17	12.98	131	100
Scholars(Polaris)			1	2.6	30	78.9	6	15.8	37	97.4
Non-Scholars(FB)					33	86.8	4	10.5	37	97.4
Total			1	2.6	63	82.89	10	13.16	74	97.4
Scholars(NSA-1)			1	5.3	15	78.9	3	15.8	19	100
Non-Scholars (GK)	1	2.5	4	10	29	72.9	4	10.0	38	95
Total	1	1.69	5	8.47	44	74.58	7	11.86	57	96.61

Note: 4 data are missing in the posttest of the experimental and control and 2 missing data for scholars and non-scholars

Table 4.b reveals that the number of very resilient respondents increases in the posttest for the experimental and the control group although the increase is more in the experimental group. This might be attributed to the intervention used in the experimental group. It is noted however, that in the control group there is still one respondent who is not very resilient. This could be due to the lack of intervention made for this group of students.

While looking at the separate data for scholars and non-scholars, some remarkable improvements have been noted especially for both groups of scholars and non-scholars who were exposed to the intervention (Polaris and Fisherman’s Bend). For example, in the Polaris group where only two students appeared to be very resilient before the intervention, after the intervention there were already six. In the

Fisherman's Bend group were there used to be only two students who were very resilient, after the intervention there were already four. The one who used to be just somewhat resilient has now become resilient after the intervention. This means to say that for that short span of time of six weeks of exposure to the intervention, the level of resilience of some students seemed to have improved. It is also important to note the following observations among those in the control groups. First, where there used to be no one in the NSA group who was found to be less than resilient, after exposure to the traditional method, one came out to be just somewhat resilient. This could possibly be attributed to too much dependence on the teacher or for this student to have turned passive about learning since their group has not been subjected to any challenging activity during the actual instruction. Meanwhile it was also noted that for the Granny Knot group, where there used to be no student who was found to be very resilient, after the intervention there have been four. This phenomenon could possibly be attributed to teacher factor.

Difference in the Mean Scores of the Control Group and the Experimental Group in the Pretest and Posttest and in the Summative test

Table 5. a t-test showing the means and standard deviations in the pretest, posttest, and summative test of the control group and the experimental group (as a whole)

Group		N	Mean	SD	t	df	Sig. value
Pretest	Expt.	76	37.07	5.63	1.17	99.17	.246
	Control	59	35.63	8.07			
Posttest	Expt.	76	44.82	5.74	1.54	97.87	.126
	Control	59	42.85	8.39			
Summative	Expt.	76	62.43	7.54	3.97	105.35	.000*
	Control	59	56.27	9.91			

The results show that both groups have a similar performance in the pretest and posttest. However, in the summative test, the experimental group performed significantly higher than the control

group, revealing a significant impact of the intervention in terms of the summative test results. The comparable results in the posttest could be due to the “freshness” of the items since they were exposed to it for the second time at eight weeks interval only. The instrument for the summative test, on the other hand, was administered to them only once.

Table 5.b t-test showing the means and standard deviations in the pretest, posttest, and summative test of the control group and the experimental group (between groups of scholars)

Group		N	Mean	SD	t	df	Sig. value
Pretest	Polaris	38	39.61	4.51	2.82	55	.007*
	NSA	19	43.42	5.37			
Posttest	Polaris	38	47.42	3.53	4.06	55	.000*
	NSA	19	51.53	3.75			
Summative	Polaris	38	39.92	4.79	.019	55	.985
	NSA	19	41.32	3.15			

It can be observed in Table 5.b that the NSA group (Control Group) has significantly showed a higher scoring ability in both the pretest and posttest. The figures further reveal that their scores in the summative test did not significantly differ. One possible factor why this is so is that of the NSA group’s smaller class size. Because the number of students was small, a semi-individualized form of instruction could have been made possible in a teacher-controlled class setting. Students could have been given more ample time to interact and to clarify the lessons with the teacher. The comparability of their scores in the rest of the assessments could be an indication that the initial advanced mental ability of both groups is a big factor in determining their success in class. It is worth-noting though that the intervention has significantly improved the degree of resilience of the experimental group especially in terms of organization and problem-solving.

Table 5.c t-test showing the means and standard deviations in the pretest, posttest, and summative test of the control group and the experimental group (between groups of non-scholars)

Group		N	Mean	SD	t	df	Sig. value
Pretest	FB	38	34.53	5.53	1.93	76	.057
	GK	40	31.93	6.31			
Posttest	FB	38	42.21	6.36	2.37	76	.020*
	GK	40	38.73	6.63			
Summative	FB	38	36.76	4.99	4.10	76	.000*
	GK	40	32.45	4.84			

Table 5.c reveals very remarkable findings. The figures show that both groups of non-scholars have started off on the same level before the intervention as proved by their scores in the pretest. It is interesting to note, however that after the intervention, the scoring ability of the experimental group appeared significantly higher compared to those in the control group specifically in the posttest and the summative test. This raises a point that the intervention has significantly improved not only the level of resilience of the students but also their academic performance.

CONCLUSIONS

Students who have a higher academic performance tend to also have a higher Resilience Quotient (RQ). They seem to have their own way of coping with the lessons, so they could readily adapt to the absence or the infusion of any form of intervention. Using the collaborative learning approach in small group discussions can enhance the students' level of resilience to some extent in relation to some of its components. The method also displayed a significant impact on their scores in the tests. This was particularly observed as significant among the groups of non-scholars. Initial evidence from this study however revealed that some aspects of resilience, specifically on being organized and being a good problem-solver, take some time

to develop. In the study, it was noted that the limited exposure of the students to the intervention did not really improve the organization and problem-solving components of their RQ. It is possible though that given a longer span of time for the intervention, they could also hone these skills to a higher level.

Evidence in the study also showed that too much dependence on the teacher as the main source of learning in the traditional approach could lead to some regression in personal vision. It could create a passive attitude on the part of the students in the teaching-learning process thereby lowering their level of resilience. The improvement in the level of RQ can also be a teacher factor. This was evidenced by the improvement of the control group in some components of the RQ even without exposure to the intervention. Working with the group could give students the opportunity to affirm their personal beliefs and individual capabilities in terms of accomplishing their tasks. Moreover, findings of this study supported the earlier assumptions that using the Collaborative Learning approach by engaging the students to small group discussions could significantly improve not only the level of resilience of the students but also their academic performance.

RECOMMENDATIONS

Based on the findings derived from this study, the following recommendations are given. First, it is important also to capitalize on developing the affective domain of learning by providing a protective work climate between and among the teacher and the students. This means providing a connection which promotes a caring and supportive relationship to promote a more effective learning process. Next, the instructors must be a model of resiliency. They should provide more opportunities to students by giving them time in listening and validating their opinions. They must also try to refrain from being too judgmental. They should constantly remind and encourage their students to obtain a high level of academic competence. Instructors must highlight the importance of meeting expectations and aiming for achievement. They must put a strong belief in their students' innate capacities, provide them more challenging tasks, offer them support when needed, focus on strengths instead of weaknesses, and promote

a student-centered instruction to encourage individual participation in a collaborative atmosphere. Third, there is also a need for instructors to create opportunities for participation and contribution. They should give students power and responsibility by allowing them to work interactively with others in the class, reflect, think critically, and express their opinions openly.

While a multitude of studies on collaborative learning have been conducted over the years, it is still best to explore the applicability of this method in different context across disciplines. After all, it is possible that what works in one context may not necessarily apply to another. It would be interesting to find out what other strategies of collaborative learning could work best with the students and which of its attributes could effect problem-solving skills and the ability to be more organized.

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Management Foundations and Global Readiness Index of School Heads of the Philippines

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Abstract - An understanding of personality contributes to an understanding of organizational behavior in that we expect a predictable interplay between an individual's personality and his or her tendency to behave in certain ways (Jacob 1995). Most organizations today must achieve high performance in the context of a competitive and complex global environment (Porter 1998). This descriptive survey-correlation method of research aimed to determine whether the management foundations of secondary school heads were related to their global readiness index. The findings of this study may serve as a basis to take their strong personal characteristics as skills that should be nurtured and to take their good points as starting points to consider where and how to further pursue the development of their managerial skills and competencies. This may also serve as a feedback to work hard to grow and develop continually in the management foundations considering that their successes as 21st century managers may well rest on an initial awareness of the importance of these basic

management foundations and that they must be comfortable with the global economy and the global diversity that it holds. Chi-square established that their management foundations are not significantly related to their global readiness index.

Keywords – management, personal characteristics, globalization, global awareness and cultural sensitivity

INTRODUCTION

Management is the attainment of organizational goals in an effective and efficient manner through planning, organizing, leading, and controlling organizational resources. These functions of management form a framework for managerial action (Schermerhorn 1999).

In what has become a classic study of management behavior, Henry Mintzberg (1989) moved beyond this functional description and identified three sets of roles namely: 1) interpersonal roles, 2) informational roles, and 3) decisional roles that managers must be prepared to perform on a daily basis. Essential to these roles and to all managerial work are good interpersonal relationships with a wide variety of people, both inside and outside the organization (Kotter 1982).

Managers are formally responsible for supporting the work efforts of other people. Anyone who serves as a manager or team leader assumes a unique responsibility for work that is accomplished largely through the efforts of other people. The result is a very demanding and complicated job that has been described by researchers in the following terms (Schermerhorn, Hunt, and Osborn 2000). *Managers work long hours.* A work week of more than the standard 40 hours is typical. The length of the work week tends to increase as one advances to higher managerial levels; heads of organizations often work the longest hours. *Managers are busy people.* Their work is intense and involves doing many different things on any given work day. The busy day of a manager includes a shifting mix of incidents that require attention, with the number of incidents being greatest for lower-level managers. *Managers are often interrupted.* Their work is fragmented

and variable. Interruptions are frequent, and many tasks must be completed quickly. *Managers work mostly with other people.* In fact, they spend little time working alone. Time spent with others includes working with bosses, peers, subordinates, subordinates of their subordinates, as well as outsiders, such as customers, suppliers, and the like. *Managers are communicators.* In general, managers spend a lot of time getting, giving, and processing information. Their work is often face-to-face verbal communication that takes place during formal and informal meetings. Higher level managers typically spend more time in scheduled meetings than do lower level managers.

The Department of Education of the Philippines is mandated by Republic Act 9155, otherwise known as the "Governance of Basic Education Act of 2001," that the principals, school administrators and teachers-in-charge (collectively referred to as school heads) must exercise instructional leadership and sound administrative management of the school.

Moreover, the Mission Statement of the Medium-Term Development Plan for Basic Education declares:

We shall decentralize educational management so that the school becomes the focus for enhancing initiative, creativity, innovation and effectiveness. Our efforts at educational quality improvement shall originate from the school and redound to its own benefit and that of the community.

Subsequently, the Department of Education further defined decentralization to mean: promotion of school-based management; transfer of authority and decision-making from central and regional offices to the divisions and schools; sharing education management responsibilities with other stakeholders; and devolution of education functions.

In other words, decentralization gives school heads and other movers of the school decision-making power, where previously, such power rested only on central, regional and division level officials. Power given to the schools in such that decision-making will be made by all those who are closely involved with resolving the challenges of the individual schools, so that the specific needs of the students will be served more effectively.

Educational institutions that are managed by the school heads are not exempted from the concept of globalization. Just as today's

organizations need managers with global awareness and cultural sensitivity so do schools need school heads who must know how to deal with people from other countries and cultures.

Personality is an important attribute in management. It represents the overall profile or combination of characteristics that capture the unique nature of a person as that person reacts and interacts with others. An understanding of personality contributes to an understanding of organizational behavior in that we expect a predictable interplay between an individual's personality and his or her tendency to behave in certain ways (Jacob 1995).

To demonstrate leadership qualities, to develop a culture of peace and respect for cultural diversity in oneself, and to implement policies that promote a culture of peace and respect for cultural diversity are but few management attribute profile or characteristics from among the competency framework for Southeast Asian school heads developed by the Southeast Asian Ministers of Education Organization (SEAMEO) on 23 October 2009.

Most organizations today must achieve high performance in the context of a competitive and complex global environment (Porter 1998).

A global manager has the international awareness and cultural sensitivity needed to work well across national borders (Moran and Riesenberger 1999) and according to Houlder (1996), experienced international managers indicate that a "global mindset" of cultural adaptability, patience, flexibility, and tolerance are indispensable.

School heads must understand first their own personal characteristics and culture in order to work well with people from different cultures hence this assessment on their self-described management foundations profile and to establish a baseline measurement of their readiness to participate in the global work environment.

This study aimed at finding out whether the management foundations of public secondary school heads of the Philippines were related to their global readiness index or the extent of their readiness to participate in the global work environment.

The findings of this study may serve as a basis for this group of public secondary school heads of the Philippines to take their strong

personal characteristics as skills that should be nurtured by them and to take their good points, but still have room to grow, as starting points to consider where and how to further pursue the development of their managerial skills and competencies.

This may also serve as a feedback for all public secondary school heads of the Philippines to work hard to grow and develop continually in the management foundations considering that their successes as 21st century managers may well rest on an initial awareness of the importance of these basic management foundations as well as a willingness to strive continually to strengthen them throughout their work career and for them to be aware that to be successful in the 21st century work environment, they must be comfortable with the global economy and the global diversity that it holds.

Finally, for the Bureau of Secondary Education of the Department of Education to consider the findings of this study as a partial basis for assessment of the personal characteristics and the readiness to participate in the global work environment of public secondary school heads.

OBJECTIVES OF THE STUDY

Specifically, this study sought answers to the following objectives:

1. To describe the management foundations of public secondary school heads of the Philippines in each of the following personal characteristics: resistance to stress, tolerance for uncertainty, social objectivity, inner work standard, stamina, adaptability, self-confidence, self-objectivity, introspection, and entrepreneurship;
2. To determine their global readiness index in terms of the following dimensions: global mindset, global knowledge, and global work skills; and,
3. To determine significant relationships between their management foundations and their global readiness index.

MATERIALS AND METHODS

Figure 1 presents the data of the respondents by region.

Figure 1: Data of the respondents by region

Region	Total
National Capital Region	6
Region I	10
Region II	6
Region III	12
Region IV-A	8
Region IV-B	10
Region V	24
Region VI	24
Region VIII	44
Region IX	4
Region XI	2
Region XII	2
Region XIII	6
TOTAL	158

Figure 2 presents the data of the respondents by position/designation.

Figure 2: Data of the respondents by position/designation

Position / Designation	Total
Secondary School Principal IV	8
Secondary School Principal III	22
Secondary School Principal II	28
Secondary School Principal I	82
Head Teacher III	6
Head Teacher II	4
Head Teacher I	4
Teacher In-Charge/Teacher III	4
TOTAL	158

The respondents of this study were 60 male and 98 female or a total of 158 public secondary school heads of the Philippines which comprises 65.83% of the total population of 240. These are the school heads who have returned the questionnaire to the researcher.

A set of data-gathering questionnaire which is composed of two parts was prepared by the writer.

Part I of the questionnaire measured the management foundations profile of the respondents in each of the following personal characteristics: resistance to stress, tolerance for uncertainty, social objectivity, inner work standard, stamina, adaptability, self-confidence, self-objectivity, introspection, and entrepreneurship which was adapted from the A 21st Century Manager Assessment Instrument of Schermerhorn, Hunt, and Osborn (2000). The items on the list are recommended by the American Assembly of Collegiate Schools of Business as skills and personal characteristics that should be nurtured in college and university students of business administration. The researcher believes that the same items should also be nurtured in the public secondary school heads as their skills and personal characteristics. It was determined by requesting them to rate themselves on their personal characteristics using this scale:

- S = Strong, I am very confident with this one.
- G = Good, but I still have room to grow.
- W = Weak, I really need work on this one.
- ? = Unsure, I just don't know.

One point is given to each Strong answer, and $\frac{1}{2}$ point for each Good answer. No points for Weak and Unsure answers. The total score is the management foundations profile of each respondent which was interpreted using the following table:

- 7.5 - 10 = Strong
- 5.0 - 7.49 = Good
- 2.5 - 4.49 = Weak
- 0.5 - 2.49 = Unsure

Part II of the questionnaire measured their global readiness index or the extent of their readiness to participate in the global work environment in terms of the following dimensions: global mindset, global knowledge, and global work skills. This was adapted from the Global Readiness Index Instrument of Schermerhorn, Hunt, and Osborn (2000) which they developed from "Is Your Company Really Global," Business Week (December 1, 1997). It was determined by requesting them to measure their readiness to participate in the global work environment. The respondents rated themselves on each of the ten items to establish a baseline measurement of their readiness to participate in the global work environment by using the following scale:

- 5 = Very Good
- 4 = Good
- 3 = Acceptable
- 2 = Poor
- 1 = Very Poor

Their scores were developed as follows:

The average score of items 1, 2, 3, and 4 is the Global Mind-set Score of each respondent which was interpreted using the following table:

- 4.26 - 5.0 = Very Good
- 3.26 - 4.25 = Good
- 2.26 - 3.25 = Acceptable
- 1.26 - 2.25 = Poor
- 1.0 - 1.25 = Very Poor

The average score of items 5, 6, and 7; and the average score of items 8, 9, and 10 are the Global Knowledge Score and the Global Work Skills Score, respectively, of each respondent which was interpreted using the following table:

- 4.34 - 5.0 = Very Good
- 3.34 - 4.33 = Good

2.34 - 3.33 = Acceptable

1.34 - 2.33 = Poor

1.0 - 1.33 = Very Poor

In interpreting the overall global readiness index of each respondent, codes were utilized. Coding was done to facilitate the analysis of the data. The dimension having the highest code was considered the index of the respondents or the extent of their readiness to participate in the global work environment.

The descriptive survey-correlation method of research was used in this study using a questionnaire to collect data. Permission to gather the data was secured from the National Association of Public Secondary Schools of the Philippines (NAPSSPHIL) Executive Board and the distribution of questionnaire has been undertaken personally by the researcher, who was the chair of the secretariat, during the first day and the registration of participants to the 2nd NAPSSPHIL Public Secondary School Heads' Congress at Puerto Princesa City, Palawan on January 20 – 22, 2010. The retrieval of the questionnaires lasted until the end of the closing ceremony on January 22, 2010.

Frequency counts determined their profile in each of the ten personal characteristics and the extent of their readiness to participate in the global work environment.

Average scores determined the overall profile of both variables.

Chi-square was used in testing the null hypothesis that there are no significant relationships between their management foundations profile and their global readiness index that was tested at the 0.05 level of significance.

RESULTS AND DISCUSSION

On the management foundations profile of public secondary school heads of the Philippines

Table 1 shows the management foundations profile of public secondary school heads of the Philippines.

Table 1: The management foundations profile of public secondary school heads of the Philippines

	Strong		Good		Total	
Personal Characteristics	F	%	F	%	F	%
Resistance to stress	86	54.43	72	45.57	158	100
Tolerance for uncertainty	52	32.91	106	67.09	158	100
Social objectivity	64	40.51	94	59.49	158	100
Inner work standards	72	45.57	86	54.43	158	100
Stamina	92	58.23	66	41.77	158	100
Adaptability	106	67.09	52	32.91	158	100
Self-confidence	86	54.43	72	45.57	158	100
Self-objectivity	80	50.63	78	49.37	158	100
Introspection	94	59.49	64	40.51	158	100
Entrepreneurism	76	48.10	82	51.90	158	100
Overall Profile	86	54.43	72	45.57	158	100

It can be gleaned from table 1 that majority of the respondents have strong management foundations profile on the following personal characteristics: resistance to stress (54.43%), stamina (58.23%), adaptability (67.09%), self-confidence (54.43%), self-objectivity (50.63%), and introspection (59.49%). On the other hand, the majority of them have good management foundations profile on the personal

characteristics of tolerance for uncertainty (67.09%), social objectivity (59.49%), inner work standards (54.43%), and entrepreneurship (51.90%).

Overall, the profile shows that majority or 54.43% of the respondents have strong management foundations profile while the 45.57% of them have good management foundations profile.

The findings of this study resembles to the investigation of Salgado (1997), as cited by Greenberg and Baron (1999), that examined the relationship between the standing of the big five dimensions of personality and job performance. The results were clear: High degrees of consciousness and emotional stability were associated with high degrees of performance across all occupational groups and all measures of performance.

On the global readiness index or the extent of readiness to participate in the global work environment of public secondary school heads of the Philippines

Table 2 shows the global readiness index or the extent of readiness to participate in the global work environment of public secondary school heads of the Philippines.

Table 2: The global readiness index or the extent of readiness to participate in the global work environment of public secondary school heads of the Philippines

	Very Good		Good		Ac-cept-able		Total	
Dimensions	F	%	F	%	F	%	F	%
Global mind-set	82	51.90	72	45.57	4	2.53	158	100
Global knowledge	42	26.58	74	46.84	42	26.58	158	100

Continuation of Table 2

Global work skills	54	34.18	78	49.37	26	16.45	158	100
Overall Index	54	34.18	90	56.96	14	8.86	158	100

Table 2 revealed that majority of the respondents or 51.90% of them indicated that they have a very good global mind-set to participate in the global work environment. In the other two dimensions, however, only 26.58% and 34.18% of them have indicated that they have a very good global knowledge and global work skills readiness index, respectively. Almost one half of them have indicated to have a good global mind-set (45.57%), global knowledge (46.84%), and global work skills (49.37%) readiness to participate in the global work environment. The other respondents indicated to have an acceptable global mind-set (2.53%), global knowledge (26.58%), and global work skills (16.45%) readiness index.

The overall index shows that majority or 56.96% of the respondents have good global readiness index. Only 34.18% of them have very good global readiness index while 8.86% of them have acceptable global readiness index.

The chi-square established that there are no significant relationships between the management foundations profile and the global readiness index of public secondary school heads since the obtained value of χ^2 , which is 2.742, is lesser than the tabular/critical value of χ^2 at the 0.05 level of significance of 5.991. The null hypothesis that there are no significant relationships between the management foundations and the global readiness index of public secondary school heads, therefore, is accepted.

The non significant relationships between the management foundations and the global readiness index of public secondary school heads imply that it does not follow that if they have strong management foundations they also have very good global readiness index.

CONCLUSIONS

This research finally concluded that majority of the respondents are very confident with their ability to get work done even under stressful condition; to sustain long work hours; to be flexible and adapt to changes; to be consistently decisive and display one's personal presence; to evaluate personal strengths and weaknesses and to understand one's motives and skills to a job; and to learn from experience, awareness, and self-study. In their ability to get work done even under ambiguous and uncertain conditions; to act free of racial, ethnic, gender, and other prejudices or biases; to personally set and work to high-performance standards; and to address problems and take advantage of opportunities for constructive change majority of the respondents are confident but believe that they still have room to grow.

This research also concluded that while public secondary school heads are very comfortable to receive and respect cultural differences they are only comfortable in continuing quest to know and learn more about other nations and cultures as well as in allowing themselves to work effectively across cultures.

The management foundations of public secondary school heads of the Philippines are not significantly related to their global readiness index or the extent of their readiness to participate in the global work environment.

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Implementation of Strengthened Technical Vocational Education Program – Competency Based Curriculum, Northern Mindanao, Philippines

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Abstract - This study attempted to assess the implementation of the Strengthened Technical and Vocational Education Program – Competency Based Curriculum (STVEP-CBC) in Region x. The study involved nine (9) DepED Technical Vocational High Schools in Region X – Northern Mindanao. The respondents included twenty one (21) administrators and ninety one (91) teachers. Descriptive statistics were used to describe and to analyze the data. The study also utilized T – test for paired values to evaluate the difference between administrators and teachers assessments in the status of implementation of STVEP - CBC. The school administrators and teachers assessed the status of the implementation of STVEP-CBC along the aspects of its program. Findings show that both administrators and teacher respondents were assessed very satisfactory on items of Competency Assessment and Certification, Instructional and Teacher Support Material, Curriculum Instruction, Program and Project

Management and Monitoring and Evaluation. On one hand, both respondents register as only satisfactory on the aspect of facilities and services. This can be due to the fact that a budgetary allocation in this area is insufficient. On the other hand, assessments of administrators and teachers vary on the following: excellent by the administrators while very satisfactory by the teachers respectively the items on Human Resource Development, Property Supply Management, Fiscal Management and Physical Plant Facility. Such high assessments of the two groups are attributed to their satisfaction level with the implementation of the different programs. The professional profiles of the respondents may also have accounted for the effectiveness on the implementation of the programs. Additional budgetary allocation and enhancement trainings for both teachers and administrators are recommended. Likewise, regular monitoring should be undertaken to keep track in the effective and efficient implementation of the program.

Keywords - Strengthened Technical Vocational Education, Program – Competency Based Curriculum STVEP–CBC activities

INTRODUCTION

Development, implementation and evaluation are administrative management processes. A program, project, plan, activity or any endeavor must start with the following phases within the administrative cycle: formulation which is the planning phase, implementation which is the execution phase and evaluation which is the review and monitoring phase. Efficiency and effectiveness of the program can be measured through consistent and effective monitoring, evaluation and assessment in order to rectify weaknesses, enhance strengths and come up with a better program to attain quality education (Gregorio 1990).

Quality education has always been the major thrust of Philippine education. Amarga (2002) as cited by Botones (March 2010) in her dissertation, pointed out that one indicator of educational excellence is the presence of highly effective, efficient and efficacious curriculum implementers: the school teachers and administrators.

In the 2006 DepEd data and statistics on cohort survival rates, out of 100 pupils that enter grade one, only 65 will reach and finish grade six. Meaning, there is already a 35 percent dropout rate in the elementary. Of the 65 elementary graduates, only 58 will enter high school. Eventually, out of 58, only 43 will finish their secondary education. In short, the dropout rate in high school is an alarming rate of 26 percent. Of the 43 high school graduates, only 23 will pursue their college education. The other 20 might have been in post- secondary or out-of-school status already. Eventually, only 14 of these 23 college enrollees will finish college (DepEd Updates 2007).

Considering the cost of tertiary education, a number of high school graduates cannot make it to tertiary education. This plus other factors such as poor quality of teaching, high direct and indirect schooling costs and the paucity of 'good jobs' discourages/prevents the parents from sending their children to college. Education has also become lower level of priority compared to other short term pressing needs such as maximizing household income or providing food security (Bennel 2007) To address this reality, the Department of Education offer the technical vocational education program which is currently implemented all over the country. It provides the students with certifiable knowledge and skills, thus making them graduates equipped lifelong skills which they can use to become productive and responsive members of society (Cangas 2008).

To be successful, vocational skills and trainings have to take into consideration the characteristics of local and national labour markets and employability which is commonly defined as a combination of assets and competence (Hartl 2009).

The Strengthened Technical Vocational Education Program – Competency Based Curriculum (STVEP – CBC) aims to help lessen the dropout rate in high school and help lessen job – skills mismatch of graduates and labor market needs of local industries. It is geared towards providing technical-vocational students with TESDA

certifiable skills while still in the high school (Andrada 2008).

In its implementation, the STVEP – CBC has directly benefited 282 technical – vocational high schools by putting them in a unique place in the public secondary system. Its vision is for them to become the center of excellence for fields of specializations in Arts and Trades, Agriculture and Fishery (DepEd Order No. 42 s, 2008).

Hean (2004) pointed out some of the observable practices which are also revelations of the teachers and the administrators of these schools. These include the following: lack of appropriate, updated training of the teachers handling the subject areas and inadequate facilities and equipment which can be used for effective teaching.

On the part of the students, there are crowded classrooms because of oversized enrolment; this is consistent with the findings of Pontillan (2002). Mismatched enrollees if the program call for appropriate screening to tailor fit the curriculum requirements to the interest, potentials and qualifications of the students. Some students have poor or low academic performance (Labrador 2004)

Concerned therefore of the above realities, this research study attempts to come up with empirical evidences and validates findings towards the improvement of the Strengthened Vocational Technical Education Program – Competency Based Curriculum.

OBJECTIVES OF THE STUDY

The objectives of the study are: (1.) to determine the status of implementation of activities of STVEP-CBC as assessed by the administrators and teachers; (2.) profile of the administrators and teachers; and, (3.) to compare the assessment of the administrators and the teachers on the status of implementation of Technical vocational activities

MATERIALS AND METHODS

Research Design

This study uses the descriptive method in determining the respondents' perspective on the status of implementation of

Strengthened Technical Vocational Education Program- Competency based curriculum in Region X, Northern Mindanao, Philippines.

Respondents of the Study

The respondents of this study were the school administrators who are principals, school-in-charge, assistant principals and department heads of the 9 identified technical-vocational schools in Region X. The other respondents were the teachers coming from these schools.

The total population of this study is presented in Table 1.

Table 1. Distribution of respondents

Technical-Vocational Schools	Administrators	Teachers	Total No. of Respondents
Aloran Trade School	4	11	15
Baliangao School of Fisheries	3	10	13
Bukidnon School of Home and Industries	3	16	19
Bunawan Agricultural High School	1	6	7
Iligan City National High School	2	9	11
Kinuguitan Agricultural School	1	8	9
Opol National Secondary Agricultural Technical School	3	14	17
Ozamis City School of Arts and Trades	3	13	16
Rogongon Agricultural School	1	4	5
Total	21	91	112

Sampling Procedure

The study made use of purposive sampling, with the administrators and teachers assigned to teach in the STVEP-CBC as respondents.

Research Instrument

A survey questionnaire was utilized to gather the pertinent data for this research. The survey questionnaire for administrator and teacher respondents consists of 3 parts. The first part is the respondents profile; the second part is the respondents' assessments on the implementation of the strengthened Technical-Vocational Education Program. This part of the questionnaire presents the twelve (12) articles of the Manual of Operation for Public Technical-Vocational High Schools. There are five statements that describe each article and the respondents are made to assess each article in terms of their awareness and knowledge in the implementation of STVEP. The third part includes the respondents suggestions for intervention mechanism. The respondents were expected to provide suggestions in the areas administration, budget, curriculum, staff, facilities and services, monitoring and evaluation, students, teachers/faculty. There are two sets of the instrument. One is for the administrator and the other one is for the teachers. This questionnaire underwent thorough review and enhancement, checked and validated by City Division DepEd officials and professors of Mindanao State University-Iligan Institute of Technology.

The second part of the instrument was designed to elicit information from the administrator and teacher respondents on the assessment of the status of implementation of activities of STVEP-CBC. To facilitate quantification and ease in analysis and interpretation, the following scaling was adopted:

Scale	Range	Descriptive Rating
1	1.00 – 1.80	Unsatisfactory
2	1.81 – 2.60	Fair
3	2.61 – 3.40	Satisfactory

4	3.41 – 4.20	Very Satisfactory
5	4.21 – 5.00	Excellent

Data Analysis

Descriptive statistics were used to describe and summarize the properties of the mass of data collected from the respondents.

The study also utilized t-test for paired values in order to evaluate the difference between school administrators’ and teachers’ assessment on the status of implementation of activities of STVEP-CBC.

RESULTS AND DISCUSSION

Profile of the School Administrators and Teachers

The demographic characteristics of the school administrators and teachers are presented in Table 1.

Table 1. Frequency and percentage distribution of the demographic characteristics of the school administrators and teachers

Variable		Administrators (N=21)		Teachers (N=91)	
		Frequency	Percentage	Frequency	Percentage
<i>Educational attainment</i>					
	Bachelor’s degree without MA units	0	0.00	21	23.60
	Bachelor’s degree with MA units	13	65.00	55	61.80
	MA degree	4	20.00	8	8.98
	MA degree with doctoral units	2	10.00	5	5.62
	Doctoral degree	1	5.00	0	0.00
	No response	1		2	
<i>Number of technical/vocational-related trainings attended</i>					
	More than 2 trainings	7	33.33	27	29.67

Continuation of Table 1

	1 to 2 trainings	13	61.90	32	35.16
	None	1	4.76	32	35.16
<i>Teaching Experience</i>					
	At most 5 years	1	5.26	27	31.03
	5.01 to 10.00 years	3	15.79	11	12.64
	10.01 to 15.00 years	7	36.84	16	18.39
	15.01 to 20.00 years	3	15.79	11	12.64
	Over 20.00 years	5	26.32	22	25.29
	No response	2		4	
<i>Administrative Experience</i>					
	At most 5 years	8	38.10		
	5.01 to 10.00 years	7	33.33		
	10.01 to 15.00 years	1	4.76		
	15.01 to 20.00 years	2	9.52		
	Over 20.00 years	3	14.29		

Thirteen of the 21 administrators are Bachelor's degree holder with MA units, four are MA degree holders, two have units in a doctoral degree and only one is a doctoral degree holder. As to this teaching experience, 7 have served for 10-15 years, 5 are over 20 years of service, 3 have served from 15-20 years and 5-10 years and 1 teacher has served at most 5 years as a teacher. As to their experience as 8 and 7 of them have been administrators for 5 and 10 years respectively, the rest have served as administrators from 10.1 to over 20 years.

As can be gleaned in Table 1, approximately 24 percent of the teachers have no units in MA degree; 62 percent of them have units in MA degree; 9 percent are MA degree holders; and 6 percent of them have earned units for a doctorate degree. As to the length of service as a teacher, 21.03 percent have served at most 5 years as a teacher; 25.29 percent over 20 years of service; 18.39 percent 10-15 years; 12.64 percent from 15-20 years and 5-10 years each. Effectiveness of implementation may also be influenced by the length of exposure of a person and his personal and professional attributes to a certain job or situation that make an edge over a new teacher in the service. In this

era of growing accountability for student performance, (Evans, 2010) stressed that understanding the way in which assessments are crafted and evaluated is of paramount importance. Testing data and results were made more applicable and meaningful to staff and students because advance-studies-exposed administrators had the ability to clarify just what the results meant and how they translated into gains for student achievement.

Status of Implementation

Table 2. School administrators’ and teachers’ assessment on the status of implementation of activities of STVEP-CBC

Indicators	School Administrators		Teachers		t-value	p
	Mean	Description	Mean	Description		
1. Human Resource Development	4.24	Excellent	3.80	Very satisfactory	2.69	.008
2. Faculty and Personnel	4.62	Excellent	3.80	Very satisfactory	3.69	.001
3. Curriculum and Instruction	4.15	Very satisfactory	4.11	Very satisfactory	.19	.851
4. Competency Assessment and Certification	3.87	Very satisfactory	4.08	Very satisfactory	-1.12	.266
5. Programs and Projects	3.89	Very satisfactory	3.53	Very satisfactory	1.69	.095
6. Facilities and Services	3.34	satisfactory	3.19	satisfactory	.73	.470
7. Fiscal Management	4.30	Excellent	3.33	Very satisfactory	4.35	<.001
8. Property and Supply management	4.22	Excellent	3.53	Very satisfactory	3.02	.003

Continuation of Table 2

9. Physical Plant Facility	4.32	Excellent	3.97	Very satisfactory	1.64	.104
10. Instructional and Teacher Support Material	4.13	Very satisfactory	3.76	Very satisfactory	1.70	.091
11. Management Monitoring and Evaluation	4.02	Very satisfactory	3.71	Very satisfactory	1.51	.135

**Significant if $p \leq .0$*

Table 2 shows the assessment of administrators and teachers on the status of implementation of activities of STVEP-CBC of their respective schools. Apparently, administrators and teachers have the same assessment on the average as very satisfactory as shown on their means specially on indicators such as Competency Assessment and Certifications, Instructional and Teacher Support Material, Curriculum Instruction, Program and Projects, and Management Monitoring and Evaluation, however, detailed assessment on each item component vary from very satisfactory to excellent. The unification that occurs with a common purpose often leads to greater satisfaction and motivation. As cited by Buffie (1989), in speaking of creating an environment that promotes collegiality, states it is important for the principal to: (a) provide opportunities for the staff to talk about teaching and learning; (b) encourage teachers to observe each other teaching; (c) involve staff cooperatively in planning, designing, and evaluating curriculum; and, if others are to follow your lead, (d) model these behaviors.

On the other hand, the mean assessment score of the school administrators on Human Resource Development, Property Supply Management, Fiscal Management, Physical Plant Facility and Faculty & Personnel are significantly higher than that of the teachers as excellent and very satisfactory, respectively. Conversely, both groups rate Facilities and Services as satisfactory as the least. This is maybe due to the fact that budgetary allocation for this area is insufficient. Supported by Palmer (2007) that even developing countries still lack tool kits, modern machineries for demonstration and hands-

on learning, local transport, dormitories and hostels, not to mention cafeterias and the priority area, the schools training center.

It can be gleaned also in the data in Table 2 that out of the eleven indicators on the status of STVEP implementation, administrators rate excellence on the five components while only Very Satisfactory on the teachers end on the following: Human Resource Development which focuses on the Employee welfare and training; Faculty and Personnel which describes recruitment, promotions and performance appraisal; Fiscal Management on school Budget disbursements and payment transparency; Property and Supply management on school property, appropriations and procurement process and Physical Plant Facility which describes the school classroom dimension standards and accessibility. Indeed, there is a little difference on the teachers' assessments against the school administrators' since both have different functions to play in the institution.

As Thomas (2005) stressed that a principal has the opportunity to provide a supportive, nurturing environment in which to work. This is of utmost importance to teachers in whatever task they may choose to undertake. But apparently, sometimes expectations of teachers on the administrator's performance on implementation do not meet their expectations. It is believed that the foundational-functional relationship is not dichotomous but continuous, and that the principal on the job inevitably moves back and forth between foundations and functions in resolving issues making decisions and performing his roles (Fowers 2008). In summary, the "dramatically different role" of the principal is outlined by Brewer (2001) as "one that requires focusing on instruction; building a community of learners; sharing decision making; sustaining the basics; leveraging time; supporting ongoing professional development for all staff members; redirecting resources to support a multifaceted school plan; and creating a climate of integrity, inquiry, and continuous improvement." A lot of factors will be considered in the implementation process where a regular teacher does not know.

But as a general view, the success of any organization solely depends upon the quality and efficiency of its staff personnel, who perform the functions necessary for the fulfillment of stated goals and objectives. This assumption is as applicable to the school system as it is to any organization involving human efforts. The extent to

which the quality of education succeeds will depend strictly upon the quality of the personnel engaged in the educational process, and upon the effectiveness with which they carry out individual and group responsibilities (Nakpodia 2006).

CONCLUSIONS

With this result, it can be concluded that school administrators and the teachers are working collaboratively for the same goal. The assessment of school administrators and teachers on the status of the implementation of STVEP-CBC along the aspects of its program reveal high ratings which emanates from very satisfactory to excellent except one aspect on Facilities and services which is satisfactory. This can be due to the fact that budgetary allocations intended for facilities and services are insufficient. Such high assessments are attributed to their satisfaction level in the implementation of the different programs.

RECOMMENDATIONS

The professional profiles of the respondents may also have accounted on the effectiveness on their implementation of the programs. Additional budgetary allocation and enhancement trainings for both teachers and administrators are recommended and a regular monitoring program shall be undertaken to keep track effectiveness and efficiency of program implementation.

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Collegial Peer Coaching Model: A Case Study in Empowering Science Teachers

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Abstract - This study was an attempt to develop and validate the proposed Collegial Peer Coaching Model (CPCM) for Science Teachers across various levels at Southern Luzon State University, Lucban, Quezon. The research design is a combination of descriptive-qualitative and developmental research methods involving 18 science teachers in the primary, secondary and tertiary levels. Three instruments were developed for the study—a teacher performance scale, a primer on peer coaching and an evaluation questionnaire. Results suggest that the participants had highly favorable performance ratings in the conduct of the three instructional components of the CPCM, as most participants achieved either ‘very satisfactory’ or ‘outstanding’ ratings after the conduct of the model, in comparison to their pre-CPCM ratings. The predominantly identified criteria for classroom observation are discussed as well as the quantity increases obtained by science teachers by group level along the three instructional components. The acceptability ratings also indicate very favorable scores. Among the conclusions made, it seems that

the science teachers' teaching science performance require more skills improvement and/or refinement in the component identified as the "management of the teaching-learning activities" than in "classroom management skills" and "personal qualities."

Keywords - Peer Coaching, Science Teacher Empowerment

INTRODUCTION

Professional practice often requires individuals to modify their attitudes, beliefs, and values. And changing one's behavior involves the modification of personal conceptions of teaching and learning. How one learned or how one was taught the subject had some influence in one's conceptions of teaching and learning. Professional development can take place only if one is motivated to change. Reflection is a tool to bring about that change. The study of teaching in conventional classrooms must be a collaborative exercise. A collaborative venture will promise reflection and develop both professional knowledge and classroom inquiry that will encourage open communication and criticism between the collaborations to achieve professional growth and improve practice. Conceptual freedom and conceptual unity are two principles that are essential for a successful collaborative work. Such things as modeling, coaching, intellectual reflective dialogues, viewing of videos of teaching practice and joint experimentation are natural components of the collaborative enterprise. Joint explorations must be carried out within ethical frameworks of reciprocity, mutual benefit and commitment to human caring. It will give everyone who participates a vision for new ways of looking at teaching and learning (Chamot and O'Malley 1994).

The interest in peer coaching has emerged in response to the literature on faculty development that is filled with concerns about transferability and action. Exposure to innovative teaching strategies such as cooperative learning or the case method is insufficient if faculty does not translate their new knowledge into classroom practices. It is suggested that change is hard and typically does not

occur without a group of colleagues who care and provide support and encouragement for one another (Cohen 1995). This study indicates that support for cooperation among faculty is just as strong as that for cooperation among students. Thus, peer coaching—faculty helping faculty—provides a powerful way to provide complex and sustained support (Ebenezer and Haggerty 1999).

Based on the foregoing perspective, the researcher was motivated to conduct a study on peer coaching by planning to tryout a peer coaching model among some faculty members teaching science subjects at the Southern Luzon State University (SLSU) in Lucban, Quezon, Philippines. The collegial type of peer coaching was used. This study tried to find out if this innovative strategy is effective to science instructors and in empowering science teachers.

FRAMEWORK

Educators for many years now have been working to make their teaching better. Despite having attended countless seminars on the subject of instruction improvement, teachers find that there is some wisdom that is difficult to impart in a group setting. Classroom-style teaching workshops are good for dissemination of information, but appear to be inadequate when the purpose is to create change in values or behavior. Peer coaching may be one answer for teachers who wish to improve their teaching in a supportive, non-threatening environment (Galbraith and Anstrom 1995).

Peer coaching is defined as a process in which two teachers visit each other's classes and later meet to discuss their observations and provide feedback on what they saw. Peer coaches strive to focus on positive reactions and solutions to possible problems as opposed to peer visits for evaluative purpose that many focus on ranking or ratings of teaching. Peer coaching aims to help fellow instructors improve their teaching and to give them someone with whom to share the ups and down of teaching (Garmston et al. 1998). One major reason as to why school systems support peer coaching is that coaching promotes a deeper analysis of teaching and learning, norms of collaboration and sharing, and an appropriate focus on and support for adult learning. It promotes development of many new skills precisely because it takes

place in a subculture that is not traditional in nature (Glenn 1993). For this reason, learning the new skills of collaboration and sharing feedback will require some new structures for use of time, new roles for teachers, and support for individuals who participate in the coaching. Research has identified many benefits of peer coaching for teachers. Among these benefits are a reduced sense of isolation, ability to implement new strategies effectively, a positive school climate, and a revitalized faculty.

There are many types and models of peer coaching. One of these is the collegial peer coaching which is described by Reference. The long range of goal of collegial peer coaching is self-perpetuating improvement in teaching. For example, a teacher to be observed may want to learn more about how to improve a particular area. This desire becomes the focus of the coaching sessions. The coach gathers classroom data on the teacher's priority and helps him/her analyze and interpret teaching/learning strategies while encouraging applications to future learning (Llagas 1995).

Teachers are advised to keep a teaching log of class activities that can be discussed when meeting with their partners. Examples of categories on the teaching log that can be used to reflect on and discuss with their partners include student activities and type of instruction. In addition, partners are advised to use a checklist when observing each other so that follow-up discussion is focused on what actually happened during the lesson (Meyer and Gray 1994).

A study on peer coaching as an effective staff development model for educators of linguistically and culturally diverse students, cites that continuing professional development is generally addressed to persons already possessing professional expertise. It is, therefore, essential that this professional development be based on their skills and that it aims basically to maintain or enhance these skills. Successful development also calls for the creation of an inclusion environment in which individuals are able to create bonds among one another share expertise and improve reciprocal skills through the acquisition of new knowledge and skills (Sweeny 1993).

Reference defines peer coaching as simply two or three teachers rotating roles and sharing in conversation, focused on a teacher's

reflection and thinking about his/her instructional processes that leads to a classroom practice. It creates an environment where teachers and students can be secured, connected, competent, and empowered.

Empowerment makes school a more effective place for learning because teachers use their insights and experienced teacher make better decisions, have flexibility and support to try new approaches/teaching strategies and custom-fit what they do to meet the needs of schools and students, learn and grow on the job, work together to solve challenging problems, and believe that improved instruction is everyone's responsibility. Empowerment creates "team spirit."

OBJECTIVES OF THE STUDY

This study was an attempt to develop and validate the Collegial Peer Coaching Model for Science Teachers across various levels at SLSU. In more specific terms, the study aimed to: (1) analyze the teaching performance of science teachers in empowering them along the following instructional components: management of the teaching-learning skills, classroom management skills, and personal qualities; (2) conduct the collegial peer coaching activities using the model to empower science teachers; and (3) assess the acceptability of the Collegial Peer Coaching Model by group level in empowering: elementary science teachers, secondary science teachers, college science teachers.

MATERIALS AND METHODS

The study consisted of three phases, namely: Preparatory, Implementation, and Assessment of the Collegial Peer Coaching Model (CPCM). The design of the study is a combination of descriptive-qualitative and developmental research methods.

The descriptive method of research was used in gathering information related to the needs of the various components of the study. There were eighteen (18) Science Teachers involved in the study. Every level was composed of six science teachers. The developmental method of research was used in the preparation of the teacher performance scale, primer on peer coaching, and the collegial peer coaching model.

In the implementation phase, the descriptive-qualitative method of research was used in gathering and interpreting the data. The quality of relationship, activities and situations existing naturally between two science teachers as peer partner during the conduct of the collegial peer coaching model were investigated.

The researcher developed three instruments for the study namely: (1) the teacher performance scale which was used to analyze the science teacher participants' teaching performance; (2) the primer on peer coaching which was used as aided material by the participants during the conduct of the collegial peer coaching model; and (3) the evaluation questionnaire which was used to assess the acceptability of the collegial peer coaching model. This was administered to the 18 science teacher-participants after the conduct of the model.

RESULTS AND DISCUSSIONS

The average performance ratings of the science teachers by group levels along the three instructional components before and after the conduct of the Collegial Peer Coaching Model (CPCM) are as follows:

On the first instructional components which is the "management of the teaching-learning activities," before the conduct of the CPCM the elementary, secondary and college groups of science teachers obtained an average performance rating of 4.00, 4.02 and 4.07 respectively with all ratings having an equivalent interpretation of "very satisfactory" (VS), and combined groups rating of 4.03 interpreted as "very satisfactory" (VS). After the conduct of the CPCM, the elementary, secondary and tertiary groups of science teachers obtained average performance ratings of 4.45, 4.64, and 4.65 respectively with equivalent interpretations of "very satisfactory" (VS) and "outstanding" (O) for the ratings of the last two groups. The combined groups' rating is 4.58 interpreted as "very satisfactory" (VS).

For the second instructional component which is the "classroom management skills," the elementary, secondary, and college groups of science teachers obtained average performance ratings of 4.12, 4.09 and 4.17 respectively with all ratings having an equivalent interpretation of "very satisfactory" (VS) and combined groups' rating of 4.13 interpreted as "very satisfactory" (VS). After the conduct of

the CPCM, the elementary, secondary, and college groups' of science teachers obtained average performance ratings of 4.63, 4.61, and 4.66 respectively with all ratings having an equivalent interpretation of "outstanding" and a combined groups' rating of 4.63 interpreted as "outstanding" (O).

For the third instructional component which is the "personal qualities", the elementary, secondary and tertiary groups of science teachers obtained an average performance ratings of 4.15, 4.27, and 4.25 respectively with all ratings having an equivalent interpretation of "very satisfactory" (VS) and combined groups' rating of 4.22 interpreted as "very satisfactory" (VS). After the conduct of the CPCM, the elementary, secondary, and college groups of science teachers obtained an average performance ratings of 4.56, 4.69, and 4.74 respectively with equivalent interpretations of "very satisfactory" (VS) and "outstanding" (O) for the ratings of the last two groups. The combined groups' rating is 4.66 interpreted as "outstanding" (O).

In the conduct of CPCM, the predominantly identified criteria for classroom observation of the 18 science teachers are ranked as follows: (1) Observes appropriate wait-time procedure in asking questions; (2) Uses varieties of methods appropriate to science teaching and objectives; (3) Ask questions that stimulate students to think critically and logically; (4) Uses varieties of questions from low to high level forms of questions; (5) Uses motivational techniques that stimulate student interest; (6) Integrates values in the lesson; (7) Checks student's mastery of the lesson; (8) Uses test result as a basis for improving teaching and student's work; (9) Gives compliment to students who answered well; and (10) Gives students the opportunity to ask questions.

Furthermore, the quantity increases obtained by science teachers by group level along the three instructional components after the conduct of CPCM are discussed in the following. (a) For the first instructional components which is the management of the teaching-learning activities (MTLA), the elementary, secondary, and tertiary groups of science teachers obtained quantity increases of 0.45, 0.62, and 0.58 respectively. The combined groups' quantity increase is 0.55. the group's general performance rating in terms of MT-LA improved from 4.03 to 4.58. (b) For the second instructional component which is the classroom management skills (CMS), the elementary, secondary

and college groups of science teachers obtained quantity increases of 0.51, 0.52, and 0.49 respectively. The combined groups' quantity increase is 0.50. the groups' general performance rating in terms of CMS improved from 4.13 to 4.63. (c) On the third instructional component which is the personal qualities (PQ), the elementary, secondary, and tertiary groups of science teachers obtained quantity increases of 0.41, 0.42. and 0.49, respectively. The combined groups' quantity increase is 0.44. The groups' general performance rating in terms of PQ improved from 4.22 to 4.66.

Finally, the acceptability ratings given to collegial peer coaching model by elementary, secondary, and college groups of science teachers are 3.75, 3.63 and 3.95, respectively, all interpreted as "strong acceptable" (SA).

CONCLUSIONS

Based on the findings, several conclusions can be deduced. First, of the three instructional components, it appears that the science teachers' teaching science performance need more skills improvement and/or refinement in the component identified as the "management of the teaching-learning activities" than in "classroom management skills and personal qualities."

Likewise, the science teacher-participant obtained a quantity increase of 4.5 to 5.00 along instructional components indicating that they met the standards for quality assurance in teaching performance. Furthermore, the Collegial Peer Coaching Model is found to be strongly acceptable to three group-levels of science teachers—elementary, secondary and college.

Lastly, the conduct of CPCM appears to have empowered the science teachers along the following instructional components: well-managed teaching-learning activities, well-developed classroom, management skills, improved personal qualities, and increased collegiality.

RECOMMENDATIONS

The following recommendations are being made in light of the findings and conclusions of the study. First, a follow-up study should be conducted using the Collegial Peer Coaching Model in all disciplines. This would likely enhance the instrument, such as in terms of improving the text and further fine-tuning the other elements of the tool. Second, the participants who engaged in the collegial peer coaching should be followed up for purpose of quality assurance. This will also significantly facilitate the enhancement of the instrument.

Third, the study should be replicated in the field. In doing this, the following suggestions may be properly considered: (1) lengthening the time frame given to the participants in the conduct of the collegial peer coaching model; (2) conducting the collegial peer coaching model by inter-department or by school; (3) increasing the number of days for the orientation-seminar on collegial peer coaching before the conduct of the model. Finally, students be also be gauged through interviews or checklist questionnaires on whether Collegial Peer Coaching Model has enhanced their performance. Improved school performance of students should always be a key consideration on any endeavor seeking to improve the teaching efficacy of mentors.

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Research Methodology Strategies in Strategic Management

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Abstract - This paper reviews and examines how strategic management researchers apply research methods, and what strategies are used as part of the research process, to locate, organize, manage, transform, create, communicate and evaluate research tools, data and information resources. It also analyzes recent developments on research methodology to create scientific knowledge in theory building and practice in strategic management offering an overview of methodologies used in strategic management research. The assessment of strategic management's research methodology is based on a review and analysis of strategies for the incorporation of knowledge of managerial research methods. Finally, the paper identifies and discusses some methodological research issues and reviews future directions on research methodologies in strategic management.

Keywords - Research methodology, research strategy, strategic management.

INTRODUCTION

Research methodology within strategic management has not been a well developed field in the academic and scientific literature. The field of organizational research methods attracts more attention from scientists than the strategic management research methods and thus, focusing more on the micro analysis than on the macro analysis. The study of strategic management is eclectic in nature, theory based, with substantial empirical research. Much of the strategic management research has been using surrogates for the firm's strategic direction.

A good theory in strategic management must meet the criteria of uniqueness, parsimony, conservation, generalizability, fecundity, internal consistency, empirical riskiness, and abstraction. "A theory is a systematically related set of statements, including some law like generalizations, which are empirically testable" (Rudner, 1966: 10). A scientific theory must have generalized conditionals, empirical content, and exhibit nomic necessity. A theory that lacks support based on scientific methodology cannot develop into a proposition, hypothesis, conception, or model subject to empirical testing (Van Maanen, Sorensen, & Mitchell, 2007; Xu & Zhou, 2004). Theoretical structures are intended to represent and give insights into the phenomena of the real world. Representations of the real world do not necessarily portray the real world itself. The dominant worldview is the form of framing sciences at any given historical moment by a particular paradigm (Kuhn, 1970; Hesse-Biber & Leavy, 2008).

A paradigm is, "a system of ideas or theoretical principles that determine, maintain and reinforce our way of thinking about an issue or a topic" (Plowright, 2011, p. 177). Plowright (2011, p. 177) argues that a paradigm is a scientific approach in which "the world we inhabit has an ontological reality, an existence that is not dependent on our perception, understanding or descriptions of that reality or world... constructivist paradigm, in contrast, claims that reality is mind-dependent and is socially constructed through the relationships, psychological activities and shared understandings that we all take part in". Scientists describe perceptions of the ontological reality through a framing process. "The work of Kuhn, and the sociologists of science... showed that scientific change had little to do with the shape

science obtains through the application of a general rational method, and more to do with the fact that it is a social institution.” (Hughes & Sharrock, 1997, p. 93)

OBJECTIVES OF THE STUDY

The objective of this paper is to analyze recent developments on research methodology to create scientific knowledge in theory building and practice in strategic management. The objectives of the analyses offer an overview of methodologies used in strategic management research. The assessment of strategic management's research methodology is based on a review and analysis of strategies for the incorporation of knowledge of managerial research methods. To identify and discuss some methodological research issues in strategic management, this paper reviews future directions on research methodologies in strategic management.

MATERIALS AND METHODS

Research methodology is defined as highly intellectual activity used in the investigation of nature and matter and deals specifically with the manner in which data are collected, analyzed and interpreted. A research methodology defines the research purposes, activities, procedures, measurements and applications. The background of research methodology refers to philosophy of research conceived as the way in which is formulated the research strategy is formulated and conducted. The research methodology determines the framing of explanations arisen from the analysis of data and observations.

Although the field of strategic management is growing, the development of research methodologies applied has not the same tendency. Research methodology in strategic management has developed from single case studies at firm and industry levels on issues such as corporate strategies and firm performance (Rumelt 1974). Rumelt (1991) based on some methodological features empirically demonstrated that industry was less important than firm characteristics for firm performance. Research methodology used in strategy has contributed substantially to the development

of the strategic management and can make significant contributions to the knowledge and study of administration and strategy fields. Regardless of the research methodology used, research methods of management strategy play a key role in the advancement at a high level of methodological rigor, extending the empirical analyses to more highly theoretical scientific principles.

Overarching research methodology goals can apply to individual specific projects managing their participants and deliverables. Sharing methodological expertise involves knowledge dissemination of techniques and practices. Changes of research methodology practices may involve some convenience in the use of research methods. Anshen and Guth (1973) argue that the field of research methodology requires some research strategies to improve the research capital such as the study of science and arts, the design and use of analytic concepts and operational approaches, the study of historical relationships and the examination of interfaces with social problems and other institutions. Research methodology is the rationale behind a technique of collecting and analyzing data systematically.

A. *Data collection*

Research methodology is the system of collecting data for research projects, either theoretical or practical research. Data collection is treated as a design issue to enhance the construct and internal validity of the study, as well as the external validity and reliability (Yin, 1994).

B. *Data analysis*

"Data analysis consists of examining, categorizing, tabulating, or otherwise recombining the evidence to address the initial propositions of a study" (Yin, 1994). Research methodologies and data analysis are increasing in sophisticated domains. More advanced tools for text-mining, grid and cloud computing, semantic web, among others can be used as part of the research methodology on strategic management. The tools and methods for creating and using data analyses must be technologically accessible.

Other data analyses are being used in strategic management research such as repertory grid (Ginsberg, 1988, 1989; Reger & Huff, 1993), cognitive mapping (Huff, 1990), and policy capturing (Hitt & Tyler, 1991). Alternative techniques of data analysis use diverse methods as using arrays to display the data, creating displays, tabulating the frequency of events, ordering the information, etc. (Miles and Huberman, 1984). A good research strategy is one that allows for the observation of the interested phenomena and the data analysis that is being collected from a variety of sources and perspectives.

C. Taxonomy of research methods

The taxonomy developed by Van Horn (1973) classifies empirical studies in case studies, field studies, field experiments and laboratory experiments. Alavi and Carlson (1992) presented a taxonomy of research methods in three levels: Conceptual, illustrative and applied concepts. Saunders and Thompson (1980, 129) compare conceptual with empirical research and argue that a turn away "from feeble attempts at the insight type and toward hard examination of applicable data in an empirical framework is what is needed now." Keegan and Kabanoff (2008) developed a measurement approach through applying content analysis to annual reports that incorporates managerial discretion into conceptual and empirical models. Thus, a mix of empirical testing and explanatory conceptual search aims at theory building and development for the field.

There is not any best single research methodology intrinsically better (Benbasat et al., 1987). For example, it is required to have a more pluralistic attitude towards strategic management research methodologies (Remenyi and Williams, 1996). To improve the quality of research it requires adapting a combination of methods (Kaplan and Duchon, 1988) and avoiding only using a single research method characterized as methodological monism.

D. Theory-testing and theory-building

The research methodology should imply the use of both an inductive logic and a deductive logic at different phases of the research based on

previous findings and allowing theory-testing and theory-building. Inductive methodology research can be qualitative and quantitative and is being used to generate inductive theory. Quantitative techniques may be used as inductive methodology to generate inductive theory. Empirical findings emerging from the strategic management research have been for the most part inductive oriented in nature and aimed at theory building. Research methods in strategic management provide the theory-testing and theory-building and framework analysis to be applied to practical problems.

Theory-building research seeks to find similarities across many different domains to increase its abstraction level and its importance. The procedure for good theory-building research follows the definition of theory: it defines the variables, specifies the domain, builds internally consistent relationships, and makes specific predictions. Theory-building in strategic management is not developing evenly across all methodologies. If strategic management theory is to become integrative, the procedure for good theory-building research should have similar research procedures, regardless of the research methodology used. Jemison (1981) support the integrative research in content and process advocating the mid-range theories and hypothesis testing. Tyler (2000) discussed procedural justice sustaining that people may apply the heuristic by proper procedures to achieve outcomes.

Theory-building of strategic management research has been approached from the perspective of industry effects. Chandler reported in case study methodology some strategy management problems providing the basis for theory-building. The typology of generic strategies (Porter, 1980) is the framework that has fostered theory-building and empirical work. Some theory-building borrowed from the resource-based theory are amenable to empirical test through methods such as the "rate perspective" (McKelvey, 1997: 365).

Scholars have some expectations of methodological tools and scientific criteria in strategic management in order to share surprisingly similar practices in management theory-building, creation of managerial knowledge and collaboration in scientific research. Despite the robust research methods used in theory-building of strategic management and the substantial accomplishments, Ketchen, Boyd, and Bergh () consider that the field confronts significant challenges.

Research in theory-building and operational procedures in strategic management needs to incorporate rational-analytical, behavioral-neo-institutional and political approaches.

E- Limitations of research methods

Given the nature of the phenomena investigated in strategic management, the research methodology may have certain limitations. The research methodology is better suited to investigate phenomena in strategic management where few moderating or intervening variables have an impact on the relationships between dependent and independent variables. The methodological structure of strategy investigations has enduring effects (Hitt, Gimeno, & Hoskisson, 1998). Strong structures in the research methodology ensure guidance to be focused at all times. Thomas (1984, 14) suggests that "theory development should be the most important aim for research" in strategic management to have directions and traditions because it suffers from an identity crisis and lack of consensus.

1. Research strategies

Strategic management uses a relatively restricted set of research strategies and analytical methodologies of choice (Podsakoff and Dalton, 1987). The research strategies adopted to improve research in strategic management requires analytical concepts, theory building, formal analytical techniques and operational procedures.

Research strategies exist within the knowledge movement. Deploying knowledge governance mechanisms that mitigate costs of creating, sharing and integrating knowledge may have normative and practical implications for the research strategies in strategic management. Tripodi and Epstein (1978) present potential uses of two strategies for incorporating knowledge of research methods. Foss (2009) discussed the dominant research strategies framed by the "knowledge movement" (Eisenhardt and Santos, 2002; Nonaka, 1994; Spender, 2005) manifesting itself in organization and strategic management. Foss (2009) sustained alternative research strategies distinguishing between "capabilities first", "networks first" and "individuals first" strategies. A research strategy may begin from individual members.

Foss (2009) elaborates a simple taxonomy of research strategies within the knowledge movement that he calls "Capabilities First," "Networks First," and "Individuals First". The capabilities first and the networks first research strategies focus on supra-individual antecedents seeking to account for firm-related outcomes such as integration and knowledge sharing, innovation.

2. Strategic management research approaches

The strategy research field borrows from different normative, interpretative, analytic, positive, empirical and the quantitative-qualitative research approaches, among others. The study and research of strategic management is eclectic in nature, theory based and empirical research.

A. Normative approach

The development of normative theory is enhanced by the differences in determination and explanation of strategies as a salient goal of strategic management research (Schendel & Hofer, 1979). The rational normative model assumes that the nature of the theoretical problem may determine the choice of the appropriate research method (Cohen, March, and Olsen, 1972, Martin, 1982). Normative theory-building is enhanced if a causal relationship is supported between the performance construct and other constructs, where performance is the outcome and not the cause under consideration. As a research strategy, reaching derived normative implications of empirical findings gives greater confidence and accuracy in developing and testing theory, although the parsimony of the study is diminished.

Hinings and Greenwood (1988a) identify configurations as containing elements of both organizational structure and processes strongly underpinned by meaning and interpretive schemes which bind them together in an institutionally derived normative order. Configuration research in strategic management links constructs of multiple domains such as complexity and uncertainty of the environment, organizational structures, organizational behavior and culture, technology process, strategy making processes, content

of strategies, etc. The research on strategic management has fruitful developments in strategy content and process research.

Multiple domain configuration research enables to study complex multivariate relationships and the fit among constructs in multiple domains for findings that have normative implications. A more integrated approach to theory-building in strategic management research should consider normative results to guide formulation and implementation of strategies in organizational settings. Erroneous interpretations of firm-level performance may lead to inaccurate descriptions and interpretations of observed relationships, which in turn mislead findings that may have normative implications for researchers and practitioners alike.

B. Interpretative approach

One important component of the case studies is the criteria for interpreting the findings (Yin, 1994, p. 20). The analysis and interpretation of research in case studies is dependent upon the aggregation of data collected from many sources and participants. The criteria for interpretation of the findings and data linked to the propositions require development in case studies.

Phillips, N., Sewell, G. and Jaynes, S. (2008) suggests some research methods based on a discourse analysis as a critical approach to strategic management to examine and interpret the social construction of reality and the roles of rhetoric and narrative within strategy processes. In strategic management research, constructs are presented as archetypes, gestalts, and configurations. In both normative and descriptive strategy researches explore issues relevant to their configuration appropriateness (Mintzberg, 1990). Research methodologies should be appropriate for configuration research. Configuration research has as an important role to classify, describe and explain the phenomena. Researchers use configurations to develop normative and descriptive theory. Strategic management research uses configurations to represent and interpret the phenomena and to analyze complicated and interrelated relationships among many variables which are collectively meaningful. The discourse analysis provides a deeper understanding of the managers' interpretations, intentions, motivations, expectations and decisions.

The critical theory research approach to strategic management opens possibilities to examine, analyze and expose hidden agendas of the strategic agents and actors. An alternative framing of research methods in strategic management may suggest an additional layer and level of investigation when applying specific theoretical approaches. Framing is described as the "selection, emphasis, exclusion, and elaboration" (Weaver, 2007, p. 143). Framing is the way a phenomenon is seen which depends on what is chosen to include or exclude aspects to emphasize or elaborate on. Selection is inevitable arbitrary, "and, the greater the mass of information from which a selection has to be made, the more disputable will be the investigator's choice." (Toynbee, 1976, p. x).

Analyses may be valuable if focusing on data definition and interpretation considering institutional structures, and applying evidences from elsewhere. Institutional structure, funding attached to issue-specific research and data limitations, the established databases and large volumes of existing research may affect the research possibilities. Triangulation of methods for interpretation occurs when there some followers of one approach which can increase confidence in interpretation (Denzin, 1984). Research on strategic management has not been consistently designing research using adequate conceptualizations of managerial environments in the empirical research which at the end derives wrong findings and misleading interpretations.

C. Analytic strategies

Significant analytical research has been made in strategic management beyond the typologies and taxonomies of strategies. Any research methodology has a general analytic strategy supported by some analytic techniques which rely on some theoretical assumptions. Strategies for research in strategic management are chosen to provide varying definitions of what strategic management research is, or should be in the development of a theoretical body and formal analytic techniques. The use of the analysis method can show a relationship between two variables, such as the frequency of one term employed and the strategic management implications. Researchers can demonstrate

specialization in the craft of some methods which can apply to the development of some other analytical tools.

Traditional approaches to strategic management research emphasize some sources of data and analytical technique downplaying some variables while overlooking some others. Researchers that have access to data reduction analytical methods and secondary data sources can develop and test hypotheses related to the field of strategic management from multiple approaches (Ketchen, Thomas & Snow, 1993; Nath & Gruca, 1997). The multiple methods involve data collection of behaviors through personal interviews, focus groups, and webometrics. Thus, there is a range of possibilities for more diverse approaches and sources of information, being aware of limitations inherent in any research to avoid overstating the value of findings in complex real phenomena.

Researchers in strategic management must frequently demonstrate their capabilities of the archives and databases, which is a critical task of knowledge dissemination. Besides their activities of database development and digitization, they become involved with development programming after they perceive a gap in either content or analysis functionality. Data collection and analysis methods in experimental and quasi-experimental research can hide some details (Stake, 1995). Corpus based methods collect data using interviews and newspaper articles marking up using some parts of the speeches to identify portions of sentences, frequencies, concordances, etc., which are processed using text-mining and analysis tools.

The use of corpus-based methods in research requires creating instruments to analyze the concordance through packages and resources such as newspaper data. Corpus-based methods examine concordance by creating a spreadsheet to check and reorder data. Corpus linguistics researchers' methods rely upon machine-readable texts in the "analysis of specially-designed collections of texts by computer" (Anderson, 2008). Corpus linguists use complex datasets, diverse methods and a variety of theoretical perspectives to tackle research questions. The research strategy as a field has received support from the literature on scanning activities and may be framed by the research questions. Scanning activities are the gathering of information "about events and relationships in a company's outside

environment, the knowledge of which would assist top management in its task of charting the company's future course of action" (Aguilar, 1967, p. 1). For data collection in case studies, participants can use text-based methods to gather and examine socio-linguistic phenomena. Analyzing language fluctuations represents some methodological challenges.

Researchers and scholars show limited uptake of advanced tools for data management and sharing. Organizational strategies are formulated and implemented among managers with the more savvy professionals using document management systems, databases, LaTeX for word processing and other more sophisticated software. Good quality of research methods are needed for effective data management and sharing, although compliance with scientific requirements. The most common practices of data management are usually accomplished on the computer desktop and storage on PDF and image files.

An analytic statement requires further conceptual development to become a law like generalization. The analytic generalizations of a case study can be informative to other similar cases. Although there are some analytic statements that are true by definition these are not law like generalizations. An analytic statement based on the commonly accepted definitions may be true when is accepted as a correct assertion. Replacing definition of terms in a theory with its definition in the theory to determine if the statements are true by definition, it clarifies if the statements are purely analytic without empirical data. Any literal or theoretical replication logic can both strengthen and broaden analytical generalizations.

The difference between analytic generalization and statistical generalization was explained in these terms "In analytic generalization, previously developed theory is used as a template against which to compare the empirical results of the case study" (Yin, 1984). The analytic strategy requires of the specific statistical techniques to evaluate data gathered. Evaluative research methodology aims to provide some useful feedback using standard social research methods. Some analytical tools as event studies, event history analysis, logistic regression, simultaneous equations analysis, and multidimensional scaling are used in strategic management research. Yin (1994) presented some analytic techniques such as pattern-matching, explanation-

building, and time-series analysis. Pattern-matching compares a predicted pattern with an empirically based pattern enhancing the internal reliability of the study when both patterns match. An analysis may follow conventional analytic techniques using anecdotal and statistical analysis.

Some analytical tools become more useful in strategic management research such as repertory grid (Ginsberg, 1988, 1989; Reger & Huff, 1993), event studies, event history analysis, logistic regression, simultaneous equations analysis, multidimensional analysis, cognitive mapping (Huff, 1990), and policy capturing (Hitt & Tyler, 1991). Narrow categories for analytic tools such as single versus multiple regressions are used by Shook et al. (2003). Multiple regressions became the dominant statistical technique used in strategic management research after the research in the strategic management field was dominated by cross-sectional, static studies and employed few control variables (Ketchen, Boyd, and Bergh,). Regression may not be the most appropriate analytical method to apply where the research design and the causal relationship between two variables is not clear. Keats and Hitt (1988) employed causal modeling approach with longitudinal or time ordered data in their research in strategic management. Advanced methods of data analyses on strategic management based on databases and text mining tools are bringing greater changes in research methods.

Methodological contributions in conceptualization and measurement of firm-level performance have implications (Meyer, 1991) to analyze formation, adaptation and evolution of organizational configurations on strategic management research. Some data analytic methodologies can be used on the configuration approach.

There is value in additional analysis of processes of change both for assessing desirability and for understanding feasibility. Research value should not be judged solely on the sophistication of the techniques or the quality of available data but on the existing body of knowledge. Analytic modeling provides rational approaches to research in strategic management. Some sophisticated analytical techniques used in research on strategic management, such as for example the employment of archival data bases that are applied to capture complexity of the phenomena, to achieve more objective

measures and data validation. However, the correctness of analytic data is not necessary for the confrontation of these data with real facts. Model estimation is only part of the way towards addressing feasibility, magnitudes change, costs and benefits, considering also the legitimate research questions that incorporate additional factors. Research questions based on a particular theory or technique may not consider other additional aspects.

The use of analytical techniques in management research to develop strategy knowledge can be comparable in scope and impact to the behavioral approach. Aldag and Stearns (1988) review a sample of organizational research topics. Shook, Ketchen, Cychota & Crockett (2003) searched for data analytic trends on 297 papers published between 1980 and 2001 found that the use of analytical techniques is growing, although many scholars report that they are ill-equipped to use these techniques. Research in strategic management may be restrictive in the data and methods to emphasize comparisons in a complex environment of real phenomena. There is plenty of room for improvement on the use of a range of analytic tools for research in strategic management.

D. Positivist approach

The positivist upbringing favor to have full control of field research under a well structured research protocol. Amitabh and Gupta (2010) found that the logical positivism-empiricism paradigm, one way linear causality in the strategy-structure-performance relationship is favored by researchers instead of two-way causality that will increase contributions using innovative designs and archival data.

There are several research methodologies that have been identified by Galliers (1991, p. 149) in two paradigms, the positivist and interpretive. Lack of objectivity associated with interpretive research methods has resulted in adopting a more positivist quantitative approach. Debate has arisen in between the areas of positive versus normative perspectives (Friedman, 1953). Mixing quantitative and qualitative methods is becoming more common, and Guba and Lincoln's criticisms of positivist approaches in the social sciences cannot be ignored. The positivist perspective has been criticized in

the social sciences field. Hughes & Sharrock (1997, p. 197) argues that “Had the social sciences measured themselves against one or other of the natural sciences apart from physics...then the status of the social sciences *as sciences* might have seemed a good deal less problematic”.

E. Empirical research

Few studies have attempted to empirically determine the extent of the use of a restricted and exclusively set of methodologies in strategic management. There have been major changes in the methodologies of strategic management research despite that the field is still very young.

Hoskisson, Hitt, Wan, W.P. and Yiu (1999) examine the primary theoretical and methodological bases of strategic management through its history, which they consider is eclectic in nature and theory-based with substantial empirical research. They concluded that the early works (Chandler, 1962, Ansoff 1965) centered on the relationship between strategy and structure can be characterized from a contingency perspective. Early theoretical and methodological developments in strategic management took a contingency approach in Chandler’s (1962) *Strategy and Structure* and the resource-based framework in Ansoff’s (1965) *Corporate Strategy*. Initial strategy research emphasized analytical methodology to explain the competitive environment of firms and industries based on simple assumptions such as the homogeneity of firms within an industry in terms of resources and strategies and the mobility of these resources.

Miller & Friesen (1978) conducted empirical research to demonstrate the existence of configurations or archetypes that exhibit internal logic, stability and integrity based on what Miller (1987) terms the imperatives such as environment, structure, leadership and strategy. However, due to difficulties in data collection and analysis, empirical research in organizational configurations has lagged behind the development of theoretical approaches. Empirical studies of configurations used cross-validation of responses to assess reliability and convergent validity (Miller, 1986; 1987b; 1988 and Miller & Friesen (1980; 1983).

1) *Theory of the firm*

Theories of the firm provide a framework for analyzing important research issues in strategic management (Seth, and Thomas, 1994). Seth and Thomas (1994) demonstrate the usefulness of economic theories of the firm as a framework for guiding and analyzing strategy research and evaluate the conceptualization of the theory of firm to research strategic management compared to the traditional assumptions of strategy. In turn, the research methodology and findings challenged the strategic management principles supporting theory of the firm arguing that industry characteristics have more impact on performance.

To enhance descriptive analysis of the firm as well as to the human agents in organizational research in strategic management, it has arisen a repertoire of cognitive and motivational assumptions from very different sources, such as the economics model of man, behavioralism, social and motivational psychology as a critical reaction to the economic agent theory (Simon, 1955; Cyert and March, 1963).

2) *Industrial organization economics*

Industrial organization (IO) economics provides a foundation for research on strategic management with some econometric tools for the analysis competitive dynamics. The macroeconomic approach of industrial organization, the five-force framework (Porter, 1980) and the resource-based view (RBV) (Wernerfelt, 1984) Schmalensee (1985) of firm-specific qualities required new research methodologies, such as analyses of variance decomposition techniques and regression analysis despite the operationalizing the attributes of competitive advantage and firm specific qualities. Empirically, the relative advantage of small firms has advantages that have been ill-understood by the discussion (Zenger and Lazzarini, 2004). Most of the research conducted in strategic management among SMEs to explain the relationship between scanning dimensions, activities and their performance are of a descriptive nature.

Empirical analysis based on Porter's framework has been conducted by Dess & Davis (1984), Hawes & Crittenden (1984), Kim & Lim (1988), Miller & Dess (1993), White (1986), Wright, Kroll, Tu, & Helms (1991).

To test the arguments of Porter, the method of regression analyses was ushered. Other studies use other methodologies and analytical techniques to sample and measure the firm and industry effects on performance (McGahan & Porter, 1997; McGahan & Porter, 2005, and Ruefli & Wiggins, 2005).

3) *Resource-based theory*

The research on firm resources strategy has introduced some descriptive theories from industrial organization economics such as the studies on teamwork production (Alchian & Demsetz, 1972) and the relationship of price and quality (DeVany & Saving, 1983). Conceptual and empirical research based on resource based-view is very limited in terms of augmenting the original knowledge sustained by Barney (1991) as it has been treated by Bates & Flynn, 1995; Brush & Artz, 1999; Litz, 1996; McWilliams & Smart, 1995; Michalisin, Smith, & Kline, 1997; Mosakowski, 1998; Powell, 1992a,b; Rindova & Fombrun, 1999; Yeoh & Roth, 1999).

The industrial organization economics supports the resource based theory as a descriptive and explanatory approach (Barney, 1992; McWilliams & Smart, 1995; Meyer, 1991) whereas the strategic management has a prescriptive orientation. Empirical research on strategic management based on the resource-based view has used course-grained measures of firm intangible resources. The resource-based view provides some foundations for research on strategic leadership and process research on decision theory. However, the resource-based view of the firm supports the assumptions of heterogeneity and the imperfect mobility of resources of firms within an industry (Barney, 1991: 101). Recent research in strategic management has accepted the application of the resource-based view of the firm despite that it is difficult to test empirically because of the complexity and difficulties in operationalizing and measuring idiosyncratic firm resources and capabilities that are valuable, rare, costly to imitate and no substitutable (Barney, 1991). Armstrong & Shimizu (2007) examined 125 papers employing methods in resource-based view studies from 1991 to 2005 finding that although researchers have overcome some challenges in studying resources and their effects, others challenges still remain.

The research based-view strategy theory is criticized as being descriptively accurate and correct but quite difficult to manipulate in real life, for not meeting the operational validity criterion until managers can apply the descriptive theory to manipulate the independent variables (Priem and Butler, 2001). Bacharach (1989) and Hunt (1991) argue for some statements from the resource based-theory dealing with competitive advantage that are not amenable to empirical tests. According to the analysis of Bacharach (1989), Hunt (1991) and McKelvey (1997) the resource based view does not meet the empirical content criterion. The resource based view theory is considered to have a static argument that identifies generic resources without considering differing situations, posing potential limitations for the advancement in strategic management research.

4) *Capabilities*

The dominant resource-based analytics in strategic management is considered to be the sustained competitive advantage emerging through firm-specific capabilities (Dierickx & Cool, 1989; Barney, 1991). Empirical research on the resource-based view and capabilities theory has been using some course-grained measures and proxies of firm resources, such as human capital leverage, intangible resources, technological and organizational capabilities. The notion of capability unites sources of firm-level experiential knowledge and behavioralism as an analytical notion of the knowledge movement of research in strategic management.

A critical methodological challenge for strategic management is the capabilities development to offer evidence-based findings those organizations and managers can use to improve and attain the best performance (Locke & Latham, 1990). A starting point for scientific analysis in knowledge in firms is the collective levels rather than an empirical proposition despite that there is significant evidence at individual level, such as the empirical research on routines and capabilities predominantly mono-level (Gupta, Tesluk & Taylor, 2007).

Stinchcombe (1991: 379-380) argues that “[w]here there is rich information on variations at the collective or structural level, while individual-level reasoning (a) has no substantial independent

empirical support and (b) adds no new predictions at the structural level that can be independently verified, theorizing at the level of [individual level] mechanisms is a waste of time."The Knowledge-based theory of economic organization (Grandori, 2001, Kogut & Zander, 1992; Nonaka, 1994; Spender, 1996; Grant, 1996; Nickerson & Zenger, 2004) brought to research in strategic management fresh concepts and analytical methods, constructs, dimensions (Winter, 1987) and measures (Heimeriks & Duysters, 2007).

Empirical research within strategic management supports the argument that productive knowledge at the firm level has an impact (Hoopes & Madsen, 2008). However, the knowledge movement has some difficulties in identifying theoretically as well as empirically the causal mechanisms. Self-determination theory (Deci & Ryan, 1985), from motivational psychology has supported successfully both theoretical and empirical research in knowledge-related behaviors (Cabrera, Collins & Salgado, 2006).

5) *Other empirical approaches*

Stake (1995) proposed a naturalistic generalization as an intuitive empirically-grounded approach based on relationships between the experiences of the researcher, the readers and the case study itself, facilitating the understanding and explanation of the unit of analysis. The empirical implications regarding the unit of analysis are related to the operationalization and the types and sources of data in research using the configuration approach. The empirical use of more holistic methods on the research of configurations (Venkatraman & Prescott, 1990) such as canonical correlation analysis, cluster analysis and q- factor analysis empirically facilitates to capture multivariate interconnections among strategy, structure, organizational behavior, process and environment.

The empirical research should refer only to taxonomy and not typology for derived classifications. Empirical research use different operational types of tools and sources of data according to object of study and the unit of analysis. The empirical methods are classified as non-econometric and econometric.

F. Econometric methods

Empirical strategic management research may get more support from econometric theory models. The empirical research in strategic management is increasing with the use of econometric methods, changing the appropriate use of empirical research methodologies in strategic management. Empirical methods centered on the use of econometric techniques taking account for endogenous and omitted variables for discrete strategy choices is becoming more widely applied in strategic management research. Econometric data only describe and analyze situations that are history because they have already occurred. Econometric techniques are such as classical regression, limited dependent variables, and methods that account for omitted variables.

Common econometric research techniques automatically exclude much available information. An empirical research analysis of performance as a function of decision variables, assume that are exogenous, to yield right results should correct endogeneity based on the assumption that managers make decisions to achieve higher performance. The empirical research approach is common in experiments assuming that strategy choice can be exogenous and assigned randomly to participants. Econometrics implicitly excludes from the analysis much of the information coming from a variety of sources of data and research methods used by other sciences by selecting only the functional forms and information suitable for econometric analysis.

Empirical research in the field of strategic management is concerned with endogeneity. Empirical papers should consider endogeneities to be corrected econometrically. Empirical research in strategic management is beginning to focus on correcting for endogeneity, and must benefit from econometric advances. To achieve highly pertinent empirical strategic management research is required the implementation of econometric methods to correct for endogeneity. Empirical strategy research in firm-level performance outcome should consider correcting for endogeneity.

Hamilton and Nickerson (2001) reviewed more than a decade of empirical research and assessed the econometric methods used and found that few papers econometrically correct the endogeneity of

management decisions and the expected performance. Hamilton and Nickerson (2001) report in their study that 169 of the 196 performance-related papers (86%) do not control for endogeneity. They also report that out of 601 papers, 426 empirical papers published, only 27 papers explicitly econometrically correct for potential endogeneity concerns. The authors argue that empirical research in strategic management is a failure due to the low number of papers that account for endogeneity. Failure to statistically correct for endogeneity leads to faulty conclusions contaminating the direction of empirical research difficult to predict *ex ante*. The empirical research in strategic management simply reports coefficient estimates and “robust” standard errors that account for heteroscedasticity but not pre-estimation error.

From an alternative perspective to econometrics, it may consider a wider range of not predetermined relationships between the chosen variables, but selecting other significant points to influence the choice.

G. Non-econometric methods

Non-econometric methods are simple statistical descriptors or multivariate analysis, exploratory data analysis such as principal component analysis or cluster analysis.

Research strategy in strategic management is having a major shift away from more basic analyses, such as descriptive studies with a rise in the use of regression and ANOVA models. Empirical papers use descriptive statistics, means and correlations as their primary analysis, chi-square tests of contingency tables, regression and ANOVA for analysis, and discriminant and cluster analyses in the context of strategic groups. Cluster analysis has been applied as a research technique in strategic management research since the late 1970s. Ketchen & Shook (1996) focused on cluster analysis of 45 papers published during the period 1977-1993 found that the implementation of cluster analysis methodology often less than ideal.

However, the implementation of this research technique has not been applied properly to generate knowledge in strategic management. Cluster analysis as a multivariate technique enabled to reduce large data sets into groups and types. Cluster analysis as

a statistical technique requires several methodological choices to sort data into similar groups or sets to give solution to the cluster. Research choices are made within a bounded time and space which can justify the particular denials and exclusions associated with our choice of approaches to research.

Logical empiricism as a research approach has been used for example to identify performance indicators of implemented strategies. Empirical strategy research is emerging in the form of a broad-based narrative reviews, content analyses and best practice guidelines. Collaboration among researchers involves detailed methodological and content analysis and discussions, often taking into account the established standards and even challenging them. The empirical research separates purely analytic contents which are considered true because of their "either/or" form based on their logic or because the definition of their terms, from synthetic statements, which are true only after investigation. The empirical content criterion addresses the logic and semantic of theory rather than vagueness, as Bacharach (1989) argues that many organizational-level theories are so vague they can never be empirically tested.

Empirical strategy research has gained from the use of contingency tools. Boyd, Haynes & Hitt (2007) identified moderation in form or strength (Venkatraman, 1989) such as interaction, as the most prevalent tool used to analyze contingency studies. There is little empirical research to support the assertion that control of strategic assets determines the profitability of firms (Miller and Shamsie, 1996).

An empirically based pattern may be confronted to the initial theoretical framework for theoretical validation. Empirical tests include field-based case study and comparative outlier (Hitt, Harrison, Ireland, and Best, 1996) and the case survey (Larsson, 1993) methodologies used for theory development and for theoretical replication and extension. Field research methods have been used to develop strategic management theory supported by a multiplicity of research approaches and data analysis techniques. Field studies are classified according to their research goal as descriptive, explanation, or predictive.

Results and research findings in empirical research should be reasonably accurate despite the implicit assumptions due to loss of

information to portray the phenomena under investigation. Results based on empirical research pertaining to scanning practices have contributed to the development to theoretical approaches to strategic management. The result of research can be some absolute truths besides it involves decisions on the choice of methods, questions and selection of the data. Research methodological decisions are made regarding questions, sources of data, methods, techniques, etc.

Anshena and Guth (1973) emphasize the need of integrative, multidisciplinary research in strategic management. Empirical methodology research in strategy, model building and new techniques should be emphasized (Saunders and Thompson, 1980). Jeremy Bentham advocated utilitarianism, the dominant consequentiality position. A utilitarian believes in 'the greatest happiness for the greatest number.' (PHG Foundation, 2011).

H. Case study

Case studies are fine-grained research methodologies (Harrigan, 1983). Case study methodology has applications to investigate empirical phenomena in real-life contexts. A case study model can be applied to explain and describe complex causal links in real-life interventions, to describe the intervention itself and to explore some situations (Yin, 1994). A case study can be used to analyze by building an explanation as a pattern – matching, for exploration send a hypothesis-generating process. The case study as a research method in strategic management has been useful to analyze generic business strategies and corporate diversification strategies among other important organizational areas. One of the characteristics of the research methodology of case studies is that researchers have no control over behavioral events (Tellis, 1997).

Case studies have been used in varied investigations, particularly in sociological studies, but increasingly, in instruction. As a research tool of strategic management investigations, the case study methodology has been employed since the 1930's subject to criticisms that consider is not a reliable research methodology. The methodology of case study recommended by Yin (1984) and a version of the questionnaire developed by Levy (1988) were modified and adapted for use at Fairfield University. Levy (1988) used the methodology of the case

study in his investigation aimed to show the impacts of information technology at the University of Arizona. Levy (1988) used a single-case design based on exploratory and explanatory methodology strategies to conduct an in-depth case study of the pace of acquisition of information technology at the University of Arizona was considered the most suitable for the investigation of information technology.

While the exploratory strategy examined the environmental and economic aspects of information technologies, the explanatory strategy analyzed the patterns followed by institutions of higher education when acquiring and using information technology. The single-case study methodology used by Levy (1988) was based on the contributions of Yin (1984) and Feagin, Orum, and Sjoberg (1991).

Case study research is not necessarily sampling research considering that it is a system of action focusing on some selective issues where the most critical factor is the unit of analysis. Each case study is unique in such a way that the data collection, questions and unit of analysis cannot have the same form. The unit of analysis in a case study could be "an individual, a community, an organization, a nation-state, an empire, or a civilization" (Sjoberg, Williams, Vaughan, & Sjoberg, 1991). Holistic or embedded case studies can be revelatory of inaccessible phenomenon involving more than one unit of analysis. Case studies have been used in varied strategic management investigations an ideal methodology when a holistic, in-depth investigation is needed (Feagin, Orum, & Sjoberg, 1991).

Intrinsic case studies are those on which the researcher has an interest. Instrumental case studies are those considered to contribute to develop more profound understanding beyond the researcher. Collective case studies are those that belong to a group of cases. The action research as a methodology provides to the involved participants an insider view of the specific situations for the analytical and reflective learning, although it has been criticized that it may lack objectivity.

The case study methodology requires a discussion of procedures and their application. "good use of theory will help delimit a case study inquiry to its most effective design" (Yin, 1993, p. 4). To consider case studies as a research strategy in strategic management consideration must be given to construct internal validity, external validity, and reliability (Yin, 1989). Any case study should attain external validity

and must provide the reliability required of all research in strategic management. The reliability, internal and external validity of any case study research can be enhanced by the rules and procedures stated in the protocol, more essentially in multiple-case studies (Yin, 1994) that follow replication logic. To ensure accuracy in case studies, and to confirm validity of the research processes is required triangulation to establish meaning with explanations using multiple sources of data (Yin, 1984). The types of triangulation identified are data source, investigator, theory and methodological triangulation. Case study as a research strategy can triangulate methods, data, theories, researchers, etc. (Feagin, Orum, & Sjoberg, 1991) asserted that triangulation can occur with data, investigators, theories, and even methodologies.

Case studies can be exploratory, explanatory, descriptive (Yin, 1993) intrinsic, instrumental and collective (Stake, 1995) and multiple-case applications. Exploratory case studies may be used to prelude research. Exploratory case studies aim to find causal relationships in research. Descriptive case studies are based on descriptive theory. A case study may be organized around a descriptive framework leading to the analysis that relies on theoretical propositions. If there are not any theoretical propositions in the research design for a reliable analysis, still is possible to develop a descriptive framework for a case study.

The multi-site study is a research strategy that combines several approaches merging on case study research (Eisenhardt, 1989; Yin, 1993, 1994). Audet, J. and d'Amboise, G. (2001) conducted a case study research in a multi-site study to analyze data of an organizational phenomenon by combining the positivism, interpretative and qualitative theoretical approaches using cross-case comparisons and explanation building techniques.

Yin (1994) recommended as a case study methodology to design, conduct, analyze the evidences and develop the conclusions, recommendations and implications. The development of the case study protocol is required in the case study methodology (Yin, 1994). A complete description of the research explains what available information is necessary to used. Design of case studies as a research strategy should satisfy the conditions of the research question posed, the extent of control and the degree on focus over behavioral events

(Yin, 1994). Case study as a research designs are not variants of other research designs (Yin, 1994).

Case studies are designed to use multiple sources of data bringing out the details from diverse viewpoints of the involved participants. The case study as a strategy of research in strategic management has the characteristic to consider points of view of all parties, agents and actors involved regarding the selected issues to study (Feagin, Orum, & Sjoberg, 1991). The nature of the research questions lead to the relevant strategy to be used in an explanatory-exploratory case study (Levy, 1988). The explanatory strategy determines the extent of similar patterns applicable in other environments.

The analysis presented in a case study must include relevant evidence, use of rival arguments. Using multiple sources of data for case study research based on documentation, archival records, interviews, direct observation, participant observations and physical artifacts (Yin, 1994) is an important strategy to achieve reliability of the research (Stake, 1995; Yin, 1994). Yin (1984) analyzed the strengths and weaknesses of the different sources of evidence, which are presented in table 1.

Yin (1994) recommended conduct as the second stage of the methodology used in a case study, to be carried out by the activities of preparation for data collections, distribution of the questionnaire and conducting interviews. As a field method, data collection is treated in isolation from the research process (Yin, 1994), although this would not be productive in case study research. Doz (1996) conducted an empirical test on field-based case study methodologies to collect both archival and interview data from three sets of alliance partners, using a qualitative theory building approach. Doz (1996) used field-based case study methodologies centered on qualitative theory building approach to empirically test archival and interview data from sets of alliance partners.

Table 1. Types of Evidence

Source of Evidence	Strengths	Weaknesses
Documentation	<ul style="list-style-type: none"> • stable - repeated review • unobtrusive - exist prior to case study • exact - names etc. • broad coverage - extended time span 	<ul style="list-style-type: none"> • retrievability - difficult • biased selectivity • reporting bias - reflects author bias • access - may be blocked
Archival Records	<ul style="list-style-type: none"> • Same as above • precise and quantitative 	<ul style="list-style-type: none"> • Same as above • privacy might inhibit access
Interviews	<ul style="list-style-type: none"> • targeted - focuses on case study topic • insightful - provides perceived causal inferences 	<ul style="list-style-type: none"> • bias due to poor questions • response bias • incomplete recollection • reflexivity - interviewee expresses what interviewer wants to hear
Direct Observation	<ul style="list-style-type: none"> • reality - covers events in real time • contextual - covers event context 	<ul style="list-style-type: none"> • time-consuming • selectivity - might miss facts • reflexivity - observer's presence might cause change • cost - observers need time

Continuation of Table 1

Participant Observation	<ul style="list-style-type: none">• Same as above• insightful into interpersonal behavior	<ul style="list-style-type: none">• Same as above• bias due to investigator's actions
Physical Artifacts	<ul style="list-style-type: none">• insightful into cultural features• insightful into technical operations	<ul style="list-style-type: none">• selectivity• availability

(Yin, 1994, p. 80)

The case study methodology has the data analysis of case study as one of the least developed areas of research methods. Research based on case study has a frequent criticism of the generalization of results that are not being widely applicable in real and some other specific situations. There has been a lot of criticism of some research techniques and methodologies of not being scientific in nature, such as the case study because it is not possible to replicate it.

I. Quantitative and qualitative research

There is a trend in strategic management research projects toward the integration of both quantitative and qualitative data (Judge and Zeithaml, 1992) that requires using multiple methods and measures (Hitt, Hoskisson, Johnson, and Moesel, 1996). The increasing sophistication of some research methodologies combines both quantitative and qualitative approaches and statistical tools. Combined qualitative and quantitative data approaches as a strategic management research design methodologies is gaining more grounding and popularity. There is an increased tendency in the quantity and quality of research developments in the theoretical and methodological fields of strategic management (Hitt, 1997). Research in strategic management tends to integrate in complex models both quantitative and qualitative data (Judge and Zeithaml, 1992) requiring multiple methods and multiple measures of specific constructs (Hitt, Hoskisson, Johnson, and Moesel, 1996).

The research methodologies used in strategic management are becoming increasingly sophisticated and frequently combine both quantitative and qualitative approaches with new statistical tools. Quantitative measures attract the attention to underlying objective facts that give evidence of the phenomena, while qualitative data colors and enrich the analysis and interpretation of such phenomena.

1) *Quantitative research*

The analytical mathematical research methodology, analytical statistical and causal relationships are popular quantitative research methods used in strategic management to test for internal validity. Quantitative research is the systematic scientific investigation used to measure and gather quantitative data of everything that is measurable. Research in strategic management is already developing complex and sophisticated models though the integration of multiple theories and methods such as structural equation modeling, panel data analysis, network analysis dynamic models of partial adjustment, logistic and Poisson regression analyses and event history analysis.

Quantitative research methodology in strategic management emphasizes longitudinal data, dynamic analysis, and focus on specific strategic decisions and actions. Data for quantitative research can be collected through interviews, structured questionnaires, surveys, etc. Quantitative measures are likely to facilitate cross-case comparisons comparison between scores, and the use of multiple indicators with scales provides more confidence in the validity of the measure. Comparison between the predicted pattern and actual pattern for internal reliability of the study might not have any quantitative criteria, but discretion of the research is required for interpretations.

Quantitative methodologies have some limitations if they are confined in studying configurations, despite overcoming problems associated with conventional statistical analysis.

2) *Qualitative research*

Qualitative research methodologies have evolved beyond the techniques of qualitative data collection helping researchers to improve

understanding and explaining a variety of complex management phenomena. The qualitative research approach can be used to analyze the strategic management phenomenon barely researched that is both adaptive and innovative. Given the complexity and ambiguity of the qualitative methodological components (Lee, 1999), the researcher has more room to design a research strategy more suitable to his skills and his specific objectives and needs. The qualitative research approach is being used for example in the design of multi-site study research strategies to gain an in-depth knowledge of strategic management in organizations.

Qualitative research is a multi-focal investigation to get an in-depth insight of behaviors, values, attitudes, motivations, based on unstructured interviews, feedback and recordings methods. Qualitative data are useful for uncovering emic views (Guba & Lincoln, 1994, p.106). In strategic management research it may not be possible to undertake standard analyses limited by the etic or outsider theory based on the knowledge of the countries' firms' economic, political, cultural, etc. circumstances may not correspond within the emic or insider view.

Greckhammer, Misangyi, Elms, and Lacey (2008) introduce the research technique termed qualitative comparative analysis (QCA) for strategic management research aimed to diagnose interdependent causal effects across different levels of analysis. Longitudinal qualitative analysis as a research strategy in strategic management provides meaningful insights about the inter relationships among the environment, strategy, structure, processes and outcomes and the different constructs of organizational evolutive configurations (Eisenhardt, 1989; Bourgeois & Eisenhardt, 1988). A qualitative research design may support and combine theory testing and generation (Lee, 1999). Qualitative research does not require and justifies probabilistic sampling (Merriam, 1998, p. 61). Patton (1999, p. 1190) argues that, "it need not be antithetical to the creative aspects of qualitative analysis to address issues of validity and reliability". Other research methodologies such as case replication (Leonard-Barton, 1990) and retrospective event histories (Glick et al., 1990) are designed to overcome some of these problems.

Some approaches to strategic management include action (Birks, 2010; Stringer, 2007) and grounded theory (Strauss & Corbin, 2008),

approached that differ from the “detached observer” view of research. Egon Guba describe action research as a reaction to the search for common, general findings (Stringer, 2007, p. ix) that combines qualitative and quantitative research methods in a close involvement in specific situations. Personal experience and involvement supports grounded theory approach that provides insights for the etic/emic analyses although it may result in a limited range of possibilities because the difficulties to become impartial observer.

Qualitative studies are being the target of criticism which considers has limitations because they are subject to the researcher bias, non-replicability and labor intense (Van de Ven & Huber, 1990). It is also criticized the impartial observer view of detached researchers (Guba & Lincoln, 1994) as unrealistic, because their subjectivity. The concept of “street-level epistemology” (Hardin, 2002 states that information and views are passed on from others, including academic disciplines.

3. Strategic management research

As a field of strategic management advances, so should its level of research methodological rigor. Research methodology improves the scientific background and framework of strategic management, and contributes to enhance confidence in the results and findings generated. McGuire (1986) argues that researchers and managers can benefit from each other if their needs and modes of thinking are compared. Both have to abstract the general theoretical principles to be applied to specific situations and to assess the generalizability of their conclusions. Bower (1982) argues that research in strategic management should concentrate on issues of concern to the top management of the firm to enrich the field by well-structured problems although it may emerge the problem of rewarding academics.

The interest in strategic management research has been increasing over the last three decades. Research methods in strategic management have evolved over time growing since its inception in the late 1970s (Bowman, Singh & Thomas, 2002; Kay, McKiernan & Faulkner, 2003; Mintzberg, Ahlstrand, & Lampel, 1998). Some academic papers presented the research methodological implications in a broad overview of strategic management’s development, such as hypothesis formulation, quantitative and qualitative analytic tools among other

important methodological issues (Hitt, Gimeno and Hoskisson, 1998). Empirical strategy papers increased in number and in diversity of topics to create a strong research stream in strategic management. However, there is a relatively limited set of research methodology strategies and analytical procedures in strategic management.

Strategic management is one of the most recent fields of the management discipline (Boyd, Finkelstein & Gove, 2005; Hambrick, 1990). Strategic management has become one of the most popular fields (Bergh, 2001; Ramanujam & Varadarajan, 1989) since a pioneering research by Rumelt (1974) found that “strategy matters” and gives rise to a notable research in the field (Bergh & Holbein, 1997; Greve & Goldeng, 2004). Research in strategic management has focused on some specializations such as strategic leadership, competitive dynamics, restructuring. The large number of topics and subjects covered by strategic management literature gives the idea that it does not have a unified, coherent and integrative scientific field’s identity, object of study, research methods, conceptual and theoretical frameworks.

The conceptual, theoretical and methodological frameworks challenged by Williamson’s (1975, 1985) model of transaction cost economics, the following investigations on strategic management by Miles and Snow (1978), Meyer (1982), Eisenhardt (1989), and Henderson and Cockburn (1994) produced influential conceptual, theoretical and methodological frameworks. During the 1980s, different approaches to research methodologies resulted in the new theoretical developments of strategic management; among them the transaction cost economics (TCE) (Williamson, 1975, 1985) that provided theoretical and conceptual frameworks, although it is difficult to capture and measure not observed transaction costs in bargaining and negotiating processes.

Content analysis in strategy research has been improving for the last three decades (Bergh & Holbein, 1997; Boyd, Gove & Hitt, 2005; Shook, Ketchen, Hult & Kacmar, 2004). Bergh & Holbein (1997) looking at longitudinal designs in 203 papers on strategic management from 1980 to 1993 found that more than 90% of studies had insufficient attention to methodological assumptions, thus, the investigations were affected by type I bias. Sarker and Lee (2001) using a case research methodology in business process reengineering to test competing theories, found evidences to refute the dominant technocentric theory

and the alternative sociocentric view while providing support to adopt the socio-technical approach.

Bergh & Fairbank (2002) found that strategy researchers reach flawed conclusions and inaccurate findings because when measuring changes they do not recognize the required research methodology. Hitt, Boyd and Li (2004) summarized key content analyses of research methodology employed in strategic management. Ketchen, Boyd and Bergh, D. D. (2008) reviewed the research methods applied in strategic management between 1980 and 2004 observing a growth in the number of articles devoted to strategy topics using empirical tools.

Lohrke (2008), Shook (2008), and Wright (2008a) have reviewed different topics of research methodology, integrating them in a coherent analytic framework and making important contributions to research on strategy methods. These papers review the application of some research methods employing traditional tools and more specialized methods. Among the traditional methodological tools are reviewed meta-analysis, strategic groups and survey data collection. Among the more specialized methods the authors review cause mapping, conjoint analysis, internet data collection, repertory grids, etc. Regarding the content analyses, these authors review some conceptual, theoretical and methodological frameworks, such as the resource based-theory, discretion and upper echelons, etc.

Research methods used address theoretical perspectives such as resource-based view, traditional tools such as survey data collection, meta-analysis, and more specialized methods such as internet data collection, conjoint analysis, repertory grids, cause mapping, etc. The methodological practices of strategic management research strength the scientific character of the field to the extent that increase the confidence in the findings resulting from a variety of research design, sampling, measurement, analysis, and interpretation of results techniques.

Management research is aimed to analyze recent developments on research methodology in strategic management. Organizational location using spatial research methodology in strategic management is a research topic that has called the attention of some researchers such as Dohn and Hahn (2008). Venkatraman (2008) highlights the improvements on research methodological sophistication of the strategic management field.

Research methods used at the different levels of analysis to capture motives, preferences, and decisions of industries, firms, management strategic groups and individuals are very limited on the design, implementation and monitoring strategies. The simplicity of some methods used to analyze multi-level phenomena, such as variance decomposition, is not suitable for more complex analysis of situations. The integrative nature of strategy research leads to an imperative for adoption of multiple theoretical frameworks. Innovations in research methodology provided new insights out of the debate industry versus firm provided new insights. "...every new innovation consists of a new combination of existing ideas, capabilities, skills, resources etc. It follows logically from this that the greater the variety in these factors within a given system, the greater the scope for new combinations of these factors, that is, new innovations..." (Fagerberg, 2003, p. 7). Researchers and scholars address identified methodological areas of omission.

Strategic management has borrowed some research methods and techniques from other fields such as economics, sociology, psychology, politics, and more recently geography. Research in strategic management influences other fields such as organizational theory (Oliver 1991, 1997) and human resource management (Huselid, 1995; Wright, Dunford & Snell, 2001).

Ketchen, Boyd and Bergh (2008) argue that the research methodology used to analyzed strategic management are as robust as the findings generated, although the methods still face some challenges despite the accomplishments. Not all case studies require or have absolute necessity of statistical robustness. However, researchers in strategic management repeat past mistakes of adopting a technocentric or sociocentric approaches without considering the interactions between the social and the technological (Collins and Cordon 1997).

4. Challenges for research methodology strategy

New communication and information technologies have changed the pace, volume and nature of available information but also in the methods for analyzing such data. Sources of data are more easily accessible and searchable depending of type and mix of research

methods and techniques used. Analysis of textual information as an input derived from data sources and literature review has many forms and is itself research (Johnson & Christensen, 2012; McKee, 2003) that may require some quantitative, mathematical and econometric modeling. Meta analyses and combinations of existing knowledge can give valuable insights.

Research methods in strategic management face several challenges due to the methodological limitations for the examination and analysis of the strategy's processes and phenomena complexities. Longitudinal methods help to the analyses of evolving events over time although the complexity, uncertainty and immeasurability variables associated to these phenomena. The strategy phenomena pose a challenge for researchers due to the multidimensional nature of constructs. Strategic management might be enriched through inclusion and use of alternative techniques in addition to conventional tools.

The strategies of research in strategic management should consider the actions and interactions of all agents and actors involved in organizational activities. Research on the processes of formulation, design and implementation of strategies in organizations has called the attention not only of scientists, scholars and practitioners but also common people interested in the topic, despite the fact that the research methods have limitations.

Research methodology still has plenty of perverse problems that limit the application of research findings in design, measurement and analysis. Research methodological practices prevail that provide limited insights in strategic management.

Less developed economies have a small budget for scientific research, innovation and technology transfer. It is difficult to introduce new research methodologies in less developed countries where the scientific culture is not widely promoted and adapted as the common ground among the scientific community. "Conventional wisdom" (Galbraith, 1999) considers that group culture and political influences shape dominant views. Strategies for engaging strategic management researchers and scholars with new types of research methods and resources and new ways of practicing and working with them require sensitivity to the existing scientific cultures and practices. If researchers in strategic management want to be effective in optimizing the use

and exchange of research methodology and resources, they should be more sensitive to the practices and cultures of different research communities.

Samik-Ibrahim (2000) proposes a grounded theory methodology (GTM) in a developing country at the stage where research activities have a lot of obstacles and many shortages such as low effectiveness-productivity and efficiency and lack of funding. Grounded Theory Methodology (GTM) is a "general method of comparative analysis" to discover theory with four central criteria: Work or generality, relevance or understanding, fit or valid, and modifiability or control.

The future research in strategy process research has the tendency to be more holistic, more integrative, with an emphasis on team work, corporate management and be more oriented and supportive of action research methodologies (Hitt, Gimeno y Hoskisson, 1998). Future research in strategic management phenomena will include integration of multiple theoretical and empirical complex models supported by sophisticated statistical tools such as structural equations modeling and multinomial logit analysis.

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Rhodium Interaction with Human NRG1 Gene of Schizophrenia

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Abstract - Rhodium (II) acetate [Rh₂ (O₂CCH₃)₄] could be used as an indicator for single nucleotide polymorphism (SNPs) involved in the onset of schizophrenia. Rhodium (Rh₁) has affinity to make covalent interactions with neuregulin (NRG1) gene at SNPs mutation. Binding effects of Rh₁ has been studied under different molar concentrations at different time periods. In this study we used Rh₁ to evaluate its interaction with NRG1 gene in Schizophrenic patients of Pakistan. Rh-NRG1 adduct were amplified by PCR and visualized on agarose gel electrophoresis. Here

we show Rh1 binding with NRG1 gene was inhibited with increasing concentration ranges from 0.5 -3 μ M. It has been noted that upon binding with NRG1 gene Rh1 decreased the mobility and intensity of the DNA bands. Noticeably Rh1 didn't inhibit the activity of Mun1 restriction enzyme having specific CAAA cleavage site. After the digestion of NRG1 gene having SNPs mutation combining with Rh1 proves its covalent binding only with Guanine or Thymine and not with Adenine or Cytosine. This is a novel study that shows rhodium can covalently binds with human dsDNA and can inhibit its amplification. The effect of Rh1 to target different SNPs mutations (normally occurs in genetic diseases such as schizophrenia) can be identified by using this technique. There are variations between human populations, so a SNP allele that is common in one geographical or ethnic group may be much rarer in another, and Rh1 can act as a useful tool to identify SNPs of schizophrenic genes.

Keywords - Pakistani Population, Schizophrenia, Single Nucleotide polymorphism (SNP), Neuregulin (NRG1), Rhodium (Rh)

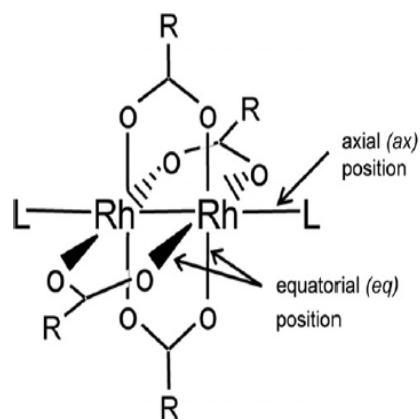
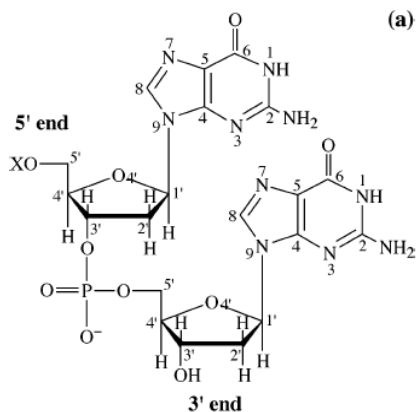
INTRODUCTION

Schizophrenia is a chronic, severe, and multifactorial brain disorder. NRG1 gene with SNPs mutation shows the increase risk for schizophrenia. Neuregulin (NRG1) is the strongest leading schizophrenia susceptibility gene. NRG1 was first implicated in schizophrenia in an Icelandic population (Stefansson, H, et al., 2002). Human NRG1 gene is located on chromosome 8p22-13 and is approximately 1.2 Mb long including more than 30 exons and several large introns (Paul J.H., Amanda, J.L., 2006). Recently 13 SNPs have been typed for schizophrenia in NRG1 gene (M Gardner, et al., 2006; Amanda J. Law et al., 2006) Previous studies have shown DNA

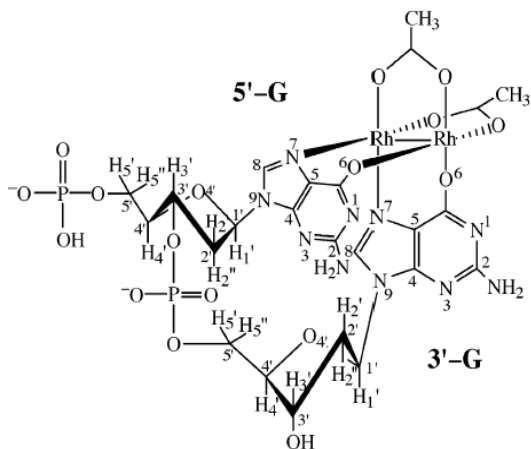
interactions with heavy metals such as zinc (Zn), rhodium (Rh) and copper (Cu) (Katsuyuki, A. Abdus, S., 2002; Rahman M.d.M, et al., 2008) Early studies have demonstrated that interaction of rhodium occurred only with poly Adenine but not with poly Guanine or poly Cytosine (J.L. Bear Jr, et al., 1975; J.L. Bear 1986; E. Tselepi-Kalouli, et al., 1990). Studies done on Rh using L121 cell line have revealed that rhodium could be used as an anti-tumor metal when they form adduct with carboxylate (R.A. Howard, et al., 1979). Metal based anti-tumor drugs play very beneficial role in identifying biological activities (Helen, T, et al., 2003), such as to detect mismatch base pairs, to identify single nucleotide polymorphism (SNPs) mutations and in cancers. Adducts are also important for understanding the mechanism of the biological activities of antipsychotic agents. Recently it has been shown that Rh has the ability to recognize mismatch base pairs in double stranded DNA molecule (dsDNA) and detected SNPs within the genome. This provided the general approach to the discovery of SNPs in amplified regions of the dsDNA (Jonathan, R.H, et al., 2004; Henrik Junicke, et al., 2003).

The purpose of this study was to explore rhodium's covalent attachment with NRG1 gene. Since rhodium has ability to target double stranded DNA by forming various covalent adducts, our study can be useful in the synthesis of rhodium based antipsychotics drugs for the treatment of schizophrenia. In this study we have selected the single nucleotide polymorphism (SNPs) primer (rs3924999, G38A) for NRG1 gene (Yang, J.Z, et al., 2003). Interaction between NRG1 and rhodium acetate were investigated under different molar ratio at different time durations. As detect rhodium binding effect with NRG1 gene, Mun1 restriction enzyme was used to cleaved NRG1 gene and to check the binding of rhodium whether it bound with G, C or A.

The purpose of this study is to explore rhodium's covalent attachment with NRG1 gene. As rhodium has ability to target double stranded DNA by forming various covalent adducts. Our study can be useful in the synthesis of rhodium based antipsychotics drugs for the treatment of schizophrenia.

Rhodium $\text{Rh}_2(\text{O}_2\text{CR})_4\text{L}_2$ 

DNA Base (Guanine)



Rhodium Guanine Adduct

Fig. 1. Structure and atom numbering of Rhodium adduct (Helen, et al., 2003)

Experimental Method

DNA extraction

Venous blood samples were collected from identified subjects after getting human ethic approval from Jinnah Post Graduate Medical Centre (JPMC) hospital. The samples were stored in 3 % EDTA solution in falcon tubes for 3 hrs. Genomic DNA was extracted using the phenol–chloroform method as described previously (Debomoy K. Lahiri and Bill Schnabel. 1993). Concentration of DNA was determined by using UV absorbance at 260 and 280 nm. The ratio of 260/280 nm was 1.76 which is close to 1.8.

Preparation of Rh (I) adduct with Human NRG1 gene

The isolated human DNA was combined with rhodium. Rhodium acetate was purchased from (MERCK& Co. Inc., U.S). NRG1 gene was prepared for Rh(1) binding at the concentration of μM (5, 3, 1, 0.5, 0.1) and nM (10, 5, 1, 0.5, 0.3 and 0.1) were dissolved in 1mM sodium phosphate buffer at PH 7 containing 3mM NaCl_2 . The reaction mixture was incubated at 37 °C for 24, 48 and 72 hours in dark as to protect from light-induced disturbance during the incubation (Md. Masudur Rahman, et al., 2007).

Preparations of PCR mixture for Rhodium treated DNA adduct

We used two sets of DNA sample. One set was treated with rhodium but not used for PCR to serve as control. The sequence of the primer was as follows for the rs3924999: Forward primer sequence are 5'ACTGGTTTCACACCGAAGGAC 3', and reverse sequence 5'CCAAGATGAGATCCATTTTCGC 3' (Yang et al., 2003) While other set was treated with Rhodium and used for PCR reaction, we have used SNPs primer (rs3924999) for PCR reaction. PCR reactions were performed in 0.2 ml PCR tubes contained a reaction volume of 50ul (1x PCR buffer, 1.5mM MgCl_2 , 10mM primer forward and reverse, 100uM of dNTPs, 3 U of Taq polymerase and 200ng/ul template of human genomic DNA). PCR conditions used for amplification of NRG1

gene includes an initial denaturation at 94°C for 5 min, followed by 35 cycles at 94°C for 30 sec, 55–62°C for 40 sec, 72°C for 1 min, and a final elongation at 72°C for 10 min. rs3924999 was designed to amplify 246bp. After the PCR amplification these samples were run on gel to determine the change in mobility and intensity of the DNA adduct. All the DNA samples were incubated with Rhodium adduct for 24, 48 and 72 hrs and the binding reaction were carried out with 1 μ M DNA and plus Rh at different molar concentration as described earlier.

Digestion of the adducts by restriction enzymes

The digestion reaction was carried out by incubating the PCR adduct product (SNP rs3924999) samples with *MunI* restriction enzyme at 37°C for 4 hrs and *Tru1I* at 55°C for 4 hrs, both enzymes were purchased from Fermentas (International Inc, Canada). The PCR adduct products were run in 2% (w/v) agarose gel in tris borate EDTA (TBE) buffer. The gel electrophoresis was carried out at 80 V for 1 hr and 45 minutes and washed with Milli Q water for 10 minutes to visualize the DNA. The gel photographs were taken by Gel Doc system (Alpha Innotech Fluor Chem™).

RESULTS AND DISCUSSION

Rhodium metal was used to make adduct by combining it with genomic DNA and *NRG1* gene as to see whether these adducts changes their inhibitory properties (DNA replication, DNA band intensity and mobility) with time and concentration. The effects of these adduct with non-amplified, amplified and digested products were investigated. We observed slow DNA bands movement in non-amplified adduct with an increase rhodium concentration (from 10 nM to 5 μ M). There were no changes found in the DNA band intensity after 24 hrs. incubation (Fig. 2a). However, longer incubation (72 hrs) with high levels of Rh-acetate leads to decreased band intensity (Fig. 2b). These results clearly illustrated the potency of Rhodium's inhibitory actions that start at 1nM and can reach maximally at 5 μ M. This indicates a time dependent Rh binding affinity towards the Neuregulin gene 1. On the other hand only decreased band intensity was observed in amplified

adduct after 24 hrs of incubation with Rh-acetate with no changes in band movements (Fig. 3a). Present result shows an inhibition of DNA bands with increasing concentration of Rh-acetate. For example bands strength decreases from 0.1 nM - 100 nM concentrations and gradually disappears at 0.5 μ M - 5 μ M after 48 hrs of incubation (Fig. 3b). Complete disappearance of the bands were observed after 72 hrs of incubation at 5 nM and onwards (Fig 3c). Amplified adducts were digested with restriction enzyme Mun1 that has a capability to cleave the DNA at CAAA sequence. The result showed bands after digestion with Mun1 from 0.1 nM to 3 nM confirmed the binding of Rhodium with G and not with C or A (Fig. 4).

DNA-Rhodium adduct samples (Without PCR)

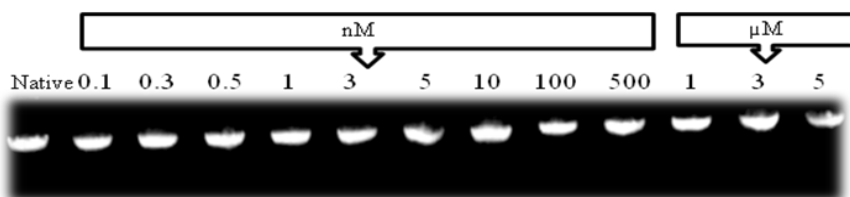


Fig. 2a. 24 hrs incubated samples without PCR

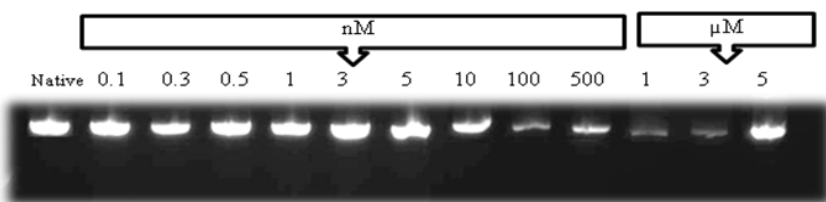


Fig. 2b. 72 hrs incubated samples without PCR
Native = DNA without treated Rhodium

Fig. 2(a & b). Agarose gel electrophoresis exhibit interaction between rhodium acetate and genomic DNA (non amplified) in TBE buffer at pH 8, incubated for 24hrs at 37°C. Lane 1 untreated (Native) DNA, lanes 2 to 12 are for rhodium DNA complex at different concentrations.

DNA-Rhodium adduct samples with PCR

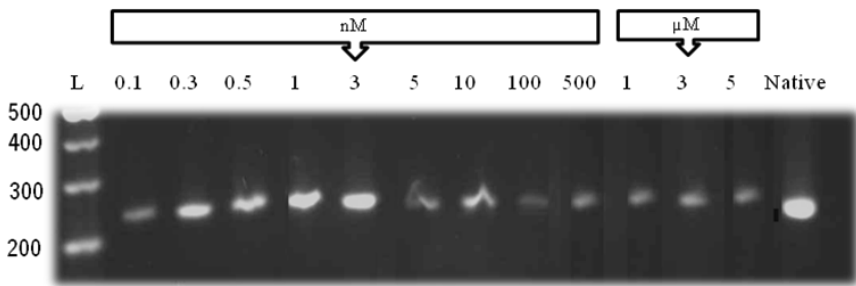


Fig. 3a. After 24 hrs incubation with PCR samples (SNP rs3924999)

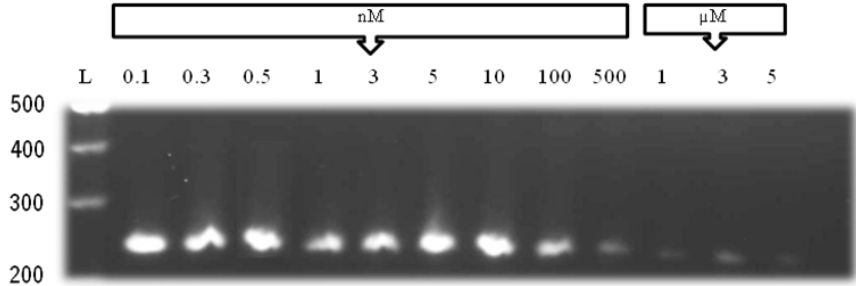


Fig. 3b. After 48 hrs of incubation

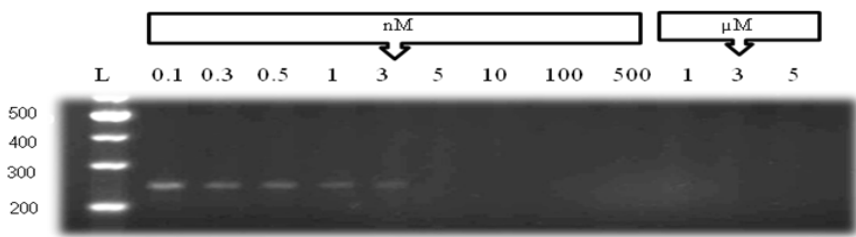


Fig. 3c. 72 hrs incubated PCR samples
L= ladder (Known sequence marker)
Native = DNA without treated with Rhodium

Fig. 3 (a, b & c) 2% agarose gel of the PCR product (246bp) of NRG1 gene. Lane L corresponds to molecular marker of 100 bp; Native lane indicates the amplified product of NRG1 without treated Rh. Lane 2 to 12 rhodium treated amplified product of NRG1 gene.

Restriction Digestion

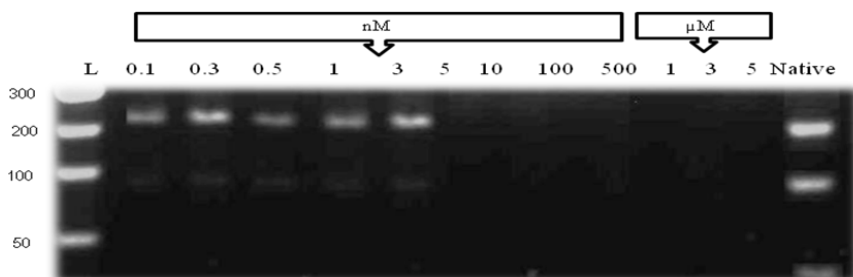


Fig. 4. Digested PCR product after 72 hrs incubation

L = ladder (Known sequence of DNA)

Native = DNA without treated Rhodium

In Fig.4 Rhodium treated amplified product (72hrs incubated) were digested with Mun1 restriction enzyme. Lane 1 to 12 exhibits rhodium acetate treated samples while lane 13 shows native sample (without rhodium).

Rhodium is a transitional metal and a member of platinum group. Previous studies have revealed the interaction of Rh1 form complexes with plasmid DNA and confirmed their binding effects on the mobility dependent on conformations (H.M. Ushay, et al., 1981; S.E. Sherman, S.J. Lippard., 1987; G.L. Cohen, et al., 1979). Rh upon binding with the plasmid DNA changes the circular closed confirmation (CCC) to the open confirmation (OC) with decreased mobility in gel electrophoresis. As Rh has ability to make covalent bond with the nucleotides many studies shows that Rh1 can be used as an anti-tumor agent for the treatment of cancer (R.A. Howard, et al., 1979). Jonathan and colleagues 2004 has revealed that Rh1 is the best target agent for the detection of mismatch base pairs in genomic DNA (Helen, T, et al., 2003). Earlier studies on Rh also revealed that Rh is used to induce inhibitory effects on DNA amplification by using plasmid DNA (Md. Masudur Rahman, et al., 2007). This can be taken in account for high binding affinity of the metal with DNA regardless of the source (plasmid, genomic DNA or oligonucleotides).

The present study emphasize on the time dependent reaction of Rh binding with human NRG1 gene period. Further study has

extended to visualize its binding effects on the replication of NRG1 and on endonuclease activity. Here two types of Rh-NRG1 adduct has been prepared. The first group contains a non amplified NRG1 gene whereas; the second group contains an amplified NRG1 gene. Both groups received same treatments including incubation times (24, 48 and 72hrs) and Rh concentration (0.1 nM – 5 μ M).

Gel electrophoresis was carried out for the visualization of the Rh and NRG1 interaction at different concentration and incubation time. Representative gel images shown are in Fig.2 in which the Rh-DNA adduct was allowed to move in electric field toward anode, the mobility was slow (Fig. 2a and 2b) and band intensity decreased. These results indicated that Rhodium binding with genomic DNA increases with increase the Rh1 concentration and reaction time (24 and 72 hrs). This study suggests at Rhodium acetate complex has positive charge which neutralized the negatively charged PO_4 group of the DNA thereby resulting in stable complex formation and decreased mobility as described in previous study (Ali Arslantas, et al., 2007).

Fig.3 shows that 246bp amplified product of NRG1 gene was inhibited by Rh1 at different concentrations. Amount of the amplified product of NRG1 gene decreased with increased the amount of Rh1 at different reaction times. Fig.3a 24 hrs incubated PCR adduct rhodium slightly affect the DNA replication but changes the mobility and intensity of DNA bands with increasing Rhodium concentration. Fig.3b shows the 48hrs incubation bands from 0.1 up to 100nM concentration, which get lighter and gradually disappeared at 500nM onwards, indicating that DNA amplification is inhibited with increasing incubation time. In fig.3c after 72 hrs incubated samples the amplification was inhibited by rhodium from lower concentration of 5nM onwards and gradually disappeared. In this study we also investigated the interaction of human genomic DNA with Rhodium acetate and found covalent interaction with DNA at nucleotide mismatch site (cytosine and adenine) when digested with MunI enzyme which acts on cutting sites CAAA. Our results exhibited heterozygous mutation on Agarose gel showing 3 bands (one allele mutation) instead of 4 bands (two allele mutations) confirmed that Rhodium didn't have binding site for adenine and cytosine. It seems that rhodium bind with specific bases of the DNA and inhibited PCR amplification. These results confirm

earlier experiments indicating that rhodium acetate bind with guanine rather than adenine and cytosine (Mun1I has binding site at CAAA). Literature indicates when rhodium bind with DNA it prevents the DNA to replicate as it interacts with N7 and O6 of guanine forming the rhodium adduct. This adduct breaks the hydrogen bond especially at O6 position in the DNA structure (10).

This study clearly demonstrated that Rh complexes neutralized the negative charge DNA which further inhibited the DNA amplification due to covalent bond formation with guanine or cytosine bases at position N7 and O6.

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Parental Attachment and Proactive Attitude among Adolescents

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Abstract - The purpose of the research was to study the relationship between parental attachment and proactive attitude among adolescents. For this purpose, a sample of 600 adolescents was selected through stratified random sampling technique from different schools and colleges of Rawalpindi and Islamabad, Pakistan. The adolescents' ages were grouped into three categories; students belonging to early adolescence (13-14 years) students belonging to middle adolescence (15 to 17 years) and students belonging to late adolescence (18 to 19 years). A short demographic sheet for the adolescents was used to get information on their ages, gender and institutional affiliation. The study consisted of two phases. Phase I dealt with determining the psychometric properties of the scales and pilot study and Phase II consisted on the main study. Statistical analyses revealed positive correlation between parental attachment and proactive attitude at moderate level among adolescents. On comparing the gender based differences on the proactive attitude, female adolescent's scores were

comparatively higher on Proactive Attitude Scale as compared to the male adolescents. Results further revealed that adolescents belonging to late adolescence group showed more proactive attitude as compared to the adolescents categorized as early and middle adolescence group. Moreover, adolescents belonging to upper socio-economic status were more proactive than adolescents belonging to middle and low socio-economic status.

Keywords- parental attachment, proactive attitude

INTRODUCTION

Adolescence is a developmental period when multiple transitions occur. Substantial changes occur in physical, hormonal, familial, relational, educational domains and social behavior within a relatively short period of time. Most notable changes occur in the nature of social interactions. There is a popular stereotype that adolescence is a stage in life that consists of increased conflict, and defiance to traditional social values and standards (Caissy, 1994; Hall, 1916). However, this stereotype applies to a small percentage of early adolescents. Many theoretical frameworks lay stress on parents-child interaction in the process of socialization. These include psychoanalytic theory, social learning theory, and social cognition theory. Many researchers link socialization process with parent-child relationship (Bowlby, 1969/1982; Ainsworth, 1989; Eisenberg & Valiente, 2002; Grusec, Davidov, & Lundell, 2002) and family processes in the development of proactive attitude (Eisenberg and Fabes, 1998). Proactive behavior refers to “intrinsically motivated voluntary actions that are intended to help or benefit another individual or group of individuals” (Eisenberg and Mussen 1989, 3). This voluntary act that is intended to benefit another person includes sharing, helping, comforting, rescuing, and cooperation.

Proactive attitude is a personality characteristic which has various facets such as resourcefulness, responsibility, values, and vision. It has implications for motivation and action. The proactive person takes

responsibility for his or her own growth and possesses a potential to improve oneself and one's environment. The socialization of proactive development progresses through the dynamic interaction between children and their parents. It has also been found that attachment between parent and child harnesses an environment where values are better socialized and accepted (Eisenberg & Valiente 2002), thus, promoting proactive attitudes and positive outcomes. There are links between parental affection and children's proactive characteristics (e.g., Clark & Ladd, 2000), although exceptions also exist (e.g., Davidov & Grusec, 2006). Contrarily, adolescents' perceptions of their parents' close involvement in their lives has predicted higher rates of engaging in voluntary community work in early adulthood (Zaff et al., 2003).

Attachment theorists state that secure attachment relationships supporting proactive development are through internal working models of attachment relationships (Mikulciner & Shaver, 2005). Maternal openness and encouragement of emotional expressivity have been associated with proactive attitude (e.g., Eisenberg, Fabes, & Murphy, 1996; Eisenberg, Fabes, Schaller, Carlo, & Miller, 1991; Eisenberg et al., 1992; Garner, 2003). Authoritative parenting support proactive attitude by encouraging children to be more caring for others (Hastings et al., 2000). Likewise, maternal authoritative style predicted more proactive attitude responses for girls (Hastings, Rubin, & DeRose, 2005).

Other studies indicate that for girls who had been more inhibited, early maternal authoritarianism predicted more proactive responses (Hastings, Rubin, Mielcarek, & Kennedy, 2002). Maternal sensitivity to children facilitates proactive development in children (Robinson, Zahn-Waxler, and colleagues, 1994). Researchers have not focused as much attention on the roles of fathers in the proactive development of children as compared to mothers, although some studies do suggest that paternal influences may contribute to children's proactive development (e.g., Dekovic & Janssens, 1992; Janssens & Gerris, 1992; Sturgess, Dunn, & Davies, 2001). There are links between age, gender, socialization, and proactive attitude among adolescents. Researches indicate that proactive and moral behavior increases with age (Eisenberg, 1986; Kohlberg, 1976; Piaget, 1932/1965). Hence, it should be assumed that adolescents would show more proactive

behavior than they did when they were children. However there is stability in elementary school-age children's proactive attitude (Zhou et al., 2002), specially in adolescents' proactive attitude toward peers (Wentzel, Barry, & Caldwell, 2004). Gender is one of the most consistent correlates of proactive attitude. Studies confirm the early emergence of sex differences favoring girls in the expression of nurturing attitudes toward others in need (Zahn-Waxler, Robinson et al., 1992) and socialization experiences (Robinson, Zahn-Waxler, & Emde, 1994). However, observational techniques as compared to questionnaire reports provide less consistent evidence regarding sex differences in proactive characteristics (Eisenberg & Fabes, 1998; Grusec, Goodnow, & Cohen, 1996; Hastings, Rubin, & DeRose, 2005; Zhou et al., 2002).

Studies have also shown that children from poor families having lower income or job status, are less proactive than children from more privileged homes (e.g., Haapasalo, Tremblay, Boulerice, & Vitaron, 2000; Lichter, Shanahan, & Gardner, 2002). These effects may be due to the non-availability of proactive role models, stressful experiences that increase children's self-focused concern, or socioeconomic status differences in parental socialization. Thus, the links between lower socioeconomic status and lower proactive development may be mediated by maladaptive parental socialization.

Several researchers have suggested that children and adolescents in more collectivist cultures are more empathic, altruistic and cooperative than children in individualist cultures (e.g., Knight et al., 1982; Zaff et al., 2003) however disconfirming results have also been reported (for e.g; Carlo, Koller, Eisenberg, Da Silva, & Frohlich, 1996; Pilgrim & Rueda-Riedle, 2002). Cultural differences in parental socialization in the development of proactive tendencies may be found (Knight et al., 1982; Whiting & Whiting, 1975).

Securely attached children are more proactive specially when their mothers and fathers are more authoritative than authoritarian in their style; make use of gentler control techniques; use reasoning and provide explanations; are sensitive to their children's needs; and support their children's experience and regulation of emotions. Children are more proactive when they come from secure homes; have friendly relationships with their siblings; and have good experience.

The concept of proactive attitude is extremely important in furthering research in a number of fields, including education, social work, criminal justice and law. For this purpose its psychological foundations and theoretical understanding is needed to draw practical implications.

OBJECTIVES OF THE STUDY

The study was designed to achieve the following objectives: (1) determine proactive attitude among adolescents; (2) find out the relationship of proactive attitude of adolescents and their attachment with fathers; (3) find out the relationship of proactive attitude of adolescents and their attachment with mothers; (4) analyze the relationship between parental attachment and proactive attitude among adolescents; and, (5) find out the effects of socioeconomic status on the development of proactive attitude among adolescents.

MATERIALS AND METHOD

Sample

A total of 600 adolescents (male $n = 300$ and female $n = 300$) were taken from different schools and colleges of Rawalpindi and Islamabad (Pakistan) as participants of this study. Three categories of educational institutions were taken (Urdu medium institutions, Government institutions and English medium private institutions). Simple random sampling was chosen for selecting the sample. The adolescents' ages were grouped into three categories; adolescents belonging to early adolescence (13-14 years) adolescents belonging to middle adolescence (15 to 17 years) and adolescents belonging to late adolescence (18 to 19 years). The sample was further divide to three socioeconomic classes i.e. upper, middle and lower on the basis of demographic data family income.

Instruments

The following scales were used for the study:

1. Subscales (Mother Attachment Scale and Father Attachment Scale) of the Inventory of Parent and Peer Attachment (Armsden and Greenberg, 1987)

- 2.Proactive Attitude Scale (Schwarzer, 1999)
- 3.A demographic sheet for adolescents (It required information regarding adolescents’ age, gender and institutional affiliation)

Table 1. Alpha reliability coefficients of the mother attachment scale, father attachment scale and proactive attitude

Scales	No. of Items	Alpha Reliability Coefficients
Mother Attachment Scale	8	.87
Father Attachment Scale	8	.87
Proactive Attitude Scale	8	.55

Table 1 indicates the Alpha reliability coefficients of Mother Attachment Scale, Father Attachment Scale and Proactive Attitude Scale. The Alpha reliability coefficient of Mother Attachment Scale, Father Attachment Scale and Proactive Attitude Scale is .87, .87 and .55 respectively which is quite satisfactory.

Table 2. Mean scores and SD of adolescents on mother attachment scale, father attachment scale and proactive attitude scale (N=600)

Scales	Mean	SD
Mother Attachment Scale	99.8	13.6
Father Attachment Scale	98.5	13.9
Proactive Attitude Scale	22.7	3.81

Table 2 indicates the mean scores and standard deviation of adolescents on Mother Attachment Scale, Father Attachment Scale and Proactive Attitude Scale which are M = 99.8 and SD = 13.6; M =98.5 and SD = 13.9; and M =22.7 and SD =3.81 respectively.

Inventory of Parent and Peer Attachment (Armsden & Greenberg, 1987)

It was originally developed to measure emotional attachment in adolescents. Its purpose is to measure the positive and negative affective and cognitive dimensions of adolescents' relationships with their parents and peers. Specifically, the Inventory of Parent and Peer Attachment (IPPA) taps into how well these figures serve as sources of psychological security.

Based on Bowlby's theory of attachment (1969), three broad dimensions are assessed: degree of mutual trust; quality of communication; and extent of alienation and anger. Two subscales of the Inventory of Parent and Peer Attachment were utilized for this study. The first subscale measures attachment to mother, or the degree to which the respondent feels he has a close and positive relationship with his mother. The second subscale measures attachment to father, or the degree to which the respondent feels he has a close and positive relationship with his father. IPPA is a self-report measure. It consists of 25 items for the mother, 25 items for the father, and 25 items for the peer to which participants respond using a five-point Likert scale (in which 1 = Never, 2 = Seldom, 3 = Sometimes, 4 = Often, and 5 = Always).

The IPPA is scored by reverse scoring the negatively phrased items and then summing the response values in each section. The items to be reversed scored for Mother Attachment Scale are 3, 6, 8, 9, 8, 11, 14, 17, 18, and 23. The items to be reversed scored for Father Attachment Scale are 3, 6, 8, 9, 8, 11, 14, 17, 18, and 23. High score on the scale is indicative of secure attachment. Armsden and Greenberg (1987) reported Cronbach's alpha internal consistency coefficients of 0.87 for Mother Attachment and 0.89 for Father Attachment. Armsden and Greenberg (1987) reported three week test retest reliability coefficients for the original version of the IPPA-R of 0.93 for Parent attachment (mothers and fathers rated together). As far as validity of IPPA is concerned, Armsden and Greenberg (1987) reported that parent attachment scores were significantly related to indicators of family environment, family and social self-concepts, and the tendency to seek the support of parents when needed.

Proactive Attitude Scale (Schwarzer, 1999)

The Proactive Attitude Scale was employed for the current study. It is a self-report measure intended to assess the individual's tendency to perform proactive attitudes. It is a parsimonious self-administered scale consisting of 8 items. It is designed for the general adult population (including adolescents). The administration of the scale requires approximately 4 minutes. Responses are made on a 4 point scale (1= not at all true; 2 = barely true; 3 = moderately true; 4 = exactly true). A composite score is yielded by summing up the responses of all 8 items. A high score on the scale indicates that a person has high proactive attitude and a low score on this scale indicates a person's low proactive attitude.

Procedure

After determining the sample and instruments for the current study, informed consent forms were distributed to the students and a pilot study was conducted. Boys and girls were both asked to complete Mother Attachment Scale, Father Attachment Scale, and Proactive Attitude Scale. Additionally, they were asked to complete a demographic sheet indicating their age, gender and institutional affiliation. The data collected for the pilot study provided a sound understanding of the variables and showed the direction of the study. However, for the main study the sample size was increased. The purpose of the study as well as the testing procedure was conveyed to the subjects. The subjects were ensured about the confidentiality and security of data. Hence the data was collected for the main study. The research goals were accomplished by measuring and analyzing parental attachment and proactive attitude among adolescents.

Data Analysis Procedures

In this study, analyses were performed using the SPSS Version 13.0. Quantitative research methods were used to analyze the collected data. Descriptive analysis, Independent sample t-test, and Pearson Product Correlation have been applied for data analyses. To measure

the variance between groups an ANOVA was used. In addition, the variability within each age category was evaluated using each group's standard deviations.

RESULTS AND DISCUSSION

Table 3. Correlation between mother attachment, father attachment and proactive attitude scale (N=600)

Scales	Proactive Attitude Scale r
Mother Attachment Scale	.528**
Father Attachment Scale	.523**

**p < 0.01

The above table shows a moderate positive correlation among Mother Attachment, Father Attachment and Proactive Attitude.

Table 4. Mean scores, SD, t and p values of the adolescents' scores (male, n=300 and female, n=300) on proactive attitude scale (N=600) according to gender differences

Scale	Male (n= 300)		Female (n = 300)		t	p
	M	SD	M	SD		
Proactive Attitude Scale	22.12	3.97	23.28	3.55	3.77	.000

df = 2, ***p < 0.001, **p < 0.01, *p < 0.05

The above table shows that female students scored higher as compared to male students on Proactive Attitude Scale (N=600).

Table 5. Mean scores and standard deviation showing differences with respect to age groups on proactive attitude scale (N=600)

Scale	13&14 Years Early (n =34)		15 & 17Years Middle (n=120)		18 & 19 Years Late (n=446)		F
	M	SD	M	SD	M	SD	
Proactive Attitude Scale	22.02	4.16	22.45	4.21	22.82	3.66	.999

df= 2 , **p < 0.001, **p < 0.01, *p < 0.05

The above table shows that late adolescent group scored higher as compared to early and middle adolescent group on Proactive Attitude Scale.

Table 6. One way ANOVA indicating mean scores and standard deviation on proactive attitude scale of the three groups of adolescents categorized according to low, middle, and high socio-economic status (N=600)

Scale	Group I Low SES (n=172)		Group II Middle SES(n=239)		Group III Upper SES (n =189)		F
	M	SD	M	SD	M	SD	
Proactive Attitude Scale	21.33	3.73	22.45	3.79	24.26	3.33	.000

df=2 **p < 0.001, ** p < 0.01

The above table shows that adolescents from upper socio-economic

status scored higher as compared to adolescent from middle and low socio-economic status on Proactive Attitude Scale.

The present study was designed to examine the relationship between emotional attachment of adolescents with their mothers and fathers and development of proactive attitude among them. Additionally, proactive attitude in adolescents with respect to age, gender and socio-economic status have been considered. Previous research suggest that parent-child relationship play a pivotal role in the development of adolescents' proactive attitudes (Eisenberg & Fabes, 1998; Eberly & Montemayor, 1998) and various dimensions of parenting practices predict positive outcomes in children (Lapsley 1996; Carlo et al. 1999; Eisenberg & Valiente, 2002).

A number of interesting results emerged from our analyses. First the current research findings are consistent with earlier researches that positive development is promoted by the extent, the child is attached with his/her father or mother. Mikulincer and Shaver (2003, 2007) found that a secure person feels beneficial effects on emotion regulation, which is central to mental health, social adjustment, and social attitudes and values, and thereby promotes proactive behavior. Many developmental studies on proactive attitude document that it increases with age (Radke-Yarrow et al., 1983; Eisenberg & Fabes, 1998; Pratt, Skoe, & Arnold, 2004).

Adolescence is a period in life that involves developmental changes. These developmental changes are different with respect to gender. The development of different trajectories in males and females are described in the current research. The study investigated the role of proactive attitude among male and female students. To examine gender differences, independent t-test was conducted. Female students reported higher levels of proactive attitude than their male counterparts. One variable that is often related to proactive attitude is gender. Research on the relationship between gender and proactive attitude has produced mixed results when comparing males and females. In the current study, males, on average, reported lower proactive attitude than females.

Across many studies, girls and women have been found to be more proactive than boys and men. For example, peers and teachers have been found to describe preschool-age, kindergarten-age, and

elementary school-age girls as more proactive than boys (Côté, Tremblay, Nagin, Zoccolillo, & Vitaro, 2002; Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000; Keane & Calkins, 2004). Culture is also one of the determining factors in the development of proactive behavior among children. Likewise, parents from low socioeconomic status are less responsive than parents from higher socioeconomic status groups (e.g., Knight, Kagan, & Buriel, 1982).

The present study contributes to our understanding of the relationship between parental attachment, and proactive attitude in adolescents. Proactive attitude is influenced by many factors. However, to acquire a complete picture of proactive attitude among adolescents, it is imperative to explore beyond the variables of age and gender. This study also focused on socio-economic status. The age related changes in proactive attitude were determined using an ANOVA. It has been found that scores on proactive attitude for both males and females began to progressively rise after lower and middle adolescence. The current study found high levels of proactive attitude in college students when compared to elementary and high school students. Hence, the trends in proactive attitude with respect to age groups can be found from the current research findings. The results are consistent with the majority of findings discussed previously.

A major task of adolescents is preparation for adulthood. Indeed, culture hinges on how effective this preparation is (Larson, Wilson, Brown, Furstenberg & Verma, 2002). High scores of female student in the current study are indicating that trends are changing and due importance is given to males as well as females in the process of socialization. Proactive attitude as a variable in this context needs to be explored extensively as differences may exist in the socialization of male and female adolescents in different cultures. Socio-economic status has been found to influence and affect a person's proactive attitude.

Several studies have reported significant findings regarding the effects of socioeconomic status (SES) on proactive attitude (Burbach, Fox, & Nicholson, 2004). The current research suggests that individuals with a higher SES have higher levels of proactive attitude than individuals who have a lower SES. Parental absence, unemployment of parents, family's economic condition and resources

contributes to the depletion of children's proactive attitude. Likewise, fathers and mother's higher levels of education and higher levels of family income can be other contributing factors that provide higher quality home environments for their children and thereby inculcating positive outcomes in their children. In order to address some of these issues, further research is needed. There were a number of variables that could have impacted the results.

The study revealed that parental attachment is positively related to the development and enhancement of pro social attitude among students. Findings of the current study support earlier researches. In order to study the relationship of mother attachment, father attachment and pro social attitude among students, scores on the scales were correlated. The analyses showed a moderate positive correlation among the variables used in the current study. Some researches indicate that proactive attitude increases from early to late adolescence (Eisenberg & Fabes, 1998). The current study supports previous researches in which proactive attitude has been found to be higher in late adolescence as compared to early adolescence. However, more researches are needed to explore the developmental trajectory of proactive attitude, as well as the ways in which adolescents may differ in their development of proactive attitude

CONCLUSION

Mother and father attachment both are linked to proactive attitude among adolescents. Overall female adolescents are more proactive than male adolescents. Proactive attitude increases with due course of time as the current study demonstrates that late adolescents have high proactive attitude as compared to early and middle adolescents. Moreover, high proactive attitude is found in adolescents belonging to upper socio-economic status as compared to adolescents belonging to middle and low socio-economic status.

RECOMMENDATIONS

There were a number of variables that could have potentially influenced the validity of the study. Because of a limited time frame,

students could only be surveyed between the hours of eight and two. Therefore, time of day could have had an influence on the demeanor of the students, causing possible misrepresentations of their true proactive attitude. Perhaps the most influential limitation of this study is that the participants involved were students who may not have acknowledged the importance of the study and therefore, not taken it seriously. Finally, adolescents are generally eager to please as well as be helpful. This eagerness may have influenced them to respond with more desirable answers.

In light of all these assumptions, the possible limitations are to be expected. Study on proactive attitude in adolescents was desirable since the body of research is lacking in this area. This current study has contributed data on mother attachment, father attachment and proactive attitude among adolescents; however there are some more limitations that must be considered. Keeping in view the limitations following suggestions are made:

1. A nation-wide sample from educational institutions in Pakistan should be taken in further studies so that the findings may be generalized to a larger population.
2. Qualitative studies can be designed in order to address these issues.
3. More demographic variables can be inducted in the research study to have a better understanding of these variables.

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Free T3 as a Reliable Indicator of Thyroid Dysfunction in Cirrhosis

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Abstract - Liver cirrhosis is a common ailment afflicting a significant proportion of Pakistani population of all ages. Quite often, these patients require multi-system intervention, owing to the nature of this disease. This study was specifically conceived to objectively assess the level of thyroid dysfunction in cirrhotics of the urban population of Karachi, together with its relationship to the severity of liver malfunction as gauged by the Childs classification. Liver and thyroid hormones are intricately correlated so thyroid hormone abnormalities are seen in patients of liver diseases, although they are clinically euthyroid. The aim of this study is to correlate the abnormalities in thyroid hormones with the clinical staging of hepatic encephalopathy and to examine the role of

thyroid hormone as a reliable prognostic indicator of encephalopathy. We assessed 50 patients of cirrhosis for the thyroid hormone levels (including thyroxine, triiodothyronine and TSH) by Enzyme Linked Immuno sorbent Assay (ELISA) technique. Patients were also examined clinically for gradings of Cirrhosis by The Childs Pugh classification. All procedures on patients were done in accordance with the Helsinki Declaration. Triiodothyronine (FT3) was found to be a useful indicator of thyroid dysfunctions and it parallels the grading of Childs classification, whereas thyroxine and TSH were not found to be significantly correlated. We proposed that triiodothyronine could act as a prognostic marker to predict severity of cirrhosis and for assessing minimal hepatic encephalopathy.

Keywords - Thyroid hormones, Cirrhosis, Childs classification, extra hepatic manifestations of liver disease.

INTRODUCTION

Cirrhosis becomes a multisystem disease owing to its several consequential complications, which are obviously due to liver's central role in body's metabolism. Its incidence is reportedly increased; Extra-hepatic manifestations of liver disease include involvement of the lungs, central nervous system, the heart, and the kidneys, to name but a few. The involvement of these organ systems becomes manifest along the course of cirrhosis, and therefore, some of these complications are clinically relevant. Other less subtle and clinically non-manifest complications do occur, which are usually neglected in the management of cirrhosis but are present nonetheless (Ho JK, 2006).

Several hormones may be affected, including insulin and glucagon due to a deamination defect, glucocorticoids and gonadal steroids due to a conjugation defect, and thyroid hormones due to an iodination defect (Burra P et al, 1992). Thyroid dysfunction is present in several chronic diseases like severe liver or kidney diseases, certain metabolic

disorders and infections. In patients with chronic illnesses fluctuation in thyroid hormones occur which may render routine thyroid hormone testing unreliable. Hormone testing is sometimes essential in cases where additional thyroid hormone deficiency is suspected and in patients who may benefit from thyroxin treatment (Chopra IJ 1997).

Numerous clinicians have reported a sub clinical hypothyroidism in patients with chronic liver diseases (Sheridan P 1983). Although studies in different populations vary in their findings with respect to the type and degree of thyroid dysfunction in cirrhosis, but have consistently found low FT3 levels in the face of a normal TSH and a clinical euthyroidism (Chopra IJ, 1975). Not only has this free hormone level been delineated as indicator of thyroid dysfunction, but FT3 levels have also been correlated with the degree of liver dysfunction (Nomura S. et al, 1975).

Several methods are used to stage cirrhosis, including histological and clinical staging. A reliable and time tested system for assessing the clinical severity of cirrhosis is Child Pugh's classification. It includes serum biochemical tests, with serum albumen, bilirubin and prothrombin time, and two clinical criteria with ascites and encephalopathy (Ghany M and Hoofangle JH, 2008).

Table 1. Child-pugh classification of cirrhosis

Factor	Units	1	2	3
Serum Bilirubin	mg/dL	<2.0	2.0-3.0	>3.0
Serum Albumin	g/dL	>3.5	3.0-3.5	<3.0
Prothrombin time	Seconds prolonged	0-4	4-6	>6
Ascites		None	Easily controlled	Poorly controlled
Encephalopathy		None	Minimal	Advanced

(Ghany and Hoofangle, 2008)

Score 5 and 6 are designated as Child class A

Scores 7 to 9 indicate Child class B

Scores 10 to 15 are included in Child class C

This classification also serves as an indicator of survival and predicts the likelihood of complications in cirrhosis (Ghany M, Hoofangle JH. 2008). In several studies done previously, the parameters of Child classification were found to be significantly linked with FT3 levels. This finding confirms the presence of abnormalities of thyroid dysfunction in patients with cirrhosis, despite clinical euthyroidism (Shimada T, 1988). Nonetheless, FT3 levels can be used as a useful marker and prognostic indicator of survival in cirrhotic patients along with other biochemical parameters of the Child Pugh classification (Van Theil DH et al, 1985).

We tested thyroid hormone levels (FT3, FT4 and TSH) in 50 patients with varying degrees of severity of cirrhosis according to the Child Pugh scoring system. Our study suggested the prevalence of a low FT3 level and its inverse association with increasing severity of cirrhosis according to the Childs grading system. FT3 could be a significant predictor of thyroid dysfunction in cirrhotic patients. Results of both FT4 and TSH did not show any relationship with increasing severity according to Childs classification.

Chronic liver disease is classified into Child-Pugh class A to C, employing the added score from TABLE 1, and the relationship between the grading and years of survival are shown below.

Table 2. Child-pugh and years of survival

Points	Class	One year survival	Two year survival
5-6	A	100%	85%
7-9	B	81%	57%
10-15	C	45%	35%

http://en.wikipedia.org/wiki/Child-Pugh_score

MATERIALS AND METHODS

All patients with a known diagnosis of cirrhosis admitted to the medical unit II of Jinnah Postgraduate Medical Centre were initially recruited over a period of six months. They were further categorized

according to the Child classification as A, B or C. Of the 148 cases thus enrolled, 98 were later excluded according to the following criteria:

- Subjects with known, or with past or family history of thyroid disorders or any other autoimmune diseases or evidence of hypopituitarism
- Pregnant subjects
- Subjects with recent abdominal surgeries or any massive bleeds
- Subjects receiving drugs that may interfere with thyroid hormone metabolism or secretion

A total of 50 cirrhotic patients were then included in the final analysis. Their thyroid functions (FT3, FT4 and TSH) were determined by using a kit purchased from Immunotech, Bechman Coulter Company, Cat no1363. The radioimmunoassay was done utilizing the principle of ^{125}I -labeled antibody. The thyroid function tests were then associated with Child classes A, B and C.

Other biochemical tests commonly used in cirrhosis were also performed. Serum Alkaline phosphatase, alanine aminotransferase and bilirubin were done by colorimetric method, using commercial kits purchased from Human Gesellschaft fur und Diagnostica, Germany. Albumin was determined using Bromocresol green method, using a commercial kit by DiaSys Diagnostic systems GmbH, Germany. Prothrombin time was estimated by using a rabbit-brain thromboplastin reagent (Simplastin Excel), provided by BioMerieux Inc. USA.

These results were further compared to thyroid profiles of 50 normal subjects with no known co-morbidities.

Results were evaluated using SPSS 15. Students T-test was employed to compare variables between cases and controls. Correlation- coefficient (Pearson's product) was calculated for quantifying the association between the severity of hypothyroidism and that of cirrhosis.

Autonomy and confidentiality of all subjects was ensured. All clinical and biochemical evaluations were made subject to informed consent. All records were kept confidential, except from the patients and subjects' doctors.

Local ethical committee in accordance with the Helsinki declaration approved all experimental procedures.

RESULTS AND DISCUSSION

FT3 emerged as a reliable indicator of thyroid dysfunction in cirrhosis. Results for both FT4 and TSH did not show variability with the increasing grades of cirrhosis. Table 1 and Figure 1 exhibit the thyroid function according to Child's grade. Patients with decompensate cirrhosis (Child's groups B and C) showed a significant decrease in FT3 levels ($P<0.05$) but no significant differences in FT4 and TSH levels.

Table 3. Thyroid function in hepatic decompensation cirrhotics
(All values are expressed as Mean \pm SE)

T h y r o i d Function	Child grade "A" (n=7)	Child grade "B" (n=26)	Child grade "C" (n=17)
	Mean \pm SEM	Mean \pm SEM	Mean \pm SEM
FT3 (pg/ml)	2.58 \pm 0.27	2.30 \pm 0.13*	1.38 \pm 0.25*
FT4 (ng/dl)	1.33 \pm 0.11	1.26 \pm 0.05	1.14 \pm 0.11
TSH (mIU/L)	1.51 \pm 0.61	2.52 \pm 0.23	2.21 \pm 0.32

* $P<0.05$ shows significant difference

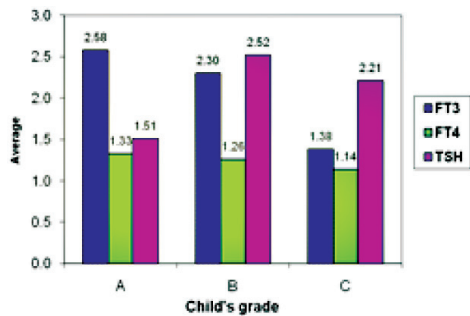


Fig. 1. Thyroid function tests in different stages of Childs class. FT3 expressed in pg/ml, FT4 in ng/dl and TSH in mIU/l. Patients with decompensated cirrhosis (childs class B and C showed a significant decrease in FT3 ($p\leq0.05$) No significant difference found in FT4 and TSH.

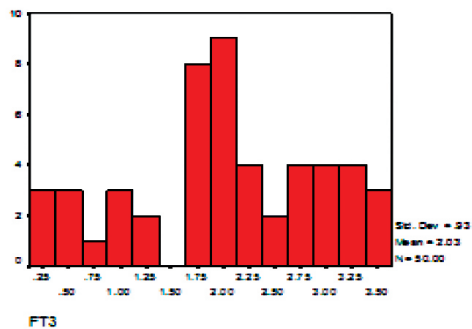


Fig. 2. Histogram of FT3 Values in Cirrhotics. Histogram showing FT3 in pg/ml on x axis and number of subjects on y axis 12 out of 50 subjects showing FT3 less than the lower limit of normal (i.e. less than 1.63)

Thyroid hormone levels according to Child's class A, B, C. Number of patients with Child's class A was 7 with B was 26, and C was 17. Childs class B and C exhibits significant decrease in FT3 (pg. /ml.)

Figure 2 shows frequencies of FT3 levels in cirrhotics, in terms of correlation coefficient, 12 out of 50 patients had an FT3 level less than

the lower limit of normal (i.e.<1.63).Thus the prevalence of low FT3 levels in cirrhotic patients was 24%.

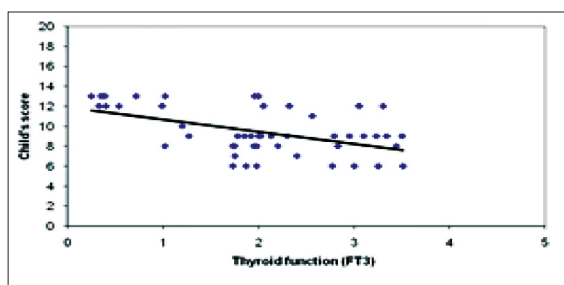


Fig. 3. Correlation of coefficient of thyroid function (FT3) and child score. Graph showing clumping of values about the regression line for FT3, expressed in pg/ml against child's score

Figure 3 shows the clumping of values in the middle of regression line of FT3 against the Child's score, exhibiting a very high correlation between the two values.

Table 4 shows correlation coefficient of thyroid dysfunction versus Child's score. Only FT3 was observed to be significantly inversely correlated to Child's class and hence hepatic dysfunction .

Table 4. Correlation coefficient of thyroid function vs child's score

Parameters	Correlation Coefficient "r"
FT3	$r = -0.49^*$
FT4	$r = -0.24$
TSH	$r = -0.06$

Table 5 shows correlation coefficients for individual thyroid function tests FT3, FT4 and TSH against albumen ,bilirubin, alkaline phosphatases, alanine amino transferase and prothrombin time. A significant P value (<0.05) positive correlation was found between FT3 levels and albumen, and a negative correlation was found between FT3 and serum bilirubin levels. Also FT4 levels showed a significant

positive correlation with serum albumin levels. Serum levels of alanine amino transferase and alkaline phosphatase correlated poorly with thyroid hormone levels. TSH showed no significant correlation with serum levels of any liver function markers. A significant negative correlation was found between prothrombin time of cirrhotic patients and their serum FT3 and FT4 levels.

Table 5. Relationship between liver function tests and thyroid function expressed as correlation coefficients

Thyroid Function	Liver Function Tests				PT
	Albumin	Bilirubin	Alkaline Phosphatase	Alanine amino transferase	
FT3	0.48*	-0.30*	0.14	-0.26	-0.48*
FT4	0.32*	-0.05	0.08	-0.02	-0.29*
TSH	-0.02	-0.05	0.17	0.13	0.02

Correlation coefficients for FT3, FT4 and TSH against albumen, bilirubin, alkaline phosphatase and alanine aminotransferase. Table shows significant ($p \leq 0.05$) positive association between FT3 and albumen levels and a negative correlation between FT3, bilirubin, and prothrombin time (PT) levels.

Thyroid hormone abnormalities are seen in liver diseases like acute and chronic hepatitis and cirrhosis and are known to parallel the severity of liver diseases (Malik R. and Hodgson H, 2002). Cirrhotic patients may exhibit abnormalities of thyroid hormone levels while being clinically euthyroid (Faber J, et al 1981). Several abnormalities of thyroid function tests may be seen including derangements in free T3 and free T4 levels as well as those of Thyroxin-binding globulin [TBG] (Huang J, Liaw F, 1995)

Out of these the finding of low free T3 was a more persistent conclusion (L'age M, 1980 and Georgia Kostopanagiotou et al, 2009) which is consistent with our results in Pakistani population. Thyroid function has again been evaluated as marker of prognosis of liver disease [Kano T et al, 1987 and Güven K et al 1993) as thyroid function

abnormalities usually get reversed on improvement in liver function (Kabadi UM and Premachandra BN, 1983).

Our study, therefore, emphasizes on assessing FT3 levels along with other biochemical parameters of Child's classification, as it may be used as a prognostic, rather than diagnostic tool for patients awaiting liver transplantation.

Although the relationship between liver and thyroid has been discussed several times in context of non-thyroidal illnesses, measurement of thyroid hormones is generally considered unreliable in severe illnesses. However, when dysfunction needs to be assessed in such patients, thyroid hormone must be measured. We have linked the FT3 levels with degree of liver dysfunction, and were able to exhibit significant relationship.

Our study has exhibited the presence of a low FT3 level and its inverse relationship with increasing severity of liver dysfunction in the local population of Karachi, Pakistan. A negative correlation between FT3 levels and increasing severity of liver dysfunction was also demonstrated by (Green et.al 1977). They specifically correlated the FT3 levels with serum albumen and had found lower FT3 levels corresponding to lower serum albumen levels. This finding is consistent with ours, and this study in Pakistani population has further expanded the scope of liver dysfunction tests in addition to the correlates of other assessments of liver function including Child Pugh scoring, by emphasizing the importance of FT3 as a prognostic marker.

Our results are also in concordance with a French study (Schlienger, 1979) in which thyroid profile was done on 50 alcoholic cirrhotics using a clinical and biological index to score the severity of the disease. They also related decreased levels of FT3 with the degree of liver dysfunction as a result of alcoholism.

Another study conducted in Pakistan, (Agha F et al, 1989), also concluded that FT3 correlates with the disease severity hence could be used as a prognostic tool for assessing the course and prognosis of cirrhosis though the comparison has different perspective. Our study also strongly agrees with the study conducted by Takahashi and Yamada 1989 who has considered FT3 as a sensitive index of liver damage.

Literature also indicated that low FT3 plays a protective role in the catabolic state (Gallo V, et al 1990). Similarly, Borzio et al (1983)

who studied 55 patients of chronic hepatitis found low FT3 levels despite the presence of clinical euthyroidism. Walfish et al (1979) have correlated FT3 levels with worsening liver function, and since they were able to follow up on their patients, they had demonstrated that mortality rates in patients with low FT3 on admission may in fact be greater as compare to higher FT3 levels.

The findings of low FT3 in cirrhotics, its association with worsening liver function by Child Pugh class, and absence of correlation between FT4 and TSH levels are all in agreement with the results of Kayacetin et al. (2003). Hepner and Chopra, in 1979, also found a similar decrease in FT3 levels in 29 patients with alcoholic cirrhosis, although they did not correlate it with the severity of the disease. Burra et al (1992) found low FT3 levels in 31 alcoholic cirrhotic patients and also demonstrated that the changes in FT3 reflected the severity of underlying liver disease.

CONCLUSIONS

In conclusion, we found significant correlation of FT3 with the indicators for detecting Childs score, while other signs commonly used for diagnosis of cirrhosis did not have any correlation. This effect suggests that FT3 could be used as a marker for grading severity of liver dysfunction.

We propose a further qualification of FT3 as a prognostic marker to predict severity and progression of cirrhosis by undertaking a large-scale follow-up study of early cirrhotic patients.

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