Toward a Theory for Sustainable International Development

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Abstract :
The sustainability of international development projects after the withdrawal of foreign aid has been an enigma to international donors. Studies have revealed that planning, ample financial resources, and use of foreign experts have not guaranteed sustainability. This study employs the CIPP evaluation model to facilitate the research of two international projects that have been sustained after the foreign donor transitioned the projects to the host country. The purpose of the study was to determine what factors promoted the sustainability of these two diverse programs, the academic faculty preparation program and the high technology neonatal intensive care program. The projects were initiated more than 15 years ago, the donor was actively involved for five years and since then has revisited the projects to evaluate the impact of the interventions. Both of the projects involved health care in an emerging country. Factors and concepts that emerged demonstrating strong influence for the sustainability of international project and are essential in a theory for international development are ; evaluation, partnership, negotiation, equifinality, respect, forecasting, transition, adaptability, flexibility, projects included ; the involvement of the host country all phases of operation ; application of skillful negotiation ; initiation of transfer of the project from the onset with the acceptance of shared responsibility for the programs ; exploration and the initiation of planning for recurrent costs once foreign aid was no longer available ; adapting new concepts and technology to the culture ; design of the projects with a decision making evaluation model to be used throughout the process allowing for appropriate adjustments during the implementation ; administrative support from government and institutions ; development of education materials in the language of the people that were easily available ; academic exchanges of personnel ; and consistency of consultation. Interviews were conducted with more than 400 people who have been related to these programs during the operation phases and in the follow up studies. Ten years after the withdrawal of foreign aid, the projects have expanded throughout the country and have made significant changes in the health care provided. The publications and research generated by these projects demonstrate the effectiveness of the transfer of knowledge and skill as well as the ongoing commitment to the improvement of health care.

Key words : international development, sustainability factors, evaluation, China, nursing education, health care initiatives, transfer of high technology

Introduction

What factors influence an international development project to make it sustainable? International development projects have proliferated in recent years. Evaluations have been done to discover that many projects or programs do not continue after the donor agency leaves. Are the programs being offered appropriate for the country and the needs of the country? How was the planning and implementation executed? Often international development programs are based on the transfer of technology and information. The knowledge of systems and their interactions is required to sustain the modernization. Montgomery[1] writing about international development projects identified that values of the

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recipients of the projects are important in the maintenance of programs after donors leave. Montgomery[1] identified indicators of modernization to be considered in initiating projects within a developing or emerging country. Health care is one of the indicators of modernization. Implementation of programs that introduce current technology are often much in demand in emerging countries and require that educational programs provide the implementers of change within the country with the requisite knowledge and skill for maintaining and advancing the program after the foreign input is withdrawn.

This study applied an evaluation model to study : identifiable factors that influence sustainability of international development projects ; the importance of the application of multidisciplinary theories to implement international development projects ; the monitoring of factors for sustainability that can be measured ; the role of educational programs in the transfer of new knowledge and technology ; and concepts that begin to support a theory for international sustainable development. The study was conducted in China where a number of programs were conducted by Project HOPE (Health Opportunities for People Everywhere) since 1983. The focus of this paper is limited to two programs that required the education of nurses as well as new members of other health care disciplines. There is little research information to explain how high technology medical units and training programs can become sustainable in an emerging country. But, effective health care is one of the indicators of modernization, and selected literature in the health care profession suggests that development programs introducing current technology should provide the implementers of change with the requisite knowledge and skill for maintaining and advancing the program after the foreign input is withdrawn.

This study has been conducted over a fifteen year period. Initial evaluations were ongoing with the development of both programs, the neonatal intensive care unit and the faculty preparation program for baccalaureate nursing faculty. The evaluations were initiated in the Peoples Republic of China (PRC) in sixteen cities and eighteen sites for the faculty preparation program and in three cities and four sites for the neonatal program. The evaluation continues to collect data on the outcomes and functioning of these two projects to ascertain factors that predict sustainability of international development projects. These projects were chosen because of the long term relationship of the foreign partner.

A unique opportunity was provided when in 1983, Project HOPE (Health Opportunities for People Everywhere), a Private Voluntary Organization (PVO) was invited by China to collaborate in developing projects for improvement of health in a variety of disciplines. After an assessment visit by a team from Project HOPE agreements were signed with five universities to develop programs with five medical universities : Beijing Medical University, Xian Medical University, Shanghai Second Medical University, West China Medical University and Zhejiang Medical University and the Chinese Nursing Assocation. Some of the programs were technology intensive medical and nursing programs and some were education programs. Interest in factors that affected the sustainability of programs after the donor left drove the analysis of the two programs in this study : the faculty preparation program and neonatal intensive care program. Thirty -three programs were operating simultaneously and the degree of sustainability varies.

Solid ground work prior to the development of the program with an assessment conducted to examine the situation, problems, resources, potential solutions in the environment, the political climate and the economic reality established a basis for the evaluation. The two programs received resource support for five years then external support was withdrawn leaving the country's professionals to implement the program independent of external human and financial resources. The use of these projects for study offered all the major elements needed to research sustainability of the transfer of technology and education.

China was defined by international health experts as an emerging country and therefore was a prime location for the study of new medical influ-

ences. China made few technological changes in nearly 6,000 years of existence. However, in the last 20 years, contemporary change has become a way of life in the country. Economic development has improved living conditions including health and has promoted the modernization of medicine.

However, as noted by many outside medical professionals, this change has forced the emergence of inequalities in access to care. In the 1980's improved health was viewed as a public good. But in recent years fiscal reform has introduced incentives that have promoted hospital-based, technology dependent medicine and changed the focus of health care to an economic commodity. It is evident that China is experiencing the positives and negatives of most developing countries.

The use of the two types of programs, one education and one high technology allowed the evaluation not only of the transfer of information and technology, but also the transfer of the knowledge of systems required to sustain the modernization.

Infant care is recognized as a vital indicator of the strength of a country's development and therefore has assumed an important role in China's medical world. Medical statistics in general are an indicator used in the evaluation of the economic status of a country. Infant mortality rates are one of the prime medical indicators that combine both the moral and economic appraisals of a country. Consequently, a major part of the medical modernization movement in the western world has been the establishment of neonatal intensive care units. Another status symbol in developing countries is the number, types and academic quality of their universities. There is a demonstrated desire by developing countries to be recognized with industrialized countries academically, recognizing that education allows for the leadership for economic development and recognition.

China was not immune to these influences and in the mid 1980's, requests from China were made to voluntary agencies and universities for assistance in modernizing its health care system by developing neonatal and pediatric intensive care units and the required training programs for professionals. It was at a time that medical equipment manufacturers were also anxious to have exposure in this emerging marketplace and bilateral and multilateral groups were very interested in having the opportunity to work in this country which had been isolated for many years. All were confronted with social and political obstacles in the process. In fact, Spence[2] highlighted that the many attempts to modernize this country have historically met with disappointing results. Nonetheless, the population is now continuing to expect more advanced specialized care in pediatrics, and that means advanced education and technology.

Problem Statement

There has been little study on the sustainability of imported technology and education in medicine. Since the 1980's many programs, with external international assistance have been initiated, but once the support has been withdrawn the lasting effects have been questionable. In fact, some educational programs have not continued without the outside financial and human resource support of the original donor institution. Questions even exist as to what design elements will facilitate a sustainable educational program.

Questions addressed through this evaluation examine the following questions :

- Is the program content relevant to the needs of the country? Is the program sustainable after the withdrawal of foreign donors?
- What factors influenced the development of sustainability?
- How was the transition made from foreign donor support to country support?
- Does the use of a decision making evaluation model facilitate the process of change in international development?
- Has there been a transfer of what was learned to others in the country by the original participants?
- How has the program been affected when the donor input is no longer available?
- Does an evaluation component influence sus-

tainability?
- What is important in the design of the program?
- How should the development of materials be approached?
- How do politics within the environment influence sustainability?
- What type of planning for recurrent costs facilitates continuation?
- Can the economic capabilities of the institution affect the sustainability of the program?
- Does the institution have institutional capacity to implement the program?
- How does leadership and administrative infrastructure affect the sustainability?
- Is it important in sustainability to consider mutual goals and expectations?

Background of Problem

A major influence on the medical setting of contemporary China is the complex history of medical education for both doctors and nurses. Since the creation of China's new government in 1949, educational policies have been influenced by the fluctuating economic and political climate. In 1949, the infrastructure of the educational system was small and fragmented with manpower shortages at all levels. The state of the economy in the 1950's caused limited changes in the continuing development of the educational system. The period of the Great Leap Forward was a difficult time ; the government required that the educational curricula include production work in factories and businesses in order to link the classroom with society.

In the 1960's an historical revolution forced all schools, universities, and medical schools to close throughout the country. Health professionals were sent to the rural areas to farm and do other manual labor. This period of time brought many changes to the health care sector and continue to affect the advancement and modernization within the country today. The universities did not reopen until the 1970's, and it was not until the late 1970's and 80's that the country began to look to the West for new ideas, knowledge and technology that would help in its development.

History of Nursing Education

A description of the history of nursing education in China is critical to understanding the challenges that existed for the PVO during the implementation of the educational program. Basic nursing education in China began in 1884 and was run internally. In 1921, a collegiate school, supported by Rockefeller Foundation was established at the capital city medical college to educate teachers and public health nurses. In 1929, baccalaureate education began and continued until 1949 when basic education programs were downgraded and baccalaureate education ceased. At that time there were approximately 30,000 nurses in the country[3]. The last baccalaureate program class graduated in the early '50's. During the late '60's and through most of the '70's, basic nursing education was non-existent.

During this period, individuals were assigned to their nursing jobs with little or no preparation. The central administrative philosophy implied that one learned by doing, therefore, if one were to be a physician or nurse then one functioned as a physician or nurse : there was no need for education. In fact, many individuals who were assigned to work as nurses in hospitals in the 1960's to 70's, are currently those in key administrative positions, either as head nurses or as directors of nursing. In 1978, basic nursing education programs were again started with middle school graduates rather than senior middle school graduates as enrollees. Today, there are 512 basic nursing programs with the entry educational level of middle school

China's ratio of 2.03 nurses to 1,000 persons in the city and 0.25 to 1,000 in the rural areas falls far short of developed countries' ratios[4]. The problem is also illustrated by the ratio of physicians to nurses outlined by the State Statistical Bureau[5]. There were approximately 922,000 nurses to 1,344,000 physicians or a ratio of 0.77 to 1 in 1990.

This lack of nurses is greater than in most countries whether developed or developing. Today in

China it is not at all uncommon to have only one nurse for 25-50 patients at night. Unlike the United States and other countries such as Japan, hospitals in China do not generally have auxiliary personnel such as nurse aides and practical nurses to assist. The lack of nurses is also magnified by the reverse relationship between the number of nurses in the urban centers compared with the number of nurses in rural areas, with more nurses in the less populated urban areas and fewer nurses in the rural communities.

The 30 year gap in nursing education has created serious problems in nursing education. Most of the education is being conducted by teachers who have not had good role models for clinical practice or who themselves may have had little formal education. Recently however, the country has introduced several new types of educational programs, which are trying to raise the knowledge level of the nurses. In addition, there have been programs developed to educate the teachers of the secondary nursing schools. These programs are conducted in the evening in adult school or during the day in some of the university nursing departments. The curriculum varies but the goal is to increase the knowledge and skill level of nurses who have been in practice and who are often in head nurse positions. These nurses will be responsible for teaching the students clinically as well as managing the nursing unit. Three graduate nursing programs have recently been initiated in the country, offering graduate courses to a very select group of nurses.

Currently only 2% of the nursing faculty have advanced education beyond the basic nursing program. A major barrier to advanced education is the national school examination for entry to university advanced education. The basic courses that are tested in the examination for admission for higher education (politics, Chinese literature, mathematics, chemistry and physics) are not content areas that the nurses have studied. Nursing school is similar to a vocational education program in the United States. Nurses are mostly graduates from secondary nursing schools that are post middle school or the equivalent of ninth grade education in the United States.

In addition, there are very stringent requirements for the granting of degrees in the country. Some students will be admitted to the university on a paying basis that will receive only a certificate of attendance if all degree requirements are not met. The certificate of attendance is granted at all degree levels to students who complete the program of study on a self pay basis but who do not meet the standards for a degree either by admission criteria, age, etc.

Nursing in this country is a female dominated profession. Recruitment and retention are difficult because of the work overload, poor management practices, low pay, low social status, low education, poor career opportunities as well as negative cultural attitudes. At a meeting of the deans and directors of baccalaureate schools in April 1989, one of the deans reported that not only did many of the graduates from the recent baccalaureate graduating class accept jobs in non-nursing fields, but that parents do not want daughters to enter into nursing. In fact, many will not allow their daughters to study nursing especially if they pass the college entrance examination[6].

Upon graduation, over 90% of Chinese nursing students are employed in the hospitals or schools where they have trained[7]. They generally remain employed at the facility the remainder of their careers. Unlike nurses in the West, they do not have the choice of electing their area of practice and in fact do not always have the option of leaving the nursing profession due in part to the socio-political factors in the country. Although nurses have increasingly requested to change careers, the government has generally denied the request. This has changed with the new economic reforms.

International Significance of Sustainability

Cheema[8] stated at the Bangladash Public Administration Training Centre (PATC) that development projects are and will continue in the future to be the main instrument of development policy and international assistance. Despite most of the

emphasis on program and sector lending, multilateral and bilateral assistance programs provide most of their aid through projects, and United States Agency for International Development (U.S.A.I.D) provides a major portion of both financial and technical assistance through international projects/programs.

For over 35 years improving health in the developing world has been the focus of activities for many non-governmental organizations such as private and voluntary foundations as well as international developmental agencies including the U.S.A.I.D. The three largest country donors of finances and personnel in the world today are the United States, France and Japan.

In a study conducted for the 1993 World Bank's development report, Michaud and Murray[9] found that in 1990 the total external assistance to the international health sector was $4800 million. Health sector is defined by two major components in the study, health and population and includes official development assistance, multilateral loans and non-governmental financing. The study notes that health sector assistance after slowing in the early 1980's, has steadily been increasing since 1986 through bilateral and multilateral channels and from 1988-1990 the external support slightly out paced the growth of the population.

Multilateral agencies, such as UNICEF and the World Bank, have increased their financial support for the health sector during the 1980's. Michaud and Murray[9] projected that the World Bank will become the single largest health sector donor even bypassing U.S.A.I.D in bilateral funding.

There are many nonprofit health care agencies involved in international projects. Some may use a short term educational methodology as a means for changing the health care services in a setting. A question exists as to whether an organization that sends a multidisciplinary medical team to a developing country to care for 10 children with heart disease is improving the long term health of all children within the setting.

These short term activities may show benefits for a select group of children during a limited period of time, but do not create the long-term change necessary to improve and sustain the health status of the world 's population. Many in the international community insist that all international health projects must include a thorough educational plan that consists of teaching health care workers to teach others. Rodriguez-Garcia, Goldman and Vieira[10] indicate sustainability implies that individuals have access to the educational information and techniques, can apply them and can benefit from them. The educational program must be institutionally viable to survive without external assistance.

Since the 1980's, U.S.A.I.D. has obligated over $1.5 billion to international health activities in such areas as child survival, family planning and humanitarian assistance. Buzzard[11] cited a recent review of evaluations of seven U.S.A.I.D. primary care health projects that identified that sustainability was found to be a problem with many of their health efforts. The results indicated shifting political support, weak community involvement and inappropriate technology as being the cause of the problem. In addition, results suggest that the development community needs to focus its efforts not only on the sustainability of project infrastructure but logistics, management and material resources.

After 35 years of substantial foreign assistance, the U.S. government like many donor organizations has increasingly required that program implementers demonstrate the potential for sustainability;ability of the local country to continue to provide the benefits of the program after the external infusion of technical, managerial and financial support has terminated. In particular, in the last few years with limited financial resources, donors are forced to allocate money very judiciously. Donors are often requiring private voluntary organizations and countries receiving foreign aide to conduct formal evaluations of program activities emphasizing the capacity for the program to be sustainable.

Although these grant requirements are being placed on the international organizations, there are minimal empirical data to support what in the

project design and implementation is integral for sustainability. Recently, a few studies[12,13,14] have begun to outline factors which may be necessary for the sustainability of health promotion programs, but there is a major void of information regarding whether this data can be applied to other types of programs such as the technology intensive initiatives.

In 1994, the Clinton Administration outlined a development approach for improving health care based on the lessons learned from helping over 100 nations. Assumptions were made by the government about what factors promote sustainable development. These same assumptions are also being utilized to develop a model for helping American communities apply methods and insights learned overseas in order to help solve problems here at home. Assumptions are being used because limited research has been conducted on measuring sustainable development. Since more agencies are promoting this need, it is imperative that further research studies be initiated.

Purpose of the Study

The purpose of this evaluation study was to identify factors which may have influenced the promotion of sustainability of the faculty development program and the neonatal intensive care projects conducted in China from 1983 to 1990. The study examined identifiable factors including those identified in the literature that affect sustainability, the ongoing evaluations of both programs, site visits to participants of both programs and outcomes generated from the initial programs indicating sustainability for application in international development. The study explored the relationship and the interrelationship of the factors within a systems framework.

There is a great body of literature on education and the transfer of knowledge and technology but there has been limited data available regarding how training components affect overall program sustainability. Sustainability in primary health care has generally been examined with limited attention directed to hospital-based programs. Also, although researchers have selected factors that may influence sustainability, they have not looked at how these factors interact. With many agencies and universities conducting international hospital-based education programs, information from this study could be used in designing, planning, implementing and evaluating technology intensive programs. The data may also contribute to a theory for international development.

This information about health program sustainability will not only be useful for international health organizations in the U.S. but could be just as critical for other leading health care donors in the world i.e. Japan and western Europe. With continued demand for increased technology and modernization in the health sector of developing countries, health educators from external countries are being challenged with establishing and implementing new educational programs to meet the country's needs.

Information about sustainability is also essential for the emerging private funders in the international community, for example, the pharmaceutical and medical device industry. The pharmaceutical industry is currently developing new models for marketing its products, i.e. integrated disease management initiatives. These corporations intend to collaborate with international voluntary agencies in an effort to market their products while at the same time develop cost effective health care programs for the countries. The grant recipient groups will be required by the donor companies not only to implement and evaluate the program but also to demonstrate the long term benefits to the receiving country and capabilities of the country to continue the activities without assistance..

Lefebvre[15] indicates that sustainability will be the crucial question that health promotion programmes around the world will face in this decade; we need to prepare some answers. There are two major problems that must be acknowledged. First, sustainability may be the latest goal of many donors, but it may not necessarily be the goal of the recipient government leaders or other self serving

individuals. Second, economics and economic gain motivates some donors, and while they give the international project the equipment and/or money, oftentimes the donor's objective is to implement a change or need in a market population in order to increase sales, profit information, or security. A solution to these problems is education of people to create the change necessary for sustainable interventions. The goal for some donors or governments might be dependence rather than independence, but the transferring of knowledge to promote independence will improve the lasting health and life of the population.

Description of Research

Elements that influence the promotion of sustainability in an education program to change the content and process of teaching in a profession and an international technology intensive medical education program need to be identified and describe their interactions. The evaluation study was conducted for a detailed examination of the programs because of the qualitative nature of its method : the evaluation study allowed discovery of insights about how human behavior interacts with other variables, for example the environment, and examined what factors may prohibit individuals from sustaining behavioral changes.

Theoretical Framework

Evaluation research model used for this study, the CIPP[16] (Context, Input, Process, Product) is well grounded in general systems theory. General systems theory provides the organizing structure for this study because the framework offers a usable/sound base to analyze the elements that influence the continuation of the project activities after the conclusion of external support. Use of this framework resulted in : readily identifiable input, inquiry about each component part, assessment of outcomes of the interventions and observations about project goals.

A tenet of general systems theory that is applicable to this study is change theory which is used to evaluate dynamic problems and is applied here because the relationship of education to sustainability is being analyzed. The theory requires the organism (in this case, an emerging country) to adjust to internal and/or external stimuli (information and technology from a developed country). Lewin[17] characterized change theory by the three stage process of unfreezing, reshaping and re-freezing. The system recognizes that because of external stimuli, change and adaptation must occur. For example, the government of the country recognized that the way in which infants are cared for, if changed, would provide for healthier children. The necessary actions were taken to alter the current system. In addition the country leaders recognized that to move toward modern western medicine the need to educate nurses as professionals at the university level was mandatory. This may be identified as the initiation of the unfreezing process. In both of the projects the same concepts of planned change were identifiable. Once this has occurred the system is open and vulnerable to accept new information and restructure. Once the restructuring occurs, the system begins to take on a new shape.

In this study, the development of the Faculty Preparation Program and the Neonatal Intensive Care Unit (NICU) required different approaches. The Faculty Preparation Program did not require any structural changes while the hospital to support the new unit required structural changes as well that evolved along with new ways of caring for fragile infants. The re-freezing occurred and the systems maintained themselves with the new methods. The education of the staff provided the transfer of information, along with the other elements necessary for sustainability, serving as the mechanism and tools for continued growth and development of healthy systems. Without the communication of the educational process, the other elements often do not have a vehicle for effective interaction.

Scope and limitations of the study

There were more than thirty-three programs conducted by Project HOPE in partnership with the universities. These two were selected as samples because of their diverse nature and evidence of their sustainability. Time and cost limited visits to more of the neonatal centers that have developed from the original site. Ongoing data collection is being done for both projects. Outcomes are being tracked overtime as well as site functions.

REVIEW OF THE LITERATURE

The literature reviewed for this study included background of the country's health care system, medical education systems, nursing systems, factors impacting sustainability, definitions of sustainability and its elements, research in Asia, tools for analysis of sustainability, change theory in cultures, technology transfer, and general systems theory.

The Health Care System Reform

In the 1980's the commune system in China which historically provided for health care financing was ended. Economic reforms emerged that presented significant change in the country's health care system[18,19,20]. With these reforms and a move by the government to develop decentralized policies, funding became diverted from the health sector and moved to productive sectors.

The system is organized into political units with three municipalities and 24 provinces, each with various health-related responsibilities that reflect the policies developed by the Ministry of Health (MOH) in the capital city. As a relatively decentralized system, financing services are left to the local provinces. Decentralization has produced health financing which has caused inequality in services in various parts of the country. This country is still largely a rural economy and health care needs to be provided both to the population's vast land areas as well as the rapidly developing cities[4]. In fact, deaths due to all major causes vary substantially between the rural and urban population[19].

Financial decentralization has meant that the local governments have increased control over budgetary allocations for hospitals in their provinces. Since the more sophisticated hospitals have more access to the local government they generally have access to more funds. In the late 80's to date, total health expenditures have been used for these advanced hospitals and in consequence, the secondary and primary institutions suffer. Bumgarner[21] states that with the population of these advanced hospitals being primarily civil servants, the insured and the wealthier farmers, it is conceivable that funding will continue to be allocated in this manner.

The country's health care system has a basis in historical events and cultural traditions as well as the current desire to modernize. In the nineteenth century missionaries introduced western medicine to the country. In the twentieth century, county hospital systems were introduced and American and Western European influences began to be seen. During the 1960's, the leader of the country launched an historical revolution and funds ; personnel and facilities were moved from the urban to the rural settings. Education for physicians and nurses was shortened considerably or absent, and medical research was not supported. Thousands of rural peasants were given basic training so that they could provide basic preventive and simple curative health care[22].

The 1980 have, the period of the initiation of the two programs ; there was a new commitment to modernization, which changed the priorities of the health care system. Rosenthal[4] noted the interest in advanced medical technology and professionalism. By late 1984, the Academy of Sciences had sent 3200 scholars abroad for study. This exposure to western-medicine provided the impetus for the scholars to return to China seeking to advance its health care system. Thus, advanced medical technology has been placed in tertiary centers and medical equipment and supplies are increasingly being produced in the country.

With new policies in the 80's, dramatic changes

occurred : the national birth rate stabilized as a result of limiting births and by the 1982 official census the mortality rate was decreased to 52/1000 live births, and today is 41/1000[23]. There were also increases in the number of health facilities and personnel although there were marked disparities between the urban and rural areas. Health care institutions increased from 176,793 in 1979 to 206,724 in 1989[5]. In 1979 there were 830,000 senior and junior physicians and by 1989 there were 1,341,000 physicians practicing western medicine[5]. The number of nurses increased from 421,000 to 922,000 in the same 10 year span.

Economic development did improve living conditions and health in the country and promoted the modernization of medicine[24]. However this economic change increased the inequalities in access to costly medicine. During this era, although health was considered a public good, fiscal reform shifted the focus in the country toward health care as a commodity. Health institutions were encouraged to produce revenue in order to cover operational and capital costs. As a result, patients were encouraged to take on certain health services whether or not they were needed or were of benefit. The new reform also introduced incentives that promoted hospital-based, technology intensive medicine[21].

Because the new medical technology at the time did not fall under state price regulations, hospitals began to charge patients, particularly those with insurance, higher prices to net a profit. Since decisions for the purchasing of technology and appropriate usage were being determined by patient's physicians it became apparent in the 80's that health-care expenditures were more dedicated to high technology hospital care than to public health.

New technological advances in the country over the past 15 years have proven to be a challenge to the system. The government has a variety of problems managing medical technology stemming from an emphasis on local drug and medical device production with questionable quality assurance problems and inappropriate pricing policies. The present system causes over utilization of some medical technologies, particularly in diagnosis[21].

Medical Education Systems

During the twentieth century, the country's training emphasis has gone through dramatic changes. Prior to 1949 only a select number of trained physicians cared for the higher class while the remainder of the people used traditional medicine. Through the-mid 50's there was the development of a medical school entrance exam and increased medical training programs. Primarily western models of university and departmental organization and curriculum design influenced China during the time period prior to the Liberation. Rockefeller Foundation supported a medical college in Beijing as it provided leadership in the development of other medical schools. From the 50's until the onset of the cultural revolution the Russian system influenced the curricula, at which time the barefoot doctor period ensued. Since the late 70's there has been a gradual restoration of formal training programs.

Currently, decisions about the number, distribution and areas of specialization of health education programs are made at the provincial and sub-provincial levels. The Ministry of Manpower determines the numbers of workers in each area and also controls the number of students for each discipline.

China has more than 116 medical schools with the majority based on a 5-year curriculum. The curricula includes medicine, public health, dentistry, pediatrics and traditional medicine[4,25]. There are also more than 550 secondary medical schools that provide training for allied health practitioners. But, due to a lack of educational resources and adequately prepared faculty, teaching has been compromised. Even curricula reform at the national level can help but can not guarantee the teaching of quality or content in the universities[21]. The universities have been somewhat resistant to change, continuing to utilize formal teaching methods such as lecture, and memorization in the classrooms. Research activities are rewarded more often than teaching and clinical training receives even less attention than classroom teaching in the medical educational pro-

grams. Even with the reforms continuing there remain limited mechanisms, for example, seminars or teacher exchange for sharing experience across institutional boundaries.

Nursing Systems

Nurses in China during the 80's practiced as assistants to physicians performing basic health care skills and even doing housekeeping. Most nursing was provided by graduates of secondary nursing schools although baccalaureate programs were being developed in leading cities in the country. In 1992, only about 300 university level nurses were graduating per year and in the 80's and early 90's there were limited in-service training programs offered in the hospitals.

Lin and Li[26] identified four problematic areas for nursing in the-mid 80's, the same time period that the NICU program was established. The areas included : shortage of nurses, lack of nursing schools particularly at the university level, lack of funds to support external consultants or offer scholarships abroad, and an unclear role of nurses. During this time there were approximately 610,000 nurses, nearly half the number required to maintain adequate assistance to patients.

The Chinese Nursing Association in the country has been in existence since 1909, and by the mid 80's there were branches in each province in the country. They have been able to conduct meetings and at some sites offer select continuing education activities, including programs by guest faculty from abroad. The World Health Organization as well as a small number of nonprofit agencies provide educational assistance to the nurses.

Factors Impacting Sustainability

Many of today's "developing countries" like China were once the pillars of civilization and provided the world with new inventions that have become basic elements in the fabric of civilization. From their advances, other cultures have been enriched, and magnified, to create the technology of today that is now desired by emerging countries. But, sustainable development is based on the economic, human, environmental, and technological ability to change. The question remains as to how development activities are maintained, advanced, sustained and measured.

The current donors in the international arena have become very interested in the term sustainability. Their concern is to learn how to design a program so that the activities and benefits that are accomplished during the duration of the program are able to continue once external funds have been withdrawn[12]. This interest of donors has increased dramatically over the years as the availability of foreign assistance funds has decreased. Cheema[8] contends that the recent focus on sustainability is the result of the inadequacies of the past approaches to project design and management. In some international programs, activities have inadequately maintained infrastructure and services, have a lack of continuity after the external support is withdrawn, a lack of integration in the government's current plans and ongoing projects and a lack of integration with the socioeconomic and administrative means of developing countries.

Definitions of Sustainability and its Elements

Although the literature varies only slightly in the definition of sustainability, it remains conflicted in determining the elements that are critical to promote it and the means to measure it. Selected economists and international development agencies define project sustainability as the capacity of a project to continue to deliver its results after a period of time[27]. Honadle and VanSant[28] defined sustainability as the percentage of program related services that are still maintained five years after the termination of donor resources. The authors contended that the building of local capacity and their ability to provide and maintain new services for others were important to sustainability. Rodriguez-Garcia and Goldman[10] indicate that sustainability suggests a balance and a correct use of resources so programs can be maintained without

external support.

Bossert[12] suggests that researchers must define what elements are expected to be sustained. The author indicates that although donors and implementers would like to see health benefits sustained, for example, decrease in the appearance of a disease, most health care delivery activities do not produce such measurable benefits. Therefore sustainability must be defined as the continuation of project activities.

Atwood[29] reported that sustainability mandates the empowerment of individuals and the communities. In order for sustainability to occur, individuals must be involved in decisions that affect them. The importance of partnerships was emphasized whether they are between external funding agencies and with local communities or within the groups themselves.

In a United States Agency for International Development's (USAID) report on sustainability, Buzzard[11] contends that based on a review of government reports and other secondary literature, some of the essential elements for program sustainability are financing, community participation in planning and implementation, host country policy, appropriate program design with respect to the scope of objectives and program management. Buzzard[11] viewed these elements as interrelated entities, not independent ones.

Several authors[30,12,31] believe a strong training component is necessary to promote sustainability. In their analysis of ten health promotion programmes, Steckler and Goodman[14] identified the following factors as key: cultivate a program leader/change agent within the projects senior administration, favor funding of those organizations with well-developed organizational development, integrate the objectives of the health promotion program with the host organizations mission, fund organizations that will directly implement the program, establish funding cycles that will nurture rather than stunt the development and progress toward program sustainability.

Goodland and Daly[13] suggest that in order for projects to be sustainable, information is needed about the resources that are required for the project to function after assistance is withdrawn. Provisions must be planned to replace those components of the project that will require it. Criteria and measurable indicators for project sustainability include : personnel stability ; equipment maintenance ; supplies available ; continuing education related to new techniques and knowledge relevant to the area ; educational materials for training new staff ; charges for services adequate to cover recurrent costs[13].

The Operations Evaluation Department (OED) of the World Bank[32] identified four main determinants of project sustainability : economic and financial, technical, institutional and policy related factors. They described a difference in the importance of each depending on the particular economic area.

Reynolds and Stinson[33], identified ten factors to analyze the sustainability of Primary Health Care programs including : target population size, composition and distribution, target groups knowledge attitudes and practices, service quality, management support, organizational capacity, political commitment, personnel resources, program revenues and expenditures and environment. These factors were used to identify threats to sustainability and if required to develop a strategy for dealing with them.

In a review and analysis of twenty-three large scale agricultural and rural development projects in 1985, the Operations Evaluation Department (OED) of the World Bank identified six sets of factors that may have influenced sustainability[32]. The six sets included : institutional capacity, improved technology, those projects which are integrated with the local cultural and economic environment, compatibility between government policies and project objectives, post-completion recurrent cost financing, and technical assistance and human resource development, however they found a difference between the impact of human resource development on education projects versus agriculture projects[8].

Research in Asia

OED (1985) found in its studies that there has been limited attention paid to sustainability in projects in Asia[32]. They felt this was due to a lack of adequate concern for project sustainability by both the donors and the countries. The issue of sustainability was not even included by the implementers during the program planning and management so that it could be measured.

Cheema[8] funded by the Asia Development Bank (ADB), conducted a study by multiple agencies on developmental urban shelter and service projects in Asia and presented findings at the Economic Development Institute (EDI) seminar in Bangladesh in 1987. His analysis indicated that despite differences among the countries there were critical factors that may have affected sustainability. The factors include : the degree of involvement of the local community in planning and managing projects, the level of political and financial support at the national level for improving and the status, committed leadership willing to change, the level of coordination between agencies and the ability to acquire suitable land in a timely and economical manner[8]. Of equal importance in the study were factors such as the strength of the implementing agency in organizing and motivating communities, support of those in local politics, management abilities of the communities, local community support and the technical and financial support by the international organizations[8].

Studies of urban shelter projects and decentralized local development projects in Asia found that if countries are too dependent on foreign resources for development projects, there is not enough political support at all levels of the government to support it and there is no community participation, and mobilization so the project is not sustainable[8]. The study concludes that sustainability requires institutional reform and changes in political and administrative organization. Oftentimes, donors have been too focused on short-term goals.

Tools for Analysis of Sustainability

In recent years, as international agencies and researchers have attempted to examine the factors which impact sustainability, selected individuals have developed tools or checklists to use in order to analyze the sustainability of a project or plan as a component of the evaluation process. These tools have varied in detail and usage.

In 1989, USAID's Center for Development Information and Evaluation (CDIE) conducted studies that focused on assessing the sustainability of health projects, as well as the ongoing activities and outcomes after funding was completed. These studies were the result of previous program evaluations in the early 80's which indicated that following the removal of support the programs in the local countries had difficulty continuing to implement programs. CDIE conducted a variety of field studies looking at case studies or taking a broad sectorial perspective[34].

In March 1991, the Population Office of U.S.A.I.D. developed a scale with nine factors in response to the Committee on Appropriations of the United States Senate that year. The office did not present the tool as a means to evaluate but it has since then been utilized for that purpose in specific cases. This scale was developed specific to the Population office needs which focuses its activities on family planning, child survival and safe motherhood. Therefore, the scale components include : adequate contraceptive supplies, variety of contraceptive methods, multiple service delivery channels, sound management, public and private sector involvement, strong leadership measurement and evaluation of program impact, comprehensive training, and effective information and communications.

The PHCMAP (Primary Health Care Management Advancement Programme) had devised a worksheet using ten sustainability factors including : target population, target group knowledge, primary health care, political commitment, personnel resources, program revenues and expenditures, and environment[34]. The worksheet was designed for the evaluator to identify and assess each factor

that threatens sustainability, identify strategies and develop an action plan, where appropriate, and numerically estimate the effect using a rating system.

Bamberger & Cheema[27] developed a sustainability checklist that can be used to look at the degree of sustainability of projects by using an index formula. There were four indicators with sub-indicators included in the checklist. The main indicators include : continued delivery of services and production of benefits, maintenance of physical infrastructure, long-term institutional capacity, and support from key stakeholders[27]. Potential problems using the scoring system or index include the use of personal judgements when rating indicators and the number of indicators (if these are altered the scoring could be altered weakening the validity).

Bamberger & Cheema[27] believed sustainability could be affected by a number of factors that must be considered during initial project design and implementation. The opinions of the designated beneficiaries about objectives, scope, implementation and benefit were considered important. Also important was willingness of the beneficiaries to accept demands on their human and financial resources, linkages to policy makers and administrators at all government levels, institutional arrangements for operations, identification of major stakeholders, appropriateness of technology and financial viability of maintenance procedures[27].

In 1990, an evaluation team looked at sustainability of a project using a framework that was included in a draft report of the CDIE multi-country study of sustainability of health projects[31]. The factors included : economic context, political context and national commitment, strength of implementing institutions and program integration, program financing and expenditures, training and mutually respectful negotiation process.

Change Theory in Cultures

In the early years foreign economic aid worked from static models of change with expected outputs. With the changes in foreign aid, technical assistance provided dynamic elements of change. Brooten, Hayman and Naylor[35] described change as a process that causes an alteration in individual or institutional patterns of behavior. Change has been defined as a collaborative and purposeful process that includes the change agent and an individual, group, or organization[36].

Change in general can be categorized as planned or unplanned. Unplanned change in an institution is generally considered disorganized with unpredictable results. Planned change involves a change agent and client system and in the same settings is deliberate and involves both problem-solving and decision-making skills, as well as an interpersonal competence.

Multiple theories of planned change have been developed since Lewin's writings in the 40's, some with more relevance to nursing[37,38,39]. Lippit described planned change as having seven stages from diagnosing the problem and assessing both the group's motivation and capacity for change to assessing the agent's commitment to change. This theory emphasizes maintaining the change once it has been started and then clearly terminating the partnership at the end of the change process[37].

Havelock[38] noted that first the change agent must develop the relationship even before the problem is diagnosed or the assessment of the resources completed. He indicated that once the solution is developed there must be both a continuing development of the relationship (so that an acceptance of the change occurs) and stabilization before the process is considered complete[38].

Havelock[38] believed knowledge of the change was critical to the process in the earliest stage and that the individual's ability to agree to change or not must be acknowledged. The stages are concluded by the individual's confirmation that the change was correct ; if not, revision of the plan would be required. Montgomery[1] believed the methods of assistance should improvise, adapt and discard programs when needed in order to provide social benefits.

Management theories have been developed which incorporate change theory as well. Carr, Hard & Trahant[40] indicate that successful models for implementing change include these key components : the need to address the change in a comprehensive manner to follow a process for introducing change (including assessment, planning, implementation and renewing) and finally to address established critical success factors. Implicit in their process for change is the need for an effective leader. Hall et al.[41] noted that without persistent, committed, active leaders a group will not change.

Recently anthropologists and technical professionals have been studying the dynamics of change in the communities in which they work. It is critical that those working in international development consider the dynamics of change between two societies; implementers and recipients. Foster[42] noted that successful technological development occurs when in the design and implementation the agencies recognize the two sociocultural systems and have some understanding of the processes of change that characterize them

Technology transfer

For many years the assumption of organizations introducing new technology was that because western technologies were advanced and better, a massive transfer would automatically lead to fast and widespread use. It became clear over time that many international development programs attempting the application of western technologies had failed to meet their goals and objectives.

Bonair, Rosenfield and Tengvald[43] believe the difficulties encountered in transferring medical technology to developing countries is negatively impacted by a limited and incomplete understanding of the cultural, social, economic, and institutional factors affecting the development, transfer and use of the technology. The authors point out that very often assessments and evaluations of technology transfer focus on the quality and effectiveness of the technology and the infrastructure limitations. Although evaluators discuss the status of the hospital building, communication systems, logistics and transportation, equally essential is that they consider other factors ; social, economic and cultural.

Aside from the donor's incomplete evaluation, the receiving country can have complications that lead to a breakdown of complete technological transfer. Although health care technology has gained visibility in the developing and industrialized countries the challenges have been difficult because they are confronting problems due to the stress on their human and financial resources and their technological dependence[44].

Diffusion research has sought to explain the reasons for the failure of transfer of technology. Basch & Eveland & Portnoy[45] indicated that diffusion occurs when knowledge is seen as being generated in and coming from one source and goes from those who have it to those who don't. There are considered to be two types of diffusion systems, active and passive. The former includes outreach activities by voluntary organizations, government groups or others who have the goal of educating professionals, or giving service to providers. The passive system requires the individual to request information on the innovative idea or practice. Sustainability studies now explore a potential improved diffusion system, a combination of the two types of diffusion systems.

In the field of diffusion research both anthropologists and sociologists, since the 1950's and 1960's, have attempted to examine the failures of dissemination of the information by individuals. Economists have focused on costs of technology use and compared cost with the effectiveness of alternative methods. Since the 50's, the research focus has changed to include a critical analysis of the system, whether it is an organization or a community. Bonair, Rosenfeld and Tengvald[43] outline three interrelated foci for future investigation ; general societal conditions, individual factors and technology characteristics. Although individual researchers have focused on each category as being the solution to improving diffusion of knowledge and techniques, the Office of Technology Assessment[46] advocates focusing research and development efforts on the interrelationships among all categories.

Technology transfer can be described as the diffusion of technology from the time it is developed to the time it is applied[47]. Schinke and Orlandi[48] outline eight stages of technology transfer : basic research, applied research, technology development, evaluation, demonstration, adoption, application in practice and obsolescence. The authors describe the transfer as the process of research through application. Montgomery[1] indicated that technological innovation requires the diffusion of new practices to the population at large. This diffusion requires education.

Shao[49] states that in order to implement appropriate technology in developing countries consideration must be given to topics such as learning, location and values. The learning is bi-directional between the medical researcher as well as the counterpart in the country. The location involves selecting the appropriate site for the research and education, and the priority of values involves providing resources and cultural sensitivity in both research and teaching.

Effective education to those in a developing country requires that information be designed to meet the goals and objectives of the program and can be understood and used by the recipients. Therefore, learning styles and teaching methodologies are at least two of the critical elements requiring assessment when creating an international development program. Initial exploratory research by Davis, Gan, and Olesen[50], for example, provided some support that China's nurse educators were found to have predominantly concrete learning styles similar to nurses in the west. However, teaching methodologies in the country appear to differ from those in the west. Duff, Johnston, and Laschinger[7] discuss their observational experiences and reported that the teaching methods in China also emphasize the authority of the teacher in disseminating information. The learner tends to be passive with the expectation that the learner will memorize and recite information when needed.

General Systems Theory

Von Bertalanffy described models and principles that apply to generalized systems irrespective of their particular kind, the nature of the individual elements or the forces / relations between them. The author states systems could be considered sets of components standing in interrelation. General systems deal with doctrines of wholeness, dynamic interaction, and organization[46]. The authors state that the evolution of general systems theory placed a new frame of reference so that knowledge which was fragmented and isolated could become integrated bringing the findings and knowledge of various specialties into transaction[51].

Many researchers developed and furthered the principles of the systems theory[52,53,54]. Each applied the principles of systems theory to their area of specialty such as human behavior, mathematics, and biology. Kuhn[55] indicated that system analysis has distinct advantages : it is widely applicable to many areas and generalizations developed from one kind of system are often found to be valid for other kind of systems.

General systems theory as described by von Bertalanffy[56] describes systems as having three major elements ; input, throughput and output and systems are described as being either open or closed. This study looked at the NICU in the hospital as an open system that is an organization that interacts with the environment. Closed systems have no interactions with their environment or feedback. Systems have both internal and external factors influencing their health. Healthy open systems continually respond and adjust to stimuli from the internal and external environments and changes or adaptations occur as a result of the feedback loops. Examples of open systems are organizations, businesses, educational systems, human body, etc.

Input includes any movement of information from the environment across the boundaries and output is distinguished as movement across the environment boundary. Static equilibrium is a state where all forces within the system are at a state of rest while dynamic equilibrium is a situation where the compo-

nents may be moving or changing but they remain balanced[55,51]. Homeostasis is a state in which the system maintains control or a steady state equilibrium. Kuhn[55] considers positive feedback as a vicious cycle, deviation amplifying while negative feedback is deviation correcting.

The input of a system are the factors that develop or construct the system. For example, the human body is an open system. In analyzing a person all inputs internally and externally that influence the development and maintenance of the person are analyzed. Biochemists, geneticists, biologists, physiologists, physicians, nurses and environmentalists are just a few of the disciplines that study the internal and external factors influencing the human body.

The inputs of the system in this study are the essential factors for sustainability such as education, program financing and expenditures, and economic context. It was apparent in this study, as in the comparison of other open systems, that while the inputs are common there is variation in the mix or interactions resulting in different levels of functioning.

This study examined throughput by focusing on how the essential elements interact within the system, for example, how program financing interacts with the training element. These interactions may vary in proportion at different settings but were still examined for the impact on sustainability.

Examining feedback and response to feedback was also part of this study. In organizations feedback is often defined as evaluation and is viewed by appraisers as necessary because analysis reveals unhealthy and out of balance elements that require adjustment for the continuation of the system. Evaluating the NICU program using a systems model, revealed all the important steps : how the elements interact, how they were balanced within the system and whether the balance was positive or negative for the sustainability outcome.

von Bertalanffy[56] identified other characteristics that influence the health systems, and can be used to understand the operation of a system ie. negentrophy. The following terms were used in this study to understand and define system changes. Entropy is information, and negentrophy is information that is kept in balance. Excess information is information overload. Excesses will destroy the systems based on the inherent system weakness to sort, categorize or use. If there is too much of one element, whether external or internal, the system may not succeed or be operational. In this case study, an overload of information, for example, would mean the program could not continue to sustain itself. Often the information is too great for effective use and/or the ability to assess prioritize, and act is impeded. Negentrophy keeps the information in balance by providing a continual evaluation of what to keep, what to respond to, what to throw away or what to ignore. For example, by continually evaluating an education program during the implementation phase, participants could correct a system imbalance. This study revealed a list of necessary factors with a variation in the balance of interactions.

Equifinality is the concept of attaining the same output, but with different combinations of input and/or throughput. An example of equifinality occurs when individuals leave from a common point or varying points and arrive at the same destination. The means of arriving at the destination may also be quite different (car, plane, different routes and/or different speeds). In this study, the combination of the sustainability elements and their interactions were evaluated for equifinality. For example, if the administrative structure was strong enough in one clinical unit, the education program might survive based on the leadership, and the program financing may play a lesser role. Therefore, each element involved in the study could have a different combination of factors but the program could still be sustainable.

Homeostasis or the striving for homeostasis or balance is another characteristic of open systems. The balancing response occurs within the system from the feedback received from internal and external stimuli. For example, an organization hiring staff when the workload is too great or changing procedures based on technological changes are

responses to strive for homeostasis. In this study a hospital with less financing than the others was able to remain balanced by procuring supplies within the country. Stasis implies stagnation and is characteristic of closed systems and organizations experiencing stasis are generally in a declining state.

The output of a system is the final observable goal or outcome. Altering inputs and/or altering the throughput can alter the output. In this case study, of NICUs attempts to identify levels of sustainability might be altered depending on how external and internal elements were adjusted and how they related to each other.

Evaluation Models

Evaluation is the process of determining merit. As a process it is dynamic and involves the model of open systems assessing the input, throughput or processing and the output. Evaluation paradigms have evolved through recent years especially with the increasing demand for accountability. A number of evaluation models have evolved. Journals of evaluation studies have evolved and use both quantitative and qualitative research methodologies.

The model selection for evaluating nursing programs should be based on the purpose of the evaluation, program needs and resources and faculty preference for one model over another. It is acknowledged that "no one model is best." education evaluation models vary in their characteristics such as discrepancy, Renzulli Key, goal-free, Stake's Countenance, Staropoli and Waltz and Stufflebeam's CIPP models and the selection is controlled by the evaluator[58].

Alkin and Ellet[58] organize evaluation models along three categories : methodology, values and uses. The methodology models emphasize description and evaluation, the values models focus on the merit of what is being evaluated and the uses produce the purposes and functions of the evaluation. Popham[59] employed a five-category set of descriptors to categorize educational evaluation models. The five classes were : goal-attainment, judgmental emphasizing inputs, judgmental emphasizing outputs, decision-facilitation, and naturalistic. Although Popham elects to establish the five categories concedes they are" neither exhaustive nor mutually distinctive"[59].

Differences between program evaluation reports and the implementers making decisions based on the results are clear. Instead of utilizing the evaluation data for program development and management and/or revising program activities the information is generally logged in a file and ignored. Often the program evaluation is a "circular process that involves people who will assess and deliberate the findings to make program decisions, implement these decisions and reevaluate the results. Systematic evaluations of nursing education programs can be difficult and time-consuming but believe they are necessary for meeting the challenges and maintaining standards for nursing education programs[6].

The CIPP (context, input, process, product) model of evaluation is a decision making model that requires continuous monitoring and information gathering to support on going decisions for a program[16]. The definition of evaluation for this model is the process of delineating, obtaining, and providing useful information for judging decision alternatives. The four elements are context, input, process and product. The context evaluation provides for planning decisions. Context evaluation requires not only looking at the immediate organization but outside the system to factors that will influence the project now as well as in the future. Data must be gathered probing into futuristic societal needs and values, technological advances, political trends, economic developments, population statistics, etc.

Input evaluation includes a thorough review of both program materials and official documents. The review included internal materials such as memos, monthly reports, consultant site visit reports and grant reports. The internal reports revealed information about the leadership and provided potential insights about the counterparts, individuals trained, relationships between the external assistance group and internal groups and insights into why programmatic decisions were made. External communication documents were also

examined : newsletters, annual reports and other public relations materials. This information was useful in understanding the administrative perspectives of the program including the administrative infrastructure for the educational program. Input evaluation explores the capabilities of the system in relation to the stated objectives. Changes are sometimes required in the objectives based on information gathered through this part of the evaluation. The structuring decisions of the project are determined in this phase, including resources needed, human and material.

Process evaluation provides ongoing data for the individuals responsible for the implementation of plans and procedures. Three major objectives of process evaluation are : to detect or predict defects in the procedural design or implementation during the implementation stages ; to provide information for program decisions ; and to maintain a record of the procedure as it occurs. This part of the evaluation is very important particularly in the early stages of program implementation to document progress and allow for identification of major problems that will deter the program implementation. This phase of evaluation allows for readjustment. The data is gathered on all aspects of the program to determine where changes need to be made. Decisions based on this data are identified as recycling decisions because immediate action is taken to adjust the progression of the project.

Product evaluation is the most common type of evaluation and often the only evaluation done. However, in the CIPP model the product evaluation measures and interprets attainments. This data evaluates the attainment of the project objectives and may give additional information for revisions. Product evaluations for programs need to be done not only at the end of the program but at yearly intervals in evaluating the sustainability of international development projects. The data gathered after the international donors have left for 5 or 10 years will provide useful data and knowledge to apply in future projects, strengths, weaknesses, omissions, etc.

Interview guides to be utilized during the semi-structured interviews were developed for both programs. The faculty preparation program also used a questionnaire to compare interview data with written data. A panel of experts from both the host sites and the donor representative evaluated the interview schedule and the questionnaire. The faculty panel included individuals who had no previous contact or involvement with the work to allow for an unbiased assessment of measurement items[60]. The interview guide items were prioritized and evaluated to assure the reflection of a single concept in each item. Both the interview guide and the questionnaire were translated into the native language.

In qualitative research the interview may be the primary strategy for data collection or the interview may be performed along with participant observation, document evaluation or other methods of evaluation[61]. Qualitative interviews can vary in the degree to which they are structured, the interviews in this study were open-ended guided by the questions.

The observational component of the study was done in conjunction with the semi-structured interview activities. Observations were selected by the hosts, however for both projects were significant for data collection.

The interview guide was utilized with each of the participants in the first three years of the Faculty Preparation Program but only in selected sites of the neonatal intensive care program. The neonatal intensive care unit has a number of sites though out the country that were initiated upon the return of the participants in the training program. It was not feasible to visit all because of cost and time.

Access to the past participants and the sites for both programs was required in order to conduct the study. In China this process necessitated a formal requisition written to the University President and the Hospital Director or Dean of Faculty of Nursing. An initial request was made to meet and interview with nurses and physicians.

Project HOPE has as its motto, "the essence is teaching, the basis is partnership". Project HOPE expects that in teaching a core group of individuals

they have the responsibility to teach others. Standard operating procedure for Project HOPE is to be invited by a country to assist in the improvement of health care through educational programs, equipment, supply and donations, and academic exchanges. Acceptance of the invitation by Project HOPE requires an extensive assessment executed by representatives of both the host country and Project HOPE. Project HOPE requires that there be ownership and investment by the host country(62). Evaluation is essential to monitor interventions when program sustainability is desired. The study selected two projects developed by Project HOPE as samples to evaluate, the establishment of a neonatal and pediatric intensive care education program and a faculty education program to determine factors that have made them sustainable in China.

Project HOPE employs a counterpart system in the implementation of programs. Counterparts are individuals from the host country and from the donor agency that share similar roles and work together throughout the project. The one from the donor agency brings the new knowledge and skill to be taught while the one from the host country has skills, recognition within their unit and perhaps the country, language and knowledge of the country customs, practices, and effective methods of introducing change. The value of the counterpart cannot be minimized in the impact upon the sustainability of international projects.

The neonatal and pediatric intensive care program was highly technological and required the introduction of new high technology equipment and education of new health care professionals to operate the program. Education of physicians and nurses for this area of specialization was also required. The faculty education program required the introduction of new abstract content as well as new methods of teaching to prepare faculty to educate students for the rapid changes occurring in health care in China. The neonatal and pediatric intensive care project was a technology intensive program that was implemented for a period of five years prior to the withdrawal of external support. Costly materials resources are also required for ongoing operation.

The faculty preparation program had as its major objective to prepare faculty for the new baccalaureate nursing programs that were being introduced. There were no nurses in the work force with advanced education so that the education in the college classroom had to be done by physicians while the nurses taught clinically. The focus of the program was to introduce nursing content theoretically and clinically to the faculty as well as process that would employ new teaching strategies and media to prepare the new graduates to function in the rapidly advancing health care system. The graduates of the baccalaureate nursing programs were to function as teachers and administrators. Content of the program included process, theory, research and curriculum that were new to the physicians and nurses.

Both programs required that teams came from the parent institutions in the host country to facilitate the interdisciplinary orientation of both programs. The neonatal and pediatric intensive care program in addition required the development of a biomedical engineering program to educate engineers and technicians to design and maintain equipment needed for the program. The initial equipment was donated for the unit but for the development of units throughout the country, equipment needed to be manufactured in China as well as the necessary disposable supplies to operate such a program.

At the initiation of both programs, planning was done based on an assessment as identified by the CIPP model. The context evaluation was done for both programs, looking at the host institutions, the economic and political factors, administrative support within the institutions and with the governing bodies. The assessment identified the reality of the situation for both programs, the problems, the resources, potential solutions in the environment, the political climate, the economic reality, the gaps in education, the lack of personnel and equipment, etc.

The neonatal and pediatric intensive care unit

required in the initial phase of the program, renovations, purchasing equipment and supplies, placing short-term consultants in the unit as teachers and bringing selected health care professionals to the United States for educational fellowships. Many revisions in the plan occurred throughout the implementation of the program.

There are many nonprofit health care agencies involved in projects that utilize a "Band-Aid" educational methodology as a means for changing the health care services in a setting. Many in the international community insist that all international health projects must include a thorough educational plan that consists of teaching health care workers to teach others.

Qualitative methods allow the researcher to discover insights and meanings related to how human behavior interacts with other variables including the environment and analyze what factors may prohibit an individual from continuing to sustain their behavioral changes. Factors for sustainability identified by others as noted in the review of the literature were considered in the analysis of the data obtained in this evaluation.

Process of Study

All planning documents and reports of these two programs were evaluated and the content analyzed for decision points, for alterations in plans based on evaluation and identification of a factor that required adjustment. The evaluations to the sites were conducted separately. The findings of each study will be presented followed by the concepts related to sustainability identified in each.

FACULTY PREPARTION PROGRAM FINDINGS

Context, Input and Process

Project HOPE in partnership with Beijing Medical University, the Ministry of Public Health and the Chinese Nursing Association planned and executed a Faculty Preparation Program for three groups from 1988-1990. A pilot program was conducted in Xian Medical University in 1987-88. An evaluation plan was generated at the time of development to monitor the progress and impact of this program. The program was created to teach the faculty of the new baccalaureate programs in China. The intent of the program was to supplement the knowledge of the participants in the areas of basic concepts in nursing, nursing research, curriculum development and leadership and management. The courses were designed to assist with the orientation of the participants to the role of a faculty member. Improvement of the level of nursing practice and stimulation of nursing research were also desired outcomes.

Evaluation research has become an integral element in decision-making and program planning. Employment of evaluation research is used to make decisions related to program management and/or policies that are part of an evolving process. Project HOPE and Beijing Medical University were keenly interested in the outcomes of the Faculty Preparation Program. Beijing Medical University at that time of the site visits was in the process of developing a Master's Program in Nursing with the major purpose to help supply China with graduate prepared faculty for the university nursing programs. Evaluation research allows for the collection of data necessary for decision making. Project HOPE was invited by Beijing Medical University to assist with the development and implementation of their master's program in nursing. Therefore, it seemed appropriate and essential that an evaluation of the past programs offered in China to prepare faculty for teaching in the newly established baccalaureate nursing programs is conducted.

An evaluation was implemented to determine the outcomes after the course was conducted for three years to eighty-seven participants. What was the impact of the program on nursing education and nursing practice in China? The interview and site visit part of the evaluation were conducted over a two-month period, visiting eighteen[18] medical colleges or universities that sent participants to the programs during the past three years. The major questions of the evaluation addressed were :

1. How has the content learned in Beijing assisted in the development and teaching of

advanced nursing curriculum?
2. What influenced you to send or not to send additional faculty to Beijing?
3. Was financial distress or lack of fiscal resources a factor in not sending additional faculty to Beijing?
4. What types of creative activities have been produced since attending the program in Beijing?
5. In what ways might the program be improved to better meet your needs or the needs of your faculty?
6. Did you feel that you needed additional resources to assist you or would have been helpful to share your new knowledge gained in Beijing with your colleagues when you returned? If so, please specify.
7. Do you feel the format (i.e. two courses simultaneously offered) was desirable or would you have preferred a single topic at a time? Other suggestions?

These questions were discussed in interviews with the alumni of the program. In addition there were two questionnaires completed by the participants. The questionnaires were mailed at the same time notification of the visit was sent. Additionally, questions related to the program evaluation completed at the end of the course were also asked to determine if there was a change over time of the general response.

Analysis of what has been, what is, and what needs to be seems appropriate at this time. Evaluation visits were made to the past participants of the program that was held in Beijing for the three years and the initial Xian program. The visits included visits to seventeen nursing programs offering courses in advanced nursing education. Advanced nursing education includes for these programs, not only baccalaureate nursing programs, but also, the three year continuing courses that are offered to nurses who are not eligible for a variety of reasons to enroll in a baccalaureate nursing program but who will be used for teaching and leadership positions. The data are based on the evaluation of the program, its goals and its outcomes. The four components of the CIPP evaluation model are addressed and discussed as they relate to the evaluation of this program and the decision making process in monitoring of its effectiveness.

Context and Input Evaluation - Planning Process

Project HOPE utilized counterparts in all of their educational programs. The concept of a counterpart mandates that all functions of the project or program are collaboratively done by the host organization and Project HOPE from planning through phase out or transition. Counterpart selection for all roles is done by the host institution. The use of this method of education and/or program operation insures the continuation of teaching process by an individual who has been involved in the entire planning, implementing, evaluating, and revising process of the program. This allows for the development of an individual in a non-threatening and productive manner that instills in the person a sense of accomplishment and self-confidence.

Project HOPE developed and taught a faculty preparation program in Xian. Xian Medical University in 1983 planned to establish a baccalaureate nursing education program. An initial process was to develop faculty to teach in the program. Project HOPE developed and taught an 18-month course to prepare faculty members for their new role. This program was seen as an example that could be replicated and offered to assist in the development of other new faculty for baccalaureate programs in China. The graduates of the program were to then work in the clinical areas where students would have their clinical experience and apply the new concepts. These graduates would share the information with the other staff and teach them the new content so that the clinical units would be good laboratories for student learning and demonstrate a higher level of nursing practice.

Consultation with the leaders of the Chinese Nursing Association, Ministry of Public Health and other leaders in medical education in China was conducted by Project HOPE consultants. The two-year curriculum of the Xian faculty preparation program was reviewed and modified after evaluat-

ing the strengths and weaknesses. The need for the demonstration by clinical experts of nursing care as well as the opportunity for participants to practice the application of nursing concepts was stressed. The planning process began in 1986 according to the file documents available in Hangzhou.

The Ministry of Public Health has been working on the problem to try to not only improve the education standards of nursing programs, but also to increase the status of the nurses and nursing. The Ministry has also enlisted the aid of the provinces and local governments to try to upgrade the status of nursing. Several new avenues for the advancement of the knowledge base of nurses has been implemented through self-study programs and special advanced education programs.

The identification of the roles of nurses based on educational levels needs to be clearly identified. In addition the Ministry of Public Health is looking at management issues within nursing and within hospitals. Studies are being done in relations to staffing needs, job descriptions, leveling of hospitals based on patient acuity and hospital resources and variance in nursing staff requirements based on hospital or unit rating.

In 1983 Tianjin began the first Baccalaureate Nursing program since 1949. Eleven other schools began programs in 1985. Some programs were four -year curriculums and others were five-year curriculums until 1987 when the Ministry of Public Health mandated that all baccalaureate nursing programs would be five academic years. The first four years are class work and the last year is a clinical internship.

In 1987 an agreement between Project HOPE and Beijing Medical University was signed establishing a teacher-training center in China with the following objectives :

1. To train the nurse educators with new nursing concepts and nursing theories to adapt the change of the education and acting as role models of nursing as a profession.
2. To train nurse educators to use nursing process in teaching and clinical practice.
3. To train nurse educators to change their traditional teaching methods with more effective methods.
4. After training, nurse educators will be able to make the syllabus of medical, surgical, obstetrical and childcare. These syllabi will include the concepts of nursing and be acceptable under the Chinese National situation.

The plan was for a twenty-week course that was to be from April to August or from May to September 1988 and to be repeated in 1989. The suggested content was to be :

Year 1 - fundamentals of nursing, communication skills and nursing theories, critical care and medical-surgical nursing, research, curriculum development and clinical practice in the administration and teaching

Year 2 -fundamentals of nursing, communication skills and nursing theories, maternal-child nursing, research, curriculum development and clinical practice in the administration and teaching.

Students and Faculty

The students were to be the nurse educators from baccalaureate programs or continuing education programs throughout China. The enrollment for each course was set with a range from 20-30. Later documents state that the only requirement for admission is that the participants be assigned to a nursing division faculty. The focus of the faculty development will be the faculty of the eleven baccalaureate nursing programs. Each baccalaureate program will be invited to send two members of the faculty. Should any program decline then a list of college equivalency Continuing Education nursing programs would be contacted to send participants.

Faculty sent by Project HOPE were initially the primary teachers for the courses with counterparts from China. Project HOPE and the Beijing Medical University Nursing Teacher Training Center Coordinator would jointly do administration. Assessment of the nursing situation in China suggested that the involvement of the Chinese counterparts be graduated over the course of the program. Baccalaureate nursing programs have medical doctors as the primary faculty for the didactic compo-

nent of the program and hospital nurses are responsible for the clinical teaching. Both of these groups have an understanding of theoretical steps of nursing process but lack the knowledge related to the application of the process.

Built into the design of the basic concepts course was a clinical practicum to assist the participants with their understanding of the application of theory. The clinically focused courses of medical, surgical, maternity and pediatric nursing also had in their design clinical experience for the application of the didactic material.

A survey of the deans and directors was completed prior to the initiation of the first program. There was agreement on the courses to be offered. The major weaknesses of the current programs and faculties were identified. Project HOPE faculty were asked to teach in ways to offset the weaknesses not only in content areas, but also asked to role model effective teaching strategies.

Project HOPE consultants also met with Madam Lin Ju Ying, President of the Chinese Nursing Association and Executive Director of the Center for Nursing which is fiscally supported by World Health Organization. She expressed concern that the twelve[12] baccalaureate programs lack prepared faculty to upgrade nursing significantly beyond repeating what is already being done at the diploma level except for spreading it over five years. Most of the deans and directors of the baccalaureate programs are not nurses, and those nurses who are deans do not have a grasp of nursing education. She expressed concern that the faculty preparation programs need to be offered in places other than Beijing and more often than once a year, particularly since Beijing is a costly place to hold meetings.

Philosophy

The purpose of the Faculty Preparation Program was presented to all participants.

Project HOPE is committed to providing Nurse Educator Consultant to continue to plan and evaluate the Faculty Preparation Program. The purpose of this collaborative program with the Beijing Medical University is to prepare nurse educators to teach both in the classroom and clinical area, in the newly established baccalaureate nursing programs throughout the country. The focus of the curriculum of the Faculty Preparation Program is to present updated information regarding the principles and practices of nursing. The emphasis is to help the participants in adopting these new concepts to China, and then how to teach them in the classroom and clinical area. The Faculty Preparation Program was designed to help meet the expressed needs of the Chinese nurses to update their nursing knowledge and teaching methods, thereby, raising the level of nursing education.

The Counterpart Model is the method of teaching used in the Faculty Preparation Program. This model stresses collaboration in planning, teaching and evaluation of courses by both the Beijing Medical University faculty assigned to be the counterpart for the course, and the HOPE Nursing Education Consultant. This method is used in the interest of developing a strong Chinese Faculty for future programs. The degree of participation of the Beijing Medical University faculty increased each year.

As in many countries, nurses in China are often taught by physicians. Close collaboration of physicians and nurses is essential to quality health care. If nursing is to develop as a profession, however, nursing leaders must be educated as practitioners, teachers, and administrators. Components in basic Concepts of Nursing, Management and Leadership, Curriculum Development and Nursing Research are offered to facilitate this educational process. Assistance is then provided to the learner to design a model for nursing in China.

The traditional biological model had to be modified in the direction of a more holistic model. Whereas medical science long focused on the treatment of disease, and nursing had long followed that medical model, the more recent focus of nursing is on safeguarding total health and on the care of all aspects of the whole person---biological, psychological, and social. The patient

or client is viewed, not in part or in isolation, but as a member of a family and of the larger community.

Clinical specialty courses were to provide an opportunity for the participants to update their knowledge and clinical practice. However, these courses emphasized the methods of teaching the specialty course materials upon their return to their own universities.

The nurse not only needs to have up-to-date facts, but also, more importantly, needs to know how to find answers and how to make decisions. Whereas, technicians may be highly trained to function with great skill in a limited area, the effort in higher education is to stimulate a spirit of inquiry, in order to develop a basis for sound judgment in decision making.

Therefore, the focus of the Faculty Preparation Program was on helping the participants to : delineate the role and functions of the nurse, apply basic nursing concepts, begin to experience and use teaching methods which require that the learner be actively involved in the learning process, and encourage them to develop problem-solving skills ; rather than emphasizing complex technology.

Professions develop as practitioners seek solutions to problems related to their professional activities. Nursing develops as a profession only as it ceases to depend totally on research in medicine and other areas and begins to seek solutions of nursing problems through nursing research.

The course in Nursing Research is designed to provide understanding of the research process and an appreciation of its importance for nurses.

This document was presented to the students in both English and Chinese. It was discussed in the beginning session and in the curriculum course as a document giving direction to the program in which the participants were undertaking as being similar to a philosophy and providing guidance and direction for the program.

The faculty preparation program objectives were as follows :

1. Identify the scope of practice, roles and functions of baccalaureate nurse as differentiated form vocational nursing and medicine.
2. Apply basic concepts related to the practice of total patient care.
3. Explain nursing process and nursing care plans in specialty nursing with illustration of case examples.
4. Apply teaching methods that promote learner's participation and critical thinking.
5. Analyze the methods of teaching clinical nursing.
6. Appreciate the ambiguity of "not knowing : and the commitment to "finding the answer".
7. Organize the specialty-nursing course to be taught by the learner in a syllabus format.
8. Identify nursing research, which are appropriate to the learner's specialty area.
9. Integrate nursing management issues related to the clinical practice of the learner's specialty nursing.
10. Devise evaluation methods appropriate to the course objectives for the specialty nursing course learner is assigned to teach.

The criteria for faculty was clearly identified by the Project HOPE consultants and Beijing Medical University Faculty. The consultants needed to be experienced in teaching both in the classroom and clinical, a minimum of a master's degree and if graduate education, preferably in anthropology and sociopsychology for the basic concepts course. For the clinical area faculty for the clinical specialty courses both practice and teaching were required. Criteria given were research experience if teaching the research course as well as experience teaching research to undergraduates. Experience in administration in the clinical setting was required for the administration course. For all faculty international experience without an attitude of cultural imperialism, along with bilingual, bicultural ability to assist with translation as well as activities of daily living were required.

Input Evaluation

Input evaluation was conducted in the planning stages and throughout the program. Data gathered to assist in the decision making related to faculty qualifications, student pool, cost factors, fiscal resources, housing for foreign faculty, requirement for meeting the basic needs of the faculty including meals and/or food procurement and preparation, housing facilities for students, tuition costs, textbooks, reference book resources, counterpart resources, translators, reproduction of teaching materials, office support on site, office equipment available for faculty use, classroom space and resources, laboratory facilities for clinical practice were just a few of the factors evaluated prior to the final planning and program operation. The original plan was shortened after review of the above factors and adjustments made in the schedule.

The student invitations were sent from Beijing Medical University to the baccalaureate programs and to some of the other institutions. The Project HOPE faculty met the students on the first day of class and obtained data from them to assist in the operation of the program. An assessment interview was held with each participant to obtain basic data that related to their profession, English language ability, education, experience and goals for the program. An English language evaluation was done prior to the assessment interview.

Based on these assessments the students were divided into work groups which mixed language ability and also clinical specialty. These work groups were for class exercises and for class projects, particularly those that required oral presentations.

The form used to collect data on the student population presented the age range from 23 years to 55 years with a major gap in the middle age ranges. This summary of the profiles of the students ages for the three years reflects a major problem that is confronted in all aspects of life and development, particularly those disciplines that require advanced education. The age distribution of the students reflects the wide variance of experience and formal education. Many of the younger students were physicians and recent baccalaureate graduates. The group of deans and directors are in the later end of the scales. It is interesting to note that while a person is considered too old for formal education at clearly defined ages based on degree, that there were so many participants in the older age range. It might also be noted that they were able to learn and also able to effectively initiate changes and new approaches to education in their schools. Wisdom, age and leadership must be acknowledged. In a country in which age is highly valued and respected it is a definite advantage when implementation of change is sought.

A second area in the profile of the students was the distribution of nurses and physicians in the program. The physicians are the university and didactic faculty of the program while most of the nurses are clinical instructors. Although this is not always true since some of the nurse faculty lecture only and do no clinical supervisions.

The distribution of the doctors and nurses in the program was significantly changed by the third year. The first two years there were many pairs from the schools. However there were 65 nurses, 18 doctors and 3 who gave doctor/nurse. The evaluations of the courses at the time under comments gave rise to statements that "there should be separate courses for the doctors and for the nurses" or that "it was good that they were in the same class since they often had to teach together." In many cases the information was totally new information for the physicians and vaguely familiar to the nurses. At time the nurses in the class could help clarify concepts for the doctors. The doctors often felt quite comfortable with class presentation or lectures. It was apparent that they had lectured and in some instances demonstrated techniques.

The first two years had both physicians and nurses in the classes. The physicians taught the didactic content and were unfamiliar with the application of the theoretical content in the clinical setting. The nurses were interested in how to apply the theory in the clinical setting. However, the clinical components of the specialty courses and the basic concepts course were challenging to the fac-

ulty. The students expressed ambivalent feelings about the clinical experience. They said that they knew all the information because they had practiced for many years, that they were doctors and did not need to know how to practice nursing, and many stated that they wanted more clinical experience or more time in the clinical area. There were requests for more demonstrations of clinical application by faculty. Some stated that there was information in the clinical setting that was inappropriate for China and other said that the content was not appropriate at this time but may be in the future and wanted to know more about the clinical application. There were requests for more information about the psychological needs of patients, how they are assessed and how they are met, while some stated that because of the short staff these needs are not important.

The resistance to clinical practice by in any of the students and by most of the physicians seems to be related to the "loss of face" concept and is not much different from the fear by older graduate or baccalaureate completion students or master's students in the United States. Individuals who have been in leadership positions or teaching have a fear of clinical experience because they have not given direct care or been on the receiving end of evaluation for a period of time. While they are anxious to learn, they are fearful of failing. This fear is often reflected by the statement that "we don't need clinical practice because we have been doing it for many years." An additional factor in this course was the educational level of the two groups of participants as well as the attitude toward the ability of the nurses in general.

The teaching experience of the group was assessed and there were differences in the number of years of experience and in the numbers of years of teaching by profession. These differences noted are not surprising again given the recent history.

The nurses overall reflect a significantly lower number of years of overall teaching. This is not too surprising since the physicians are used as teachers most often in health related programs. There was quite a range in the years of practice, from none to many.

Comparison of the number of years of clinical experience and the number of years of teaching reflect differences in the concept of who can and who should teach. A significant gap was noted in the period between 13 and 22 years. This clearly reflects the philosophy of that era, that one learns by doing regardless of the type of work.

Some of the participants had participated in several educational programs. Some had participated in both a secondary nursing program as well as a continuing educational program after some clinical practice. Others were graduates of baccalaureate programs either as doctors or as nurses. The degree in China is a Bachelor's of Medicine with a specialty that varies. Generally, the specialty is determined by a quota system. There must be so many students assigned to each specialty. Occasionally, a student is assigned to a specialty of choice. The curriculum is basically the same except for the clinical practice.

The curriculum for the Bachelor's of Medicine in Nursing requires the same courses as for medicine until the last year when in addition, nursing courses are added. This was a concern for the true nurse educators because the curriculum did not focus on nursing. Many of the young participants in the program, particularly in the third year are graduates of recent nursing baccalaureate programs. The young physicians are able to teach in some of the programs, while in other programs they are considered too inexperienced both in clinical practice and in knowledge.

The current positions of the young nurses were mostly a clinical role to obtain experience so that they would be able to assist with the teaching of the baccalaureate students in their school. They were quite interested in the courses since they felt that they would be soon teaching. The older nurses seemed to be attentive because they have been teaching and feel that there are differences in the different levels of students. Not surprisingly they often state in class that the secondary nursing students are easier to teach than the baccalaureate students. This is to be expected since many of the baccalaureate students were assigned to nursing

and wanted to be physicians. The complaints were primarily related to the fact that the collegiate students ask more questions. This same comment has been heard many times in the United States by faculty of collegiate nursing students.

The positions of the participants in the institutions were of clinical faculty or didactic faculty. Some of the doctors also are involved in some clinical practice. Many of he nurses were clinical faculty as well as head nurses. The participants came from basically two types of programs, the twelve baccalaureate programs and the continuing education programs that prepare faculty for teaching in the secondary nursing programs.

The next question on the assessment related to the background of the participants in relation to physical assessment. Since the clinical course related to medical-surgical nursing, physical assessment was considered basic. Therefore the assessment queried the participants for their background. Since many of the participants in the first two years were physicians, it was felt that there would be a large number who had previous experience with physical assessment which was verified with an 80% response that they had a course in physical assessment.

For the development of the groups for class projects and as a teaching strategy to mix the faculty from different backgrounds, the participants were asked to identify their clinical background. This information was of course, most diverse in the third year since there were so many nurses who taught in the clinical areas of affiliated university hospitals. Clinical specialties represented during the three years included the following：

Specialty	Frequency
Surgical specialty	15
Medical Specialty	14
Nursing Administration	14
Pediatrics	10
Obstetrics	9
Fundamentals	9
I.C.U	2
Emergency	1
Mental Health	1
Ophthalmology	1

Since one of the basic courses was nursing concepts basic to nursing, and it focused on the nursing process, an evaluation of incoming knowledge and/or exposure to nursing process was made. The participants were asked about their past experience with nursing process. The doctors almost universally in the interviews admitted that they were totally unfamiliar with the concept of nursing process. Some of the participants had taught nursing process and others had read about it. The level of knowledge varied and during the teaching of the course it was apparent the perceptions varied.

Background about the schools was not part of the input initially. For future programs, it is important to find out more information about the settings to which the participants will return. The initial criteria was that participants would be from the twelve baccalaureate programs. While the curriculum is standard as noted previously and was issued in 1987 by the Ministry of Public Health, the environments in which the curriculum are implemented are very different. The university factors greatly influence the ability of the participants to apply the knowledge learned in the program.

The support of the administration for the nursing programs when visited were quite varied in the various universities and colleges. The relationships between the universities and/or colleges with the affiliated hospitals were also remarkably different. All of the programs knew that a visit would be made. In some of the programs arrangements were made to go to the hospitals, to visit classrooms, and to visit laboratories. It was interesting to note that often there was no attempt made to schedule a visit to teaching areas, and in two places the question of visiting the facilities was raised by the hosts and when told that it would be desirable it was not possible. And something that was most unusual was the lack of students. Only in two schools were any students visible.

The clear-cut line of demarcation between area of teaching was true in all but one of the programs. Faculty were either clinical or didactic and there was no crossover. Only in one college was there evidence of cooperation between the two areas of

responsibility. Several of the programs scheduled time for clinical faculty to meet with the evaluators, to ask questions and to obtain information about nursing concepts, differences between American nursing and Chinese nursing, information about types of nursing research in the United States, and the use of nursing process and nursing care planning in the United States.

The emphasis and priority of some of the institutions to increase the knowledge level of nursing staff was quite impressive. Nurses have been sent to study abroad, to other programs in China, to language programs to increase their ability to learn about new nursing concepts in the literature, and have been given appropriate responsibilities to use the new knowledge to improve nursing practice in the hospital. Other nurses were met at several of the universities or college who had received additional education some as nursing educators in a two year program in Hong Kong and were not affiliated with the baccalaureate nursing program, but were working in a clinical staff nursing position with no teaching responsibility.

The number of programs where there is a considerable amount of home health nursing or public health nursing was quite impressive. None of the nursing programs offer education in public health nursing or home health nursing. Not only nurses, but also doctors are going to patient's homes to assist with their care because the cost of hospitalization is too great for the individuals or there is a lack of hospital beds. Cost is no doubt, the more realistic reason, since in the hospitals that were visited in the various cities, all had empty beds.

The vast numbers of students in some of the colleges and universities who are not on campus was also quite impressive. Some of the programs have very extensive programs serving many remote areas. Hospitals often support the independent study programs, adult education programs, short workshop, continuing education programs which vary from 1 year to 4 years based on the department by which they are administered and the status of the participant as full or part time was quite phenomenal. Some environments were alive and stimulating while others gave one the impression that life and education was in a quiescent state. Quiescence was not relegated to the small and obscure locations. They were often the most active and progressive. The striving of the obscure to be acceptable or acknowledged stimulated remarkable demonstrable achievements that they perceived as no doubt inferior to the larger institutions. When in fact were greater than what was observed in major section.

Process Evaluation of Courses and Program

The evaluation design reflected for each course the program objectives and the specific course objectives for the course as well as the content to meet the objective and the methods of assignment and the evaluation.

Teacher effectiveness was evaluated for each course and if there were multiple teachers, each was evaluated. The counterparts and the translators were also evaluated since the translator plays a key role in the transmission of information when non-native speakers are teaching. The evaluations of the faculty were generally quite favorable but some strong suggestions were often made by students. The faculty use this information to improve their presentations for future classes.

The use of assignments completed by the students and presented during the course offered feedback to monitor process of the effectiveness of the teaching of a concept. The student presentations made it clear to faculty whether or not information was being transmitted effectively. The clinical experience for the students also aided the faculty to evaluate the effectiveness of the didactic presentations. Role playing was used as a teaching method and the class then critiqued the roles and analyzed both the content and the process.

In teaching a group when change in behaviors of past learned activities is a main objective, there must be assessments done which reflect more than a written exercise, paper or test can communicate. The impact of change over time is best tested at several intervals. During the course while a change reflects the learning of new concepts and their application the true test is the application of the

knowledge in their home setting. Change is not a comfortable process if one must do it alone in an environment that is quite comfortable for the participants in the system.

The clinical experience was also evaluated by both the students and the faculty. The students had a rather extensive evaluation form that was used to evaluate their own clinical experience. Items of the evaluation form reflected nursing practices that are foreign to China. The use of the form provided a teaching tool as much or more than an evaluating tool. Each student was evaluated individually by the faculty and then a conference was held with each student to review the evaluation. The evaluation conference focused not only on the clinical performance but also the written exercise required to complement the clinical laboratory experience. The individual evaluation conference with the students was a new experience that provided new insight for the students that evaluation can be a teaching opportunity as well as scoring or ranking exercise.

Papers, group presentations, group exercises, and examinations were also used to provide process information. Since these were often done during the course it allowed the faculty to clarify any areas that were problematic to the students before proceeding to new content areas. Group presentations in any country or class have the same inherent advantages and disadvantages. There are always the workers and the free riders. The faculty while in the temporary role of student have the opportunity to gain renewed insight to the other problems that are generated in living situations since the campus was basically on vacation for part of the first course. This lead to discomfort in living conditions and had a significant impact upon the learning process. The part of the program most affected was the clinical which is the most difficult for a variety of reasons. The interest in learning is diametrically opposed to the content needed to be able to use the knowledge the students want.

As in any developing country the desire is for the flashy new technology. Before the use of technology is valid the basic infrastructure is required. One cannot effectively use high technology to save patients if the patients die because of poor care such as poor positioning or non-existent basic care. The basic foundational care issues are not dramatic, considered mundane in all societies, and in many societies below the dignity of many individuals. However, healing is based on the meeting of the deficits that result from the absence of a condition to meet a basic life support need of the body.

The deans and directors were invited to participate for a month in the second year. This was after reviewing comments made by the participants of the first year of the program and discussion with nursing leaders in China. The consensus was that if the leaders were involved in the process and better understood the new concepts that their faculty learned they might be more supportive to implementing change.

Change is a process that is not always easy and especially in a country where one's position is often threatened. The idea of a baccalaureate in nursing is change in the manner in which nurses are educated. Since both nurses and doctors were not formally educated for a long period of time, the thought of a young nurse coming to work in a hospital with a baccalaureate degree is quite threatening to some physicians. The concept that "knowledge is power" seems to translate in to nearly every language. A human weakness tends to be the fear of failure and the potential threat of not knowing something. "Loss of face" is a particular threat in a society that for centuries has emphasized the importance of face or lack of failure to retain respect.

The question that is quite prevalent in China is, "what does a nurse with a baccalaureate do?". How does this person work in the hospital? How can a person who is young, has book knowledge, but no clinical experience be used effectively? Why does a person need a college education to be a nurse? And the question the students ask is, why if I have a college education, study as long as doctors and have many of the same course, do I have to be a nurse?

The evaluation comments often reflect the short sighted immediate need impulse demonstrated by

immature individuals. This is reflected for example by the comment, "that the content is not needed because I am not going to teach it". "I need" or that "only experienced teachers should take the course, the young teachers won't or can't use that knowledge". (What is unsaid is "because we won't let them teach because they do not have enough clinical experience. And, they can't practice in the clinical setting because they are too young. And, by the time they can practice they will have forgotten all that they have learned because we will have them sit and listen to all the old professors teach as they have always taught.") Resistance to change is always a challenge.

At the end of the program in 1988, it was suggested that it would be too expensive to bring the participants together to do an evaluation, so that the best method would be to construct a questionnaire and have it sent to them to complete and return. This advice was followed and a questionnaire was sent to all participants from 1988. The questionnaires were translated and sent out with returned self-addressed, stamped envelopes, but none were returned.

All the dean and directors of the baccalaureate programs met in Beijing in April, 1989 following the program for deans and directors. At this meeting an evaluation form was given to the deans and directors to evaluate their faculty member(s) who attended the program in 1988. This was a simple evaluation to determine what the person's role and responsibility was before the class, after the class, changes in performance noted, suggestions for future programs, would they send additional participants and suggestions for follow up faculty preparation programs.

In no case did the faculty member's role change. There were some notations related to the changes in performance---"can utilize nursing process in medical or surgical nursing course", "can identify the basic nursing concepts", "prepared the faculty person to be able to go abroad to study", "more capable in knowledge", "enthusiasm for nursing education", "utilize nursing process and understand importance of nursing research", "ability to organize primary nursing and understand curriculum design" ; "combine new teaching methods with the situation in our country", "changed their ideas of the nursing profession willing to perform the profession, learned the concept of basic nursing, teaching methods and clinical teaching : , "some change in model transformation", "due to time limit not changed so much".

The general consensus was that the course needed to be shortened. The group recommended that six weeks was the appropriate length of time for the program. All of them said that they would send additional faculty except one who said that because of a faculty shortage they would not be able to send anyone again. There were a variety of suggestions for follow up courses ranging from "having a Master of Science in Nursing granted by an examination" to "offering a program for a Master's Degree", as well as "send directors to the U.S. for 3 -6 months".

Analysis of Questionnaires

The questionnaires that were sent to the past participants prior to the visit yielded the following information :

1. What content has helped you most in your teaching ?

Nursing process	95%
Nursing care plan	98%
Nursing diagnosis	99%
Curriculum development	95%
Research process	88%
Nursing management and leadership	40%
Nursing concept	97%
Teaching methods	99%
Evaluation of students	99%
Problem solving	87%

2. Was there content that you felt was not appropriate for China ? If so, please specify.

No	99%
No response	10%

Some of the specified examples of content perceived to be inappropriate for China included : "psychological nursing because there is a shortage of nurses", "curriculum development not much useful, we only teach in the clinical area", "China doesn't

have enough money to buy equipment, standard examinations, some of the content in the specialty clinical courses", "some of the content is not applicable in all situations such as nursing care planning and nursing diagnosis because not all nurses have learned about them, but in time they will be useful".

3. Have you shared your experience with other faculty/clinical instructors? If so, what has been their reaction to the content?

Yes	95%

The responses to the reaction of their peers were: "good reaction", "many hope to be able to participate in this type of workshop", "several have taught workshops similar in their area and a few of them have taught large groups", "one faculty group with three who participated in the first two years conducted a similar workshop for approximately 30 participants over a four week period", "one presented a paper to a national conference based on what she learned about nursing management and has been asked to repeat the presentation", "another sent two faculty to similar workshop taught by three past participants and then sent one of her five faculty to spend six months with several of the past participants to learn form them in a mentoring situation".

4. What revisions have you made in the manner in which you teach after attending the faculty preparation program?

Evaluation of students	95%
Use of various teaching methods	90%
Communication skills	85%

5. Have you made any new teaching materials for use in teaching? If so, please describe.

No response	20%

Responses related to new teaching materials included: nursing research, basic concepts, medical nursing, gynecological nursing, nursing management, surgical nursing teaching in clinic practice-preoperative, operating nursing, post operative nursing, patient education before discharge, some have made video tapes for teaching, other have made transparencies, posters, obtained other media and/or models.

6. What content do you feel should be added to any of the courses?

Curriculum design
Management
Nursing research
Nursing diagnosis
Nursing psychology
Nursing process

Other comments:

The questionnaire completed based on the Likert scale produced the following: it supported the responses on the open-ended questionnaire and in the discussion. In one situation it was in conflict with the verbal report. I no doubt the written was more accurate than the verbal report in an audience of other faculty. The individual questionnaires reflect the high degree of response to not appropriate that seems significant for several of the questions.

Responses to the Questions Addressed by the Evaluation:

1. How has the content learned in Beijing assisted in the development and teaching of advanced nursing curriculum?

This question was quite generally answered with the same responses that the participants wrote on the questionnaires. They seem to be quite comfortable with the teaching and the use of nursing process, nursing care planning, the use of new teaching methods, and revision in the way in which they evaluate students in the classroom and the clinical area, some of the leadership and management content, especially by the deans and directors who attended the one month program in 1989.

2. What influenced you to send or not to send additional faculty to Beijing?

In every visit the response was that if invited, they sent faculty. In most instances, the question was asked "why weren't we invited each year", or "we didn't know that you offered a program this year", or "when is the next one?" or "we want to be sure that we are informed of any program that is offered so that we can send faculty". The response from each school was that the faculty who attended, learned a great deal that that not only benefited

them but also others on the faculty. Many said that they would have sent more each time, but were told that they were limited in the number of students who could enroll. It was apparent that some of the schools felt offended that they had been exclude in one or more than one of the years. The question was often asked, "How can we have a similar course offered in our area so that more nurses can learn? We can't send that many to Beijing but if something were offered here many could learn and we could make more advances in nursing.

3. Was financial distress a factor in not sending additional faculty to Beijing?

No school acknowledged this to be a problem. This question was raised by asking if they felt that there needed to be scholarships to defray the cost of the program. Every school when asked this question stated that they felt the tuition was quite reasonable. Some of the participants were sent by the hospitals that paid all their costs. There was some strong competition in some of the university-affiliated hospitals because of the limited number who could attend from the college or university. Several commented that each school has a certain budget for the education of staff, especially for the improvement of the nursing faculty. The request was often how much would it cost to have such a course offered in their area.

4. What types of creative activities have been produced since attending the program in Beijing?

Research articles have been published ; several articles have been accepted for publication ; video tapes for teaching have been made ; a book on communication in nursing has been translated ; several journals on primary nursing have been published ; a course for preparing faculty for teaching in advanced nursing programs was conducted by three of the past participants for 30 students from various provinces for a one-month period ; a number of seminars have been presented ; one book on the papers and topics covered in the program designed for China in Chinese based on the Beijing program and taught ; a book focusing on management and leadership written in Chinese for China with much of the course content from Beijing in management and leadership adapted to the Chinese situation ; translation of Yura and Walsh, *Nursing Process into Chinese* ; translation of Perkins and Perkins, Health Care Communication into Chinese ; development of video tapes for instruction on basic nursing skills ; evaluation tools ; teaching materials and overhead transparencies ; slides to accompany lectures ; meetings with other clinical faculty to share what has been learned to assist them to improve their teaching.

5. In what ways might the program be improved to better meet your needs or the needs of your faculty?

With the exception of one university requests were made to offer the program in each geographic area so that more of the clinical faculty and nurses in the hospitals can benefit and improve their nursing. The expressed belief was that such programs would assist to improve the quality of nursing care and the standards of care would rise. All of the participants requested the program to be offered. Only one administrator of one university felt that they were not in need of such a program. However the former students disagreed with her but obviously not in the meeting.

The administrators felt that it would enhance their institutions and also the other institutions in the region. They were willing to host such a workshop and to invite the outlying hospitals to participate. They also agreed to allow the former participants to assist with the program. The impression made was that there is an unsatiable appetite for learning and knowledge. This is magnified by the lack of material resources related to the discipline both written and visual.

6. Did you feel that you needed additional resources to assist you or would have been helpful to share your new knowledge gained in Beijing with your colleagues when you returned? If so, please specify.

A number of the responses stated that copies of some of the teaching materials would have been very helpful. "After returning, my notes were not enough for me to teach others" was stated by a

number of the participants. "If only I had a copy of the book I used that came from Taiwan would have been very helpful to assist me in the development of new teaching materials and improving the content of my classes." "If we had just a little support and guidance we would like to conduct a similar program in our area. We have so many nurses who want to learn, but cannot go to Beijing. If some assistance was given just once, then we could offer our own program after that. Even a copy of the material presents would be a help, we could make more." "An opportunity to hear what others are doing and how they are dealing with or have solved the problems that we and other s have would be very helpful." "How can we get information from others about what they have done?"

7. Do you feel that the format (i.e. two courses simultaneously offered) was desirable or would you have preferred a single topic at a time? Other suggestions?

Suggestions were made repeatedly to offer single topic courses in short workshops, morning and afternoon; send flyers telling about the courses and allow students to select those which they want to attend; separate students according to interest and/or background since those who teach in the classroom only or in the clinical area only have different needs; offer the course in regional areas and/or in conjunction with part participants so that they can learn from the process of setting up a course so that they can then do it on their own; it helps to have a foreigner come in to give the new ideas originally ("no man is a prophet in his own land").

Discussion

In the planning sessions, questions were raised about the gaps in knowledge between the nurses and doctors. The knowledge gaps do not seem to be in the area of nursing content. There is a dearth of knowledge and the art of applying the cognitive knowledge related to nursing in the practice setting. There is definitely a split between the clinical and the didactic teachers. It is reminiscent of situations in the United States when and where faculty who taught in the classroom placed higher status on their role than the role of the clinical faculty. In recent years many universities have required nursing faculty to remain clinically current and some require clinical practice as well as clinical supervision. Skilled clinicians often are not interested in didactic teaching and often are not effective in the classroom situation since their talent and interest is in the practice setting. Therefore, it is not at all surprising that in developing countries which have often placed a very low status on the role of the clinical nurse that there does not always seem to be an interest here of the didactic faculty about what goes on in the clinical setting and vice versa.

The demeaning attitude of many doctors toward nursing and nurses is all too clear. The ignorance on the part of most of the deans and directors related to nursing and nursing practice is somewhat appalling. The few places with the nurses who are Peking Union graduates reflect a stronger sense about what nursing is and is not. The schools that have relationships with the Canadian Nursing Association or with the Canadian universities are clearly more nursing focused. The schools dominated by the medical model clearly reflect Madam Lin's concern that it is five years of poor quality education no different than the poor quality three year programs, just longer. The schools that have predominately doctors on faculty, virtually demonstrate no nursing with one exception. The one school headed by a doctor who feels that nursing is a practice profession; and therefore, individuals who are teaching in the discipline must be in the clinical area demonstrated a high level nursing program. A fifth year student in that school presented a clinical patient care conference based on nursing diagnosis and nursing care plan similar to those done in the United States.

Another university in which a Peking Union graduate began the nursing program also reflected the demonstration of techniques taught in Beijing. The supervision of students doing a procedure and talking to a patient by a former participant illustrated that not only had she learned the importance of communication but that she had transferred this

knowledge to the students she was teaching.

Several of the schools with a large number of participants seemed to be doing the least. Schools who only had one or two who had attended have been amazingly busy and creative. It seemed that they took the responsibility to communicate to others their new information.

A goal of evaluation is to determine the real value or merit of a program. Through evaluation one may dctermine relationships between variables which improve the educational process. In evaluating a program that influences the teaching of a practice profession it is important to obtain data on the practice settings and observations that reflect the content taught in the courses.

Site visit allowed the evaluators to obtain information not attainable through written or verbal communication. The demonstration of the application of knowledge by former students and by the students that they taught indicate the impact of such a program. The creative activities of changing teaching strategies, producing new teaching materials, conducting a small study with teaching approaches, compiling readings and/or teaching materials, translating the materials from the program in Beijing and modifying for use in China are just a few of the indicators of the impact of the program.

The initial decision for site visits limited the visits to the schools who had the largest enrollment over the three-year period. Project HOPE staff then decided that perhaps that type of selection process may skew the data. The decision was made to visit all of the programs represented. Differences that were quite significant were the opportunity or lack of opportunity to visit the clinical sites. Observations in the clinical sties provided rich information about what was going on educationally in the school.

The literature related to change theory reflects studies about the nature of the impact of certain factors upon the change process. The amount of discomfort that is broadly defined change in geographic location, cost, absence from family and familiar settings influences the impact. Related to the schools of nursing, it is interesting to note that the number of faculty in a school, the number sent to Beijing, the cost and distance, and the changes reflected seem highly correlated. There is a dearth of faculty in China for the baccalaureate programs. Quite a few of the schools have only sent a small number of faculty for a variety of reasons, but they are making great strides to implement what they learned, in addition are seeking opportunity to learn more either by returning to Beijing, having a similar program at their school or in their area or by attending a similar program wherever one is offered. They are also anxious for other faculty members to have the opportunity to attend a similar program.

The individual questionnaires using the Likert scale gave some interesting results. Ordinarily, one would only look at the averages. However, as the frequencies were being tabulated it was noted that there was a wider than usual distribution of responses. Since these statements were asking for opinions and feelings it was considered best to present the results individually.reflects the bulk of the responses are in the agree and strongly agree

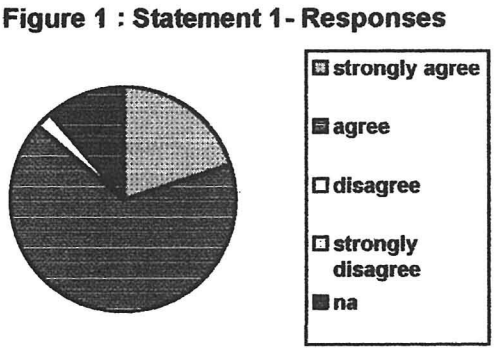

Figure 1 : Statement 1 "I have used much of the information I learned in Beijing in my teaching"

range. However, nearly 10% of the total responses are not applicable. One might question that the information was not applicable. It is not too surprising however, when visiting some of the past participants, it becomes apparent that they are still considered too young to be teaching, and not capable of doing clinical supervision or practice and therefore, it is true that they have used little to none of the knowledge learning in Beijing.

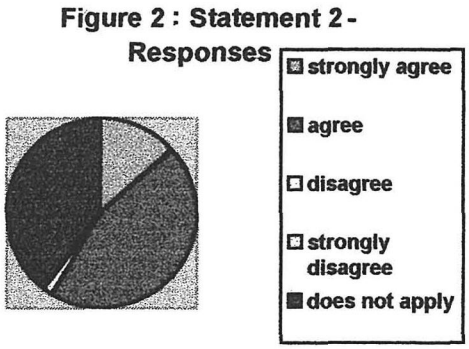

Figure 2 : Statement 2 "I have used the knowledge to improve my nursing or medical practice"

Figure 2 presents the data response for the second question, again the average is in the agree range, but the large number of not applicable is somewhat surprising, about 40%. In following up on that question after obtaining the initial responses, the reason is that many of the participants are not active in the clinical area. There is a strong split between those who teach and those who are involved in clinical practice. Clinical practice seems to have for many a negative connotation which is a concern when one is trying to upgrade the standards of a practice profession.

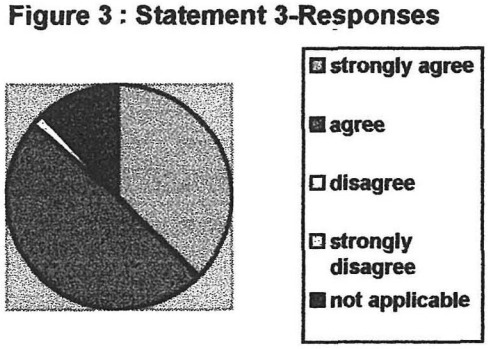

Figure 3 : Statement 3 "When I returned to my work, I began to realize how much information I learned."

Statement 3 (Figure 3) demonstrates a little over 10% response rate that it is not applicable. The overwhelming majority however reflect that they agree with this statement. This was most apparent during the visits. Not only did the participants comment on how much they learned, but also many of the coworkers commented on how much they learned from the participant sharing new knowledge and skill with them. The comment was often made that at the time it did not seem like a lot of new information but after returning, they realized how much they learned that was new information that could be used in their work situation. They also stated that they also then thought about more detailed information that they wanted to know.

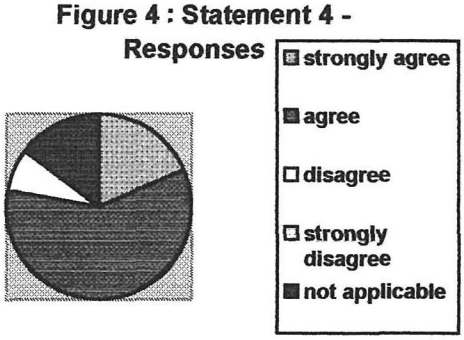

Figure 4 : Statement 4 "I read more journal articles about research in nursing and/or medicine"

Again the agreement rate is nearly 80%. There are nearly 15% who say that it is Figure 4 not applicable and just a few who disagree. It seems that some of the past participants have greater access than others to the use of reference books and journals. It was quite interesting to see some of the extensive and current collections of journals in some of the schools. There does not seem to be a consistent pattern in relation to the access of resources.

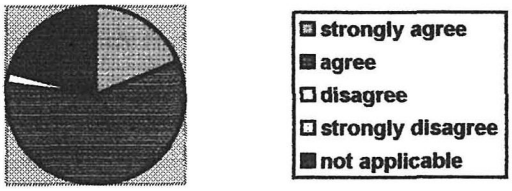

Figure 5 : Statement 5 "I have tried to use information from journal articles in my professional work"

The not applicable response rate for this is about one-fifth which is a little bit better than the 40% for the application of content to their clinical practice reflected in Statement 2. Again the average is close to the strongly agree, so that if averages are looked at the relatively high rate of not applicable would be missed. It is interesting that there have

been fewer attempts to use knowledge learned. This could be related to the type of research journal articles that many of the participants have access to read.

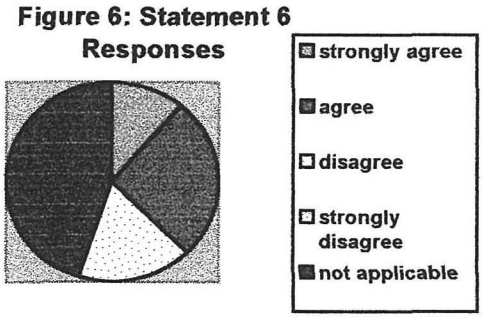

Figure 6 : Statement 6 "I have tried to do some research in my clinical area."

Nearly 50% reflect a not applicable response while the average would be in the agreement range. It is not too surprising since just about all of the past participants felt that they needed more information and experience with doing nursing research. They have all expressed the desire for additional courses and information about doing nursing research. They have also suggested that in the research course that there be some attempt by the students to do some small project. They feel that it is important to have exposure and experience with the process so that they can do research on their own in their own settings and/or schools.

Given that nursing has presented many new concepts to the participants and the concept of doing research in nursing based on concepts is quite new and not comfortable for these faculty. It is perceived by them as important and they have a desire to participate in the process and to improve the practice of nursing. This will take time, but if the interest is present and the willingness to learn, the beginning is underway.

Statement 7 indicates that there have been over 25% who have written at least a journal article. Several have developed video tapes for their own teaching and for use by others. There have been several who have translated books into Chinese. In addition some have written booklets for teaching that are being used by others to aid in the improvement of their teaching. Several have had articles published and several others have had their articles accepted for publication.

Almost all have dealt with the statement by responding that it was not appropriate. The average for this item is about 1.4 between strongly agree and agree. The use of the average would be more impressive than the large segment of not appropriate.

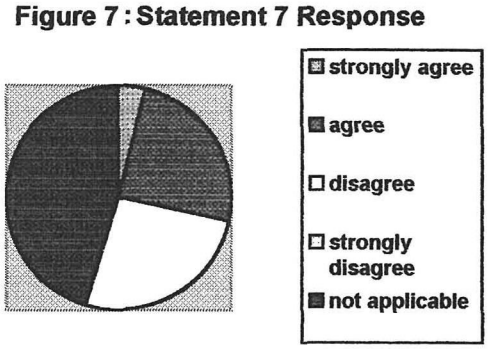

Figure 7 : Statement 7 "I have written an article for a journal since I returned from the Faculty Preparation Program"

The response rate for statement 8 reflects the desire to obtain more supervised clinical experience. This is in direct opposition to many of the comments made when more clinical time has been suggested for the courses. This statement made in their own privacy on an unsigned sheet is likely an expression of a recognition that there is more they can learn and they would like to have the opportunity to develop.

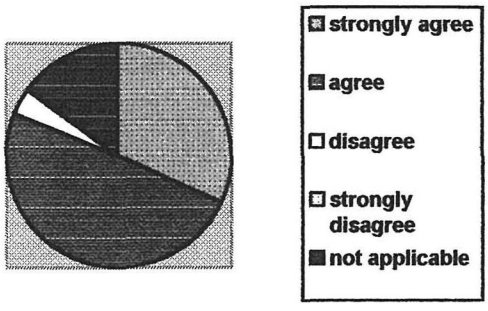

Figure 8 : Statement 8 "I think I would have liked more opportunity for supervised clinical practice"

While the response rate average would be in the agreement range, the strength of the agreement is better visualized with the graph. There are a few as one would expect who would disagree and often

those are the people most in need of leaning about clinical practice but who will avoid at all costs exposing their own weaknesses.

Figure 9 : Statement 9 Response

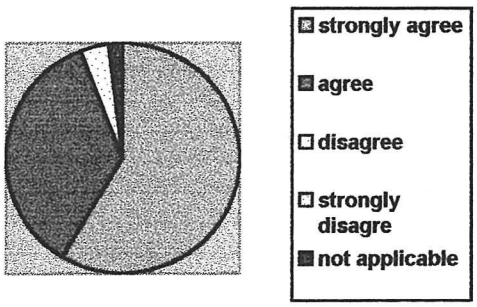

Figure 9 : Statement 9 "I would like more information about clinical teaching"

Consistently, in the classes, in the evaluations at the end of the programs and on the visits to each of the sites, the request for additional information about clinical teaching and evaluation was requested. The thirst for knowledge about clinical teaching no doubt arises form the lack of basic clinical knowledge. By asking for information about clinical teaching, one is often gracefully asking for information about how to improve one's own practice. Offcourse it is always more acceptable to learn how to teach something rather than to learn because one does not know.

The strong request for knowledge about clinical practice comes as no surprise after visiting a number of hospitals. Individuals have learned by having been the recipient of care.

Figure 10 : Statement 10 Response

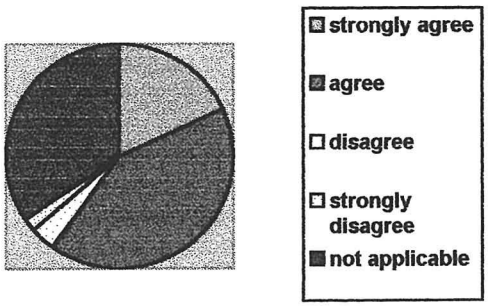

Figure 10 : Statement 10 "I have changed the ways in which I evaluate student's clinical performance"

For many of those faculty who are reading textbooks and journals are aware of the deficits in the care giving models in their institutions. How to effectively teach a model of care can be quite difficult if one does not have a concept of care. The concept of care is best learned by having been the recipient of care. For many of those with whom we work, care has not been a concept they have experienced. Therefore, it is more difficult to learn, and more complex to comprehend.

Closely related to clinical teaching is the concept of evaluation of clinical performance. A number of the past participants discussed ways in which they have changed their evaluation of clinical performance of students. It was quite impressive to know that the experience and the classes had such a significant impact on them.

Some of them reported that they developed clinical evaluation tools for evaluating students.. Others stated that they had developed objectives for the clinical learning experiences which are used as guidelines for evaluation of student performance. One of the participants said that after the course that she was quite relieved that she now had an idea about how students should be evaluated. She said that when she was assigned to teach she had no idea how to grade or evaluate the students, so she based grades on who she liked. She said that she was not comfortable with that approach but did not know how else she should grade students.

Figure 11 : Statement 11 Responses

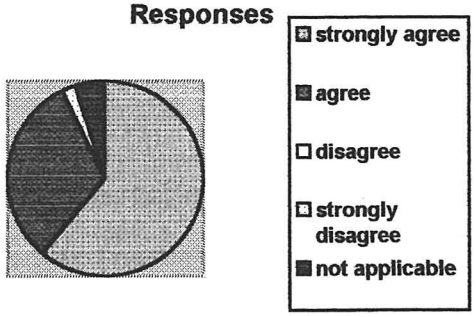

Figure 11 : Statement 11 "I would attend another course, if given the opportunity"

The strong desire to take another course could stem from many reasons. It is one statement that leaves no doubt in anyone's mind. The strong response reflects the thirst for knowledge that was experienced in each and every site visited with one

exception. The director was not interested in courses but her faculty were and also said that other hospital nurses are interested in learning more since they also have teaching responsibilities, wrote articles, improved the care and had obviously taught the students as much as they knew. The small faculties were eager to learn more, to try out new ideas, and to obtain additional information. They had support from their chief administrative officers who seemed to be anxious to see their programs grow and develop. Much of this information is not obtained through a paper and pencil approach.

Figure 12 : Statement 12 - Response

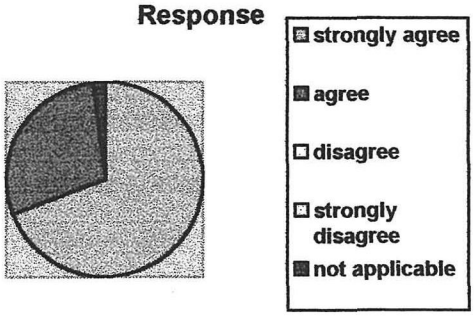

Figure 12 : Statement 12 "I would like the other faculty that. I work with to have the opportunity to attend a similar program".

Figure 13 : Statement 13 Responses

Figure 13 : Statement 13 "I have given lectures to other nurses in my area about the information that I obtained at the Faculty Preparation Program".

During the past two courses, there seemed to be some indications that some of the content was repetition for quite a few of the participants. Therefore, it came as no surprise that in the responses of the statement 14 that there was such a high agreement rate of nearly 80% that some of the content was known. During the discussions several groups expressed that they would like the option to select what course that they would participate in rather than be required to attend all or nothing at all.

Figure 14 : Statement 14 Responses

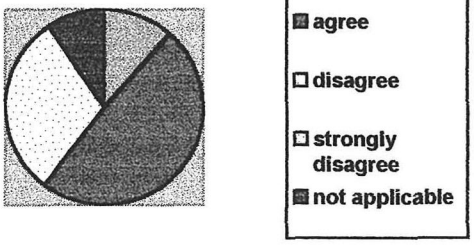

Figure 14 : Statement 14 "I think that some of the content was information that I already knew".

The increase in the number of nurses obtaining additional information and education has increased the level of knowledge for some of the faculty of the baccalaureate programs. There is still a significant gap between knowledge and application.

The nursing faculty as they read more are becoming more aware of what they do not know and what they need to know. These are the content areas that they are interested in and are requesting additional information. While the participants felt that some of the information was repetitious there was a large percentage that felt that most of the content was useful. There is a difference between repetition and not useful. While they may think that the material is useful, they are aware that there is so much more that they want to learn. Not only do they want specialized content, but also they are interested in what additional information they can obtain to assist them in improving nursing and nursing education.

Figure 15 : Statement 15 Responses

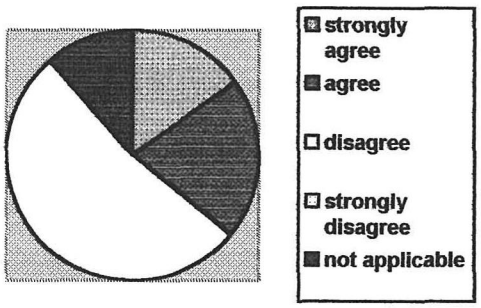

Figure 15 : Statement 15 "I think some of the content was not useful".

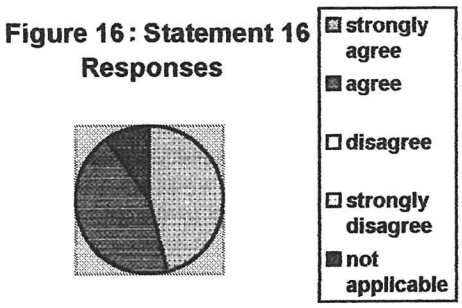

Figure 16： Statement 16 "I think it was a great experience"

The last question was directed to determine if in spite of some of the difficulties that they endured did they feel that the experience was of benefit. The responses clearly are in the range of agreement just as they are in the average of the responses.

The evaluation of the programs reflected and supported the discussion that Project HOPE consultants have had about the courses and the need to make revisions in the manner in which they are offered. The revisions of the courses need to make them more appropriate for the observed needs of nursing education in this country for the current situation and in preparation for the future. The impact of technology and the change in disease profile that will result impacts on the needs for nursing education both theoretically and clinically.

The manner in which people have been notified of the program needs to be expanded. The programs need to be offered in various locations in China so that more can take an advantage of the opportunity to learn. The past participants are the key people in their areas to assist with the teaching of content. They may serve as counterparts or do a major portion of the teaching. The opportunity for working with a consultant and setting up local programs, provides a valuable learning opportunity that will provide them with the knowledge of the process by which they continue to teach and to share with others knowledge.

The impressive dissemination of information by those who were only at the program for a short time, illustrates the relationship between accessing key people to be communicators of ideas and information. Some of the programs that have had a large number of participants have done the least. Lack of access to the hospitals generally indicates a desire to hide.

Clearly, there is evidence that teaching and the application of nursing concepts is taking place in schools with strong nursing leadership. Inquiry has begun n many locations and the testing out of approaches is taking place. New methods of teaching are being tested and evaluated. New teaching tools are being developed as well as new methods and approaches to evaluation.

The need for resource books and copies of the materials used in class were badly needed by the early participants. The value of the translated nursing textbooks was not fully realized by the non-native speakers. In each school, the evaluations were told how helpful the books from Taiwan that are at BMU were to the participants. They also said that their own notes were not sufficient when they went to produce some teaching materials. Copies of some of the videos made in China showing good basic nursing care are needed at most of the schools.

RECOMMENDATIONS：

1. Encourage BMU to do the program on their own.
2. Use Project HOPE resources to assist past participants to operate a program in their regional areas on a one time basis
3. Donate a set of translated basic nursing textbooks to each of the schools who has sent participants to aid them in the development of their courses and class materials.
4. Work cooperatively with a Chinese counterpart university and/or organization to have meeting in which the part participants can share their progress, the new tools they have developed, etc. Assist in the development of a vehicle by which they can share what progress is being made at the various schools
5. Develop videotape(s) illustrating the administration of nursing care, the effective teaching methods being used by some faculty, etc.
6. Bring past participants into programs to serve as faculty so that they can give insight to others how they in their own setting have

made progress.

7. Work with whatever officials necessary to assist the process so that the young faculty who have been educated can use their education and become effective nurses and teachers.

NB Follow-up report indicates that all the recommendations were addressed. The donor along with the Chinese Nursing Association offered with past participants in each region of the country workshops to over 2500 participants. The same teaching methods and materials were used. At some of the workshops there were over 300 in attendance. This evaluation had a major impact on the opportunities for nurses to learn about new concepts. BMU expanded the opportunities for students to come to the center and also the faculty began to serve as resource people to others. All of these activities along with the increased number of texts and journals published in China made written materials accessible and affordable, which are important for the sustainability of educational programs.

PEDIATRIC NEONATAL PROGRAM FINDINGS

Context Evaluation Findings

Background data were collected from program reports, articles, and communications written by past consultants and staff of the program. Project information was located in the sponsoring organization's program document retrieval center and archives departments. Fifteen years ago this retrieval center at the organization's international headquarters was developed to organize and store program materials in central files. The materials could be identified via a computer index but were not on disc and needed to be physically retrieved from the files stored in various buildings on the international campus.

Methods of data collection conducted in the field consisted of : semi-structured interviews, observations, and informal discussions.

Field Procedures

Questions were developed based on elements of sustainability factors identified in the literature. All interview questions were translated, after being reviewed by a panel of experts. Reevaluation was done after translation for clarity.

Selection of Subjects and Sites

Based on the information received at the primary site, it was clear that site visits needed to be made to other units which were initiated by participants of the primary site's educational programs. Therefore, a convenience sample of three was selected because of ease to travel to them as they were in the largest cities

Context, Input and Process Data

Review of Program reports and articles

In 1983, a PVO was approached by a president of a university in China to establish a NICU education program in the university's affiliated children's hospital. The donor also had a similar request from another university in the capital city. At the time, although the annual birth rate was greater than 18,000,000 only two other neonatal intensive care units for one billion people existed[63].

This PVO had already provided the medical community with modern textbooks in medicine and allied health sciences based on their identified needs[62]. More than 75,000 books were donated to three universities in the country, all of whom were eventually part of the educational network developed by the PVO. These universities in turn distributed the books to over 50 medical libraries in the country.

The donor is primarily health education focused using the trainer of trainers philosophy of helping people to help themselves. It used a counterpart model in which the external organization and the local staff worked as partners in developing and implementing the program with financial and human resource commitment from both partners.

Original Site Visit

A site visit by the agency headquarter team of representatives was conducted in April, 1983 to

identify joint teaching and training programs during meetings with members of faculties and hospital staff in four main cities.

Walsh[62] describing the health care system at the time of the assessment believed that the primary health care system was quite good. He observed that accessibility to both preventive measures, as well as, routine therapeutic care at the primary care level was effective[64]. However, the country representatives believed there were serious weaknesses in the tertiary care level of the health care system. In 1983, China hospitals could not meet the growing needs of the economically poor people despite a vast hospital construction and renovation program. In all institutions visited it was found that there was a need for advanced technology equipment and trained personnel (physicians, nurses, dentists, laboratory personnel, biomedical engineers).

At the same time, the report cited that there had been a recent delegation of responsibility and authority from the national to the provincial authorities. Budgets were allocated to the provinces and governed by the locally appointed representatives of the Ministries of Education and Health. The national government had also recently designated certain institutions in the country to serve as model training centers. So that as centers developed an expertise, other units could be replicated in other parts of China.

During that period, the country had 117 medical colleges, 4 of which were supervised by the Ministry of Public Health, the others supervised by the provincial and municipal governments[64]. The medical colleges at the time had a five-year curriculum with students admitted after high school completion based on their scores on the college entrance exams and a lottery to determine which school they were assigned to. Specialty training was completed in one year with an internship for 2 to 3 years.

Most nursing education was provided by three-year hospital based programs, although there were selected cities which had programs affiliated with medical colleges. Nurses were employed primarily in hospitals and very few practiced public health.

One of the universities surveyed by the PVO during the 1983 headquarters site visit requested assistance in the development of a model neonatology unit at an affiliated children's hospital. This children's hospital, as described by the donor's Director of Nursing, was a clean facility with 300 beds, 100 of which were general surgery beds, orthopedics and cardiovascular surgery, and the other 200 beds for other childhood illnesses[64].

At the time, infants born under 2500 grams were sent home with their mothers because they were not expected to survive. The hospital had 80 neonatal beds and infants were referred from all areas of the province. They had partially remodeled the hospital so that there were four joined units, separated by glass walls. During the visit the staff were observed feeding, holding and generally caring for the infants[59]. However, the wards appeared inadequately equipped and under staffed and the hospital staff acknowledged not only these limitations but also deficiencies in clinical skills and training and equipment.

The proposed site for the NICU program was the children's hospital which served as one of the 4 affiliated hospitals to a provincial medical university which had three main faculties at the time : medical, pharmacy and stomatology. There were 2300 students enrolled including 70 students in post-graduate training, and a total of approximately 2700 beds : a women's, children's and two general hospitals[59].

The site was the only tertiary care referral hospital for at risk newborns in the province whose population at the time of the initial startup of the program was approximately 40 million. Approximately 95% of infants in the city were born in hospitals and 70% in the rural areas[65]. Usually, sick infants were kept in their hospital of birth with only selected referrals determined by the parents finances and/ or the lack of adequate transportation. Infants from the rural areas usually arrived to the tertiary center by public bus, trains or bicycle.

After the initial site visit in 1983, the PVO had a commitment in its strategic plan to implement health programs in China and specifically to assist with the NICU program. The country representa-

tives and Project HOPE agreed on 11 health care projects as the initial priorities for the partnership between the universities and the Project HOPE.

NICU Medical Assessment Visit, 1983

It was standard procedure for the PVO that when there was a request from a particular country, the organization sent a specialty volunteer consultant team in to evaluate the situation, plan the program and continue to provide oversight as partners. In August 1983, the consultant medical team consisting of two physicians, one specializing in neonatology and one in pediatric intensive care conducted an initial two week feasibility assessment visit to the primary site. The purpose was to evaluate the physical facilities, equipment and supply needs, the capabilities and knowledge of the practicing nurses, physicians and health care workers, availability of support staff and the potential of the hospital to serve as a referral and training center.

In August of 1983, the hospital had 300 beds, 800 outpatient visits per day and 527 personnel[65]. There were six major departments : Internal Medicine, Pediatric Surgery, Child Health Care Chinese Traditional Medicine and Acupuncture, Dermatology and Ophthalmology.

The original buildings of the hospital had been found inadequate so recently the roof of one wing had been removed and replaced, a fourth floor added while the remainder of the building was also being renovated. The team reported that the hospital appearance was poor and had inadequate plumbing and electricity. In fact, the windows were open to the streets and there was no air conditioning available in the ICU area. The physical facilities on all floors were primitive and in the designated neonatal unit they were inadequate : no respiratory support equipment (central oxygen, compressed air, oxygen analyzers, ventilators), inadequate devices for temperature control (no warmer beds, primitive incubators), no monitoring devices, no indwelling catheters or portable x-rays, and inadequate fluid administration capabilities : (no infusion pumps, no angiocatheters or microdrip chambers). In general there was limited modern equipment for the care of a high-risk neonate[65]. The diagnostics laboratories were not accessible sufficiently for an ICU and there were limited microbiology and chemistry capabilities.

The director of neonatology was also the vice director of the hospital and on his neonatal ward unit there were two attending physicians, three residents, a head nurse, two assistant head nurses, 24 staff nurses and six assistant nurses. The nursing coverage for the 80 beds included seven staff nurses and three assistant nurses during the day shift and four staff nurses and two assistants in the evening and at night.

Kattwinkel[65] indicated that an individual physician's preference, medical staffing and the condition of the child often determined clinical care ; there was no multidisciplinary team management of patients in the unit. Also, physicians played a dominant role in the care of the child, often performing skills that were commonly done by nurses in other countries. Nurses assumed a low position on the ward performing limited clinical technical skills, and functioning as housekeepers and maintenance workers.

Basic procedures and equipment use, thought normal in a modern neonatal unit, were different or missing. For example, infection control practices were focused on changing shoes but hands were seldom washed and an infant with a staphylococcus infection was not isolated but put in a room with three other babies. The only method for providing oxygen was through the use of tanks giving cold dry oxygen directly via a nasal cannula placed under the nares and blood gases were rarely performed but when done they used a femoral artery[65].

Some problems were encountered due to lack of supplies, for example, umbilical catheters were never used simply because the hospital lacked the proper supplies and few blood studies were done because of the need to draw large amounts of blood. Since there were no micro drips available in the country scalp intravenous lines were used without micro drips making it difficult to regulate intravenous therapy for children. There was a resuscitation cart but it had only a few drugs (some not used

in western medicine) and inadequate equipment for resuscitation i.e. no face mask or anesthesia bags. The locally made stopcocks leaked and therefore were not used so the IV lines were interrupted each time a medicine was given. Often, the unit census far exceeded the bed capacity requiring infants to share equipment and supplies such as bilirubin lights.

There was only a basic documentation system in the unit. For example, physicians wrote orders and a brief note in the chart once a day and nurses used check marks and wrote one sentence each day to describe the patients ; their notes were not integrated with the physician's notes. Also, vital signs were documented infrequently for a properly functioning NICU, and there were no comprehensive notes on patient assessment in any of the charts.

Medical training was also limited. Physicians and nurses were trained at the local medical university where the curriculum content was outdated and there were limited opportunities for clinical practice. Upon graduation in the early 1980's physicians and nurses were assigned to a hospital and would generally remain there with little opportunity to change their place of employment. There were no orientation programs for new personnel nor any standard policies and procedures for clinical care and continuing education for medical staff was not in existence in the hospital. A positive element in this setting was that the hospital director and the staff in the NICU were anxious for the NICU program, and appeared receptive to learning and enthusiastic for change.

Finances were minimal in the hospital and patient care was paid for by the families[65]. Therefore, having a high risk neonate in China placed a large financial burden on the family. Parents were not allowed access to the unit, limiting their knowledge and involvement in their infant's care.

Since neonatal care was a very new specialty area in this emerging country there were no training programs in neonatology in the country nor in the province. Hospitals including the primary site had no system for neonatal referral and transport.

At the conclusion of the visit the team recommended that the hospital focus on upgrading the services for general pediatric and neonatal care in conjunction with developing intensive care facilities and not focus on transferring a high technology specialty in isolation to the hospital. This recommendation was met with great reluctance from the university president who remained committed to establishing a neonatal intensive care program. The donor eventually agreed, believing it best to assist the hospital with what it requested while influencing change by example in other wards.

Educational Program/Phase One

The first step was an informal clinical program designed by the PVO to train nurses and physicians in the intensive care unit. The educational approach involved the renovation of facilities, acquisition of equipment and supplies, provision of short term U.S. consultants, generally 2 weeks in duration, and short term U.S. fellowships for selected leaders in the hospital.

In August, 1983 the physician coordinator recommended that the education program be established in several phases each lasting approximately 4 to 6 months with the goal of program completion in 3 years[65]. Each phase was to be concluded by a 1 month visit from consultants, preferably a physician and a nurse, who would each have a specified responsibility within the educational plan.

Kattwinkel[65] also indicated that there should be communication between all the programs planned at the site including pediatric intensive care, biomedical engineering and the learning resource center. In particular, the report emphasized the need for establishing a clinical biomedical engineering program as the neonatal project was being implemented.

The first education to take place on site was bedside training and patient care conferences on specific topics given by short term neonatologists. Also selected U.S. clinicians, such as respiratory therapists and nurses, presented training sessions on clinical use of the high technology equipment as well as introduction to basic patient care management. To further staff education, a physician and a

nurse from the unit were offered fellowships to the U.S. during the first year.

After 18 months an evaluation was conducted by an intensivist not previously involved in the program. The consultant presented a dismal picture of the education program : there was poor administrative oversight of the unit, physician staffing was not stable enough to receive the necessary training or provide the necessary leadership and nurses continued to function as low level technicians/housekeepers providing limited bedside care[66].

The report indicated that the medical staff in the unit continued to have difficulty applying new knowledge in the clinical setting. For example, ward rounds were not conducted daily and there was no team approach between physicians and nurses in managing the neonate. There was also a lack of basic pathophysiologic medical understanding by the staff and in fact, after the visits of the U. S. consultants new practices were generally stopped and patient care practices resumed as before[66]. In addition, the physical facilities had not improved significantly, disposable supplies were being reused and the equipment not being maintained and repaired. Unfortunately, referrals from other hospitals in the province were almost nonexistent as critically ill neonates were admitted to the 60 bed ward versus the NICU due to the lack of policies and procedures for triage and admission and the cost for care. Finally, leadership of the NICU provided little support to the program.

Among the consultant's recommendations was that the ICU needed more consistency rather than various teams of experts every six months[66]. This was a problem because the NICU nurses and physicians were not consistently learning the adequate basic skills and knowledge they would need to teach others in the institution and at other settings in the country. The consultant also recommended that a biomedical engineer be added as a team member in the NICU.

Based on the findings of the 18 month evaluation, the volunteer program coordinators and the team advised the PVO and the counterparts that the educational program needed major revisions in order to achieve its goals and objectives. The counterpart, equal in rank to the program director, did not feel a partner in the program. Previously, the program director noted in the quarterly report that it should not be overemphasized that the donor needed to allow the counterpart to decide the level of care he could support in terms of expertise and finance[67]. In fact, each partner, the counterpart and the donor needed to agree on the type of care required in the NICU. If counterpart input was not considered they would not be able to implement the program in the absence of the external support and therefore it would not be sustainable.

Educational Program /Phase Two

As a result of these findings, there were dramatic changes in the program such as increased staffing and improved educational curriculum and materials. Counterparts were also more actively involved with the PVO in the design, development and implementation of the program.

Staffing improvements were begun by hiring a long term physician for 2 years to provide overall direction to the educational program and to serve as the liaison with the hospital and university leadership. Also, a full-time nurse was employed for 1 year with responsibility for developing an educational curriculum and for providing daily clinical instruction in the unit with the physician.

Besides staffing increases, a formal education program was planned to include a six-month program for physicians and a two month basic and advanced program for nurses. To assist the physician and nurse in the development of the curriculum and instructional materials a nurse educator consultant was hired. The improved nursing curriculum consisted of a two-tier course : the first covered basic ICU nursing concepts and procedures for all the NICU nurses[68]. The second program covered more advanced ICU concepts, which included pathophysiology, and would be used with a core group of senior nurses.

One significant improvement of the nursing component was the development of self-instructional modules to support the educational program. A key

physician and nurse educator in the NICU were identified to actively participate in the development of all learning materials. The nurse was a senior nurse with more than 5 years clinical experience and the physician was the medical director of the unit. The modules the team developed used content from a variety of resources including several self-learning programs available from the U.S. but due to the cultural differences all content was revised and new topics were included such as general nursing skills and documentation. Then, these new modules were translated into the native language and then were translated back by the educators to assure accuracy and clarity.

The basic nursing program modules included objectives, pre and post-tests, lessons, and competency skills. Each of the 10 modules focused on patient care topics such as respiratory management, thermoregulation, and nursing assessment. The competency skills lists were written as procedures to be used separately in a resource manual in the unit. These modules became known as the "blue books" because of the color of their cover and were printed by the donors and distributed freely and referred to frequently throughout the country.

The advanced nursing program included a review of the pathophysiology of each body system, and a nursing assessment and clinical applications section with case studies. Like the basic modules, these advanced ones had post-tests after each section and competency skills appropriate to each system.

Improvements in the physician education program included conferences on pathophysiology including clinical topics such as apnea. They also participated in patient care teaching, case presentations and ward rounds and were given selected self-learning modules on topics such as respiratory therapy.

Since documentation was a problem, the long term physician and nurse introduced entirely new documentation systems to the staff. Standard flowsheets were adapted by the educators for the NICU and nursing notes were integrated in the patient chart and once patient assessment skills were taught and used by both the physicians and nurses they were also included in their daily observation notes. Resuscitation cards were developed by the educators for each bedside and the nursing staff learned how to write nursing care plans using an adapted format from the U.S.

Another critical component of the program was the daily morning multidisciplinary rounds. One change was that the attending physician, the nurse educator, the long term physician and nurse jointly directed the rounds. In 1987, Hesketh[63] indicated that there was an improved standard of presentation at rounds and the staff was consistently following a systematic outline. Ward rounds on the floors were also occurring more frequently than had been observed in 1983.

A type of continuing education was also promoted as regular didactic lectures were offered to the NICU staff and selected hospital staff, on patient care issues. Also, the long-term physician and nurse worked with the educators in the unit daily demonstrating team patient care management and clinical decision making skills.

Senior nurses were initially brought through the basic and advanced program with help from the nurse educator who guided the nurses in the use of the modules, tested their skill acquisition and served as the preceptor resource in the unit. After three physician courses and two nursing courses, the unit educators assumed the leadership role for the education program. Training programs for improved preventative maintenance and repairs for equipment in the NICU were established in 1984. At the same time, a parallel formal biomedical engineering (B.M.E.) program had been initiated at the university and a full time engineer was hired for a period of 2 years. The program director's report cited that the early successes of the program were the construction of the B.M.E. building on the university campus, the 2 year B.M.E. technicians curriculum, hospital intern programs and the U.S. fellowship program[67]. Equipment and supplies were continuing to be purchased with an increased focus on examining availability of locally made equipment versus foreign-made and the leadership of the hospital was guided by the medical team and the engi-

neers in evaluating equipment pre-purchase.

In 1987, since such strong changes had evolved over the years, it was agreed by the donor and the counterparts that the entire program would be transitioned. So in July 1988, the educational program was transferred to the local hospital administrators and NICU unit leaders and all external financial and human resource support were eliminated.

Site Visit/ 1988-1989

The consultant evaluating the program in 1989 when the program had been self-sustaining for 1 year summarized the following findings regarding statistics : more than 1000 patients had been admitted to the unit since it was opened in 1984, 16 physicians were trained, 25 nurses were trained in the basic course and 12 nurses were trained in the advanced course, and 4 physicians and 1 nurse were offered U.S. fellowships including the director/educator of the unit and the nurse educator. There were a total of 35 U.S. consultants who had visited the NICU including the volunteer program coordinators, physicians, nurses, respiratory therapists and laboratory and biomedical technologists.

There had been some sustained changes with the medical staff. For example, nursing staff numbers for the day and evening shifts had improved although night shift remained the same. Physician coverage had improved and there was more consistent staffing in the unit ; nurses and physicians were conducting daily rounds. Although the physician and nursing roles were slightly more differentiated than in 1988 there remained overlapping responsibilities and there continued to be some struggles with the nurse and physician roles.

Some improvements were also made in facilities and supplies. The unit beds had expanded from four NICU and four intermediate to five and 12 respectively, and now the unit facilities had sinks available in each room. There was an air conditioner installed in the unit and a power generator was provided in the case of a power failure. A small laboratory facility was built next to the unit and trained staff who were able to perform and read basic chemistry and hematology tests but were not able to complete microbiology tests. Some equipment and supplies were now being purchased by the medical staff locally.

However, there continued to be difficulties with the referral process as very few infants were transferred from other hospitals in the province. The report indicated it may have been the result of lack of information from the referring physicians and cost of health care or may have been due to loss of income for the referring hospital[69].

A positive finding in the 1989 visit was that after one year of no outside financial and human support to the unit the leadership of the unit was intact. The director was responsible for managing the unit and providing clinical oversight and the nurse educator and the medical educator continued to offer in service education programs. Also, documentation systems continued to improve with changes in the flow charts and daily patient care notes.

Finally, many of the new procedures and skills taught during the period of the program, were continuing to be utilized despite the absence external support.In fact, the NICU educational program had been offered in the unit for visiting physician and nurse teams from other areas of the country and the program was taught and coordinated by the original medical and nursing educators in the NICU and their senior staff.

Rural Maternal Child Health Program

A major key new activity of the PVO initiated in 1988 was a community outreach program for the care of neonates through the NICU program. As stated earlier the initial assessment team had recommended this program as a priority but the idea was not supported by the university. However, once the hospital program was in place and recognized, the request was made by the Minister of Public Health (MOPH). The request was an acknowledgement that this program was needed to save neonates from immediate health problems such as hypothermia and hypoglycemia and to provide for stabilization of the neonate before they were referred to the NICU in the city.

This rural maternal child health program offered

basic information on the care of sick neonates for physicians and nurses. A program directors report in 1990 indicated the following successes : writing, translating and printing of 18 teaching modules in March 1990, an agreement signed with the Bureau of Public Health (BOPH)/university/organization, a training course held at the NICU for 30 participants from the county hospitals, basic equipment needs met for each referring hospital and provincial and national recognition in the newspaper[68]. Proposed future activities included a township hospital instructor's course and future expansion of the course throughout the province at the request of the BOPH. There were conducted in 1991-2.

To date, the bureau has assumed increased responsibility for the outreach program. The private organization transitioned the outreach program over to the Bureau in July, 1991, although other outside organizations continued for several years to provide limited outside financial and consultency support. The MOPH identified the program as the model for all the country and a meeting was convened a few years ago with the maternal child health (MCH) division of the MOPH to plan for the long term implementation. This program expanded initially to the rural remote areas of the country with the highest infant mortality statistics and has made a significant impact on the statistical data but more importantly on the health of infants.

Biomedical Engineering (BME) Program

The BME program at the university directly supported the BME training needs in the Children's hospital and showed evidence of success by 1990. The program director's report indicated that in November 1980 there was a five year BME reunion of 200 persons involved in developing the program including provincial government officials, students and U.S. consultants. A complete clinical engineering system agreement was also signed between the Children's hospital, an adult hospital and the private organization. This agreement outlined the responsibilities of donor agencies representative, BME director and staff and hospital administration as partners in the equipment management process. Looking toward future progress, the director's report outlined the projected activities that included an instructor training course in preparation for the future transition of the program to the university.

Site Visit/ 1991

In October 1991, a volunteer neonatologist and nurse conducted an evaluation visit to review the neonatal education program in the primary site, to examine its role as a training and referral center and to evaluate neonatal care in two city hospitals for potential NICU development. The primary site was the only location that had received external support since the 1980's.

The team described the overall nursing care practiced in the ICU as impressive within the context of the health care system[69]. Based on the team's interactions with the unit's staff at the bedside and through formal and informal seminars and discussions the nurse noted a good grasp of neonatal pathophysiology[70]. For example, one nurse described the direction of blood shunting with selected congenital heart defects and another nurse was able to list the signs and symptoms of specific defects and recognize the significance of oxygen readings from pulse oximeters.

They evaluated many specific elements of good health care and reported varying degrees of successful changes. The staffing ratio, for example, remained high for the day shift ranging from six to eight nurses for the 17 beds but there continued to be a low ratio of nurses to patient on the night shift with approximately 4 nurses covering the unit. Overall, the staffing coverage had increased from the beginning of the program in 1984 when there were 15 nurses and in 1990 when there were 24 nurses.

In education, the nursing program was being directed by a Project HOPE trained nurse educator who had recently been promoted to the head nurse. The nursing report indicated that the nursing orientation program continued to use the instructional modules developed in 1986-7[70]. Each new nurse attended a 6 week orientation program that included 3 weeks of classroom time and 3 weeks of

clinical experience. The nurses were assigned a preceptor as a resource and in the classroom instruction component, the nurses read and completed the modules and passed each post-test. One drawback the consultants noted was that the books were not being used in the appropriate sequence due to the limited copies available. Later the donor printed them so that they were available for each participant to use and take home.

In the continuing education process the head nurse offered lectures and demonstrations on any new knowledge and skills that either were not included in the modules or had been learned since the initial development of the program and she reported time constraints had limited her availability to provide all she believed was needed.

In 1991, the NICU was the only ward in the Children's hospital that offered a nursing orientation program so the Director of Nursing had begun rotating the other nurses through the unit to give them the opportunity to learn new knowledge and skills. Although the head nurse had experience as an educator, this knowledge had not been passed on to senior nurses/preceptors in the unit. Therefore, the nurse was constantly starting a new orientation class and was not able to focus on providing continuing education to the practicing nurses in the unit. During the site visit, the head nurse indicated that nursing grand rounds had just recently been initiated in the NICU and training was offered to all the head nurses in the hospital. One problem the consultant noted was that the continual turnover of staff affected the long term experience level in the unit.

One constant was the relationship between the nurses and physicians remained hierarchical in nature ; the physicians continued to play the dominant role while the nurses remained passive. However, there continued to be a positive working relationship between the head nurse and the medical director. Although multidisciplinary rounds were conducted in the unit each morning, the nurses provided little input to the discussion, but did recognize the importance of the plan of care established by the child's physician each day.

The medical team's recommendations to the director and head nurse included the suggestion that the head nurse recruit a senior nurse in the unit to assist with the orientation program[69]. The team also felt a preceptor development program needed to be established to assist them in providing instruction to the orientees at the bedside. Since the head nurse was the only nurse who spoke English in the unit, they noted that additional copies of the modules and any other resources in the native language would benefit the nursing staff. Also, the team encouraged the hospital director to provide stable staffing in the unit.

The team also visited the provincial hospitals that had participated in the community outreach program, and although they noted positive outcomes of the program they indicated that the communication and collaboration between the Children's hospital and the local referral hospital was poor[70]. Unfortunately, many infants were only referred once there was significant deterioration.

When the team visited the pediatric wards in the hospital they noted major differences in patient care management from the NICU. The staffing ratios were low with three nurses per 25 infants, for example, and nurses were assigned skills to perform such as sweeping or changing all the infants diapers in the ward. Also, the bed census continued to be high with two infants sharing a crib. In the emergency room, high-risk neonates were assessed and triaged to the appropriate ward, but infants would only be transferred to the NICU if they had the ability to pay[69]. The head nurse had offered lectures to the emergency room (ER) nurses on neonatal assessment and admission criteria, but they were received with limited success. Unfortunately, there continued to be little collaboration between departments in the hospital.

Although there were reported problems in the formal BME program at the university, the medical director and head nurse of the NICU reported that they were pleased with the results of equipment repairs, particularly with the locally made products. In fact, the NICU staff cited that the university BME department had developed an inexpensive IV

syringe pump, since there had been difficulty with the foreign-made pumps (the syringes manufactured cheaply in the country did not fit in the machines). One final positive observation was that the leaders were continuing to look at other means of getting advanced technology in the country.

The medical team also visited two other hospitals in other cities in the country during the site visit. One of which was included as a secondary site in this study. The medical team visited this site, maternal child hospital in the capital city 4 months after the NICU opened. They found a shortage of nurses for the 30 bed ward unit with many nurses rotating through all the pediatric wards and there was only an informal orientation program with no formal classroom instruction. The team assessed the need for the nurses and doctors to learn both basic and advanced concepts, develop clinical skills and learn how to implement a formal education program[69]. Fortunately, they found the director of nursing for pediatrics enthusiastic and interested in learning how to teach her staff : she asked questions about staffing, learning new skills with the advanced equipment, and nursing orientation. Overall, the medical staff was knowledgeable and receptive to learning and some had received training outside the country.

The medical team recommended that the nurse-physician team from the maternal child hospital visit the primary site to train for a period of 6 months. This recommendation was similarly made at another city hospital in western part of the country where physical facilities were poorer with limited functioning equipment, but the educational preparation of the medical nursing staff was comparable.

Consultant Visit/ 1994

In a follow up to the original program it was found that many courses stemming from the original education had been offered at the primary site[70]. From 1990-1993 the NICU conducted four training courses, each one 4 to 6 months in duration with a total of 60 participants, physicians and nurses. The trainees came both from this province and others and two of the participating hospitals returned home and conducted their own courses.

Having reviewed the historical documents selection of the sites that grew out of the primary site were selected on a convenience basis directly influenced by time and accessibility. First a description of each of the units, the primary site and the three sites initiated from education at the primary site.

The interviews and observations were conducted at each site and summarized with the focus on major themes that present that are also seen in others studies cited in the review of the literature.

Primary Site NICU Description

The primary site for the research was a pediatric university affiliated hospital in a southeastern coastal province. It was at this site that the neonatal education program, its curriculum and all training activities were developed and conducted between 1983 and 1988. Long term and short term nurses, physicians and allied health professionals from the donor agency provided complete clinical instruction at the hospital. This was a 360-bed pediatric hospital affiliate of a provincial key university whose mission was clinical medicine. The university had 70 teaching divisions, 70 laboratories, and an enrollment of 4000 students earning degrees at the bachelor's, master's and doctoral levels. The hospital is the only pediatric tertiary care institution in the province, and its neonatal/pediatric intensive care unit since the program has 19 neonatal beds, three of which were designated for pediatrics..

Key observations were conducted during both medical and nursing rounds and during the change of shift report in the morning. The medical director and head nurse of the NICU were present during the rounds. Interviews were conducted in a group.

NICU A : Pediatric Hospital

Description of Site

The first secondary site studied was a pediatric hospital in the capital city. The hospital served as a teaching hospital for universities in the city and was

responsible for the training of medical and nursing students as well as hosting approximately 100 professional trainees each year from other provinces. It is a 700 bed facility caring for children up to the age of 13. There were 1700 hospital staff including 470 physicians, 600 nurses and 200 technicians and support staff.

The pediatric institution has 24 wards with approximately 15,000 admissions per year. The NICU had a capacity of 15 beds but generally has an occupancy of 10 beds with 14 nurses and six physicians. There were three shifts with six nurses and four physicians working the day shift and 2 nurses and possibly one resident available on nights and evening shifts. Staff physicians were rarely, if ever, called in the evening or night.

The medical director of the neonatal unit learned of the NICU Education Program at the primary site and had elected to have one physician and three nurses visit the hospital in 1989 and 1990. Each of the nurses interviewed at this site had visited the primary site for a period of six months to complete the formal NICU education program. Training modules and clinical practicums were used during the length of the program and there was limited classroom instruction in the program.

Data Collection and Process

Similar to the primary site, appointments were conducted as group interviews ; there were no individual meetings. With the use of the guide, and in the presence of the Medical Director of the NICU questions were asked of the three nurses who visited the neonatal unit at the primary site in 1989 and 1990. The interview was conducted in a conference room separate from the NICU and there were no time limitations on the interview.

Observation time was granted following the conclusion of the interviews and then both the nurse and the physician in charge accompanied the interviewer to the unit. The researcher asked questions and documented the responses and any observations made.

NICU B : Maternal Child Hospital

Description of Site

The second secondary site studied is a 500 bed university affiliated maternal-child hospital in the country's capital city. The university currently has eight schools with 17 research institutes and 12 research centers and this hospital was an affiliate of one of its earliest established national medical schools. Degrees are conferred to students at the undergraduate, graduate and doctoral level.

The neonatal unit has an occupancy of 16 beds and the medical staff included 15 nurses, a head nurse and approximately seven to eight physicians. Nurses worked three shifts with seven to eight on the day shift and generally two were scheduled for the evening and night shift.

A nurse and a physician from the NICU had visited the primary site for four months and participated in the written and clinical components of the NICU Education Program. The participants spent one month studying the training modules and three months practicing and learning in the clinical unit.

Data Collection and Process

This secondary site was chosen because a nurse and physician from the unit had visited the primary site and participated in the formal education program.

The meetings were conducted in small groups and those present for the interview were the head of neonatology, two NICU physicians, one head nurse and one department nurse educator. At the hospital there was no limit to the time spent in the interviews.

The interview began with the head of neonatology present and after approximately one hour of discussions she departed leaving the remainder of the staff to answer questions. The interview guide was used for the session followed by some general discussion. After three hours of discussion, the interviewees invited the researchers to lunch which provided an opportunity for an informal discussion.

An observation was made of the NICU following the interviews and lunch. The medical director of the NICU and the head nurse, accompanied through all the rooms in the NICU including the physician rooms and the unit conference room. Stops were made in patient care areas allowing dialogue and questions which provided some unsolicited information about the unit activities. The physician and head nurse were quite interested in showing their educational plan and teaching materials used for physicians and nurses.

NICU C : Pediatric Hospital

Description of Site

A final site visited was in a pediatric facility that cared for children under the age of twelve. Located in the largest coastal city in the country it was a primary teaching hospital for physicians and nurses from the local universities. The facility previously had relationships with medical professionals from the United States, Australia, Japan, Canada etc. It had 300 beds with 800 physicians, nurses, allied health professionals and administrative staff, 7 departments and more than 15 sub-specialties.

The intensive care unit had a medical staff of six physicians that rotate between the NICU and the outpatient department. There were 15 nurses for the Intensive care Unit (ICU). In the ICU there were 10 neonatal ICU beds and 10 pediatric ICU beds. The nurses worked three shifts with five nurses on day shift, two on evenings and two on nights.

Data Collection and Process

This third secondary site was selected because a nurse and a physician had visited the primary site in 1989 for two weeks but did not participate in the formal neonatal education program.

A site visit meeting was scheduled but the director of the hospital chose to have a half hour private meeting first. The medical director of the neonatal intensive care unit then joined the meeting just prior to the meeting with the nurse educator to the ICU where the head nurse was met.

The interview at this hospital was difficult to conduct since there was no separate time set aside for the interview. In fact, the discussion with the director of the NICU and the head nurse was conducted in the unit by the bedside. This was the best and only opportunity to ask questions ; therefore, the questioning and the observational times were overlapping .

In the ICU the researcher spoke with the nurse and the medical director who had visited the primary site and the current practicing nurses in the unit. In comparison to the previous sites the time allocated for the interview was limited. The medical director discussed the patients in the NICU and made repeated requests for equipment during the discussions. Time available with the staff in the unit was limited and observations were limited to direct observation of a few nursing care activities.

Analysis of Semistructured Interviews and Observations

The following is a summary analysis of the final semistructured interviews and the observations. Common themes identified in the interviews and observations at the primary site indicated that after 10 years the training activities continued to exist. Since 1988, the head nurse/educator and the medical director had continued to provide leadership for the NICU and they continued education programs and orientation programs for the NICU staff. Technology transfer was evident in the NICU and in the pediatric cardiac ICU in the hospital. There appeared to be a reinforcement of the linkage between clinical practice and new knowledge. There were limited interactions between the university schools and the hospital. The data will be presented according to themes generated : training, political context, mutual respect and negotiations, economic factors, and other influences.

Training

From the interview questions, it was verified that training had continued in some areas. For example, there had been formal nursing orientation programs offered at the primary site and the new nurses continued to be required to complete the basic nursing modules. Also, the head nurse, reviewed one to two procedures with the nurse and expected the senior nurse (an assigned preceptor who generally had 5 years experience) to reinforce the procedures when the new nurse was practicing at the bedside. Neither physicians nor nurses were allowed in the unit unless they had one to two years experience in the other wards.

On the other hand, the physicians no longer received a formal education program each rotation and the medical director indicated that she offered one every 2-3 years due to lack of senior medical staff to support it and lack of books.

The NICU had some continuing education activities such as the head nurses lectures on patient care topics when patient census was down. Also, the physician and nurse demonstrated a search for new knowledge during the interviews and discussion. The nurse was receiving a neonatal nursing journal until 2 years ago when her subscription expired, and she had not been able to renew this herself due to cost. She also requested assistance in acquiring new learning resources for herself and the staff nurses. The physicians too have at least one current book on neonatal care but were concerned about the lack of availability of neonatal specialty books in the country.

Another sustained change was that the multidisciplinary medical team continued to conduct rounds at the bedside each morning. Although, senior nurses were expected to attend, the head nurse indicated she was unable to attend as often as possible due to her administrative responsibilities. During the rounds the physicians examined the flow sheets and asked questions on areas such as apnea and feeding.

Procedures and skills about documentation also continued to be taught by the senior staff. The head nurse discussed the process for updating the procedure manual when new pieces of equipment were purchased and new skills learned and the senior nurses and the head nurse were responsible for revising the manual. Flow sheets and nursing care plans were completed on each patient in the NICU, procedures not required anywhere else in the hospital.

Parents were still allowed to visit three times a week, and were able to remain in the unit for 10 minutes depending on whether or not the nurse or physician determined that the unit was busy. This was in contrast to the pre education situation of extremely limited visitation for one family member.

There had been no specialized external support since the withdrawal of the organization in 1988 with the exception of a physician and a nurse from West Virginia . They were general pediatric specialists who spent 3-4 weeks in the city and conducted several rounds in the unit and the outpatient department.

The basic health precautions were being observed in 1994. During the unit visits there were 14 patients in the NICU and the intermediate nursery, and the NICU was clean and neat. There were four fire extinguishers noticeable as you entered into the unit hallway, and on the right was a clean room where visitors were expected to wash their hands and use a separate hand towel to dry each time. There were approximately 25 clean cloth hand towels available and there was a bucket on the floor that was used for towel disposal. The sink faucets also had sensors attached to turn water on and off in order to limit the contamination of the hands.

In both rooms physical aspects reflected continued use of former training. Each bedside had an Ambu bag, a patient card completed for emergency medicines, a stethoscope and thermometers. At each bed in the critical care room there were bedside monitors and two monitors in the intermediate nursery, and both rooms had oxygen tanks and floor suction. Also, a desk was located at the center of each room for the nurses and physicians to chart and there were Disney characters on the walls and colorful toys near the bedsides.

In the morning the medical director conducted

unit rounds which demonstrated retained training. Each bedside nurse participated in the rounds, but the head nurse spent limited time due to requests for assistance from other staff nurses. Prior to touching the infants, the nurses and a few physicians washed their hands, however they had been told to wash their hands prior to the beginning of rounds. Also, each nurse was observed doing a comprehensive physical assessment at the beginning of the morning shift using the neurological system as instructed in the educational program.

Flow sheets were in use at each beside with nursing assessments documented every 2 hours. The patient charts nursing showed that care plans were completed on each infant and nursing and physician notes were integrated in the chart, so training information about documentation was still being used. In fact, in the main area of the NICU a chart was displayed classifying patients in the unit with the color red indicated critical condition, the pink intermediate and the green a new patient.

Concerning written materials, a resource room existed within the head nurse office, where there were four book shelves with books 5 to 10 years old. The policy and procedure manual was there and contained new procedures written since the program was transitioned to the counterparts. During the observational session a new nurse asked a senior nurse a question and was directed to the procedure manual.

Supplies were well stocked and guarded. There were a number of locally-made isolettes, syringe pumps, intravenous tubing, nasogastric (NG) tubes, isolettes and t-connectors visible in the unit and nurses were using the equipment without difficulty. Also, there was a stocked emergency cart in the hallway and each room in the NICU had shelves with daily medical supplies needed so nurses did not have to leave the room and their patients bedside. Each nurse was assigned to a room so that it was never left without a staff nurse present.

There were many common themes found at each of the secondary sites that had received long term instruction at the primary site. First, the two secondary sites in the capital city had implemented a formal education program which consisted of orientation and continuing education programs. Their education programs used the original learning modules and the preceptor model for both the physicians and the nurses. Second, educational resources were revised based on the need for additional information in the program or the use of different equipment and supplies and a policy and procedure manual was in the unit. Technology transfer from the primary site to the other sites was evident. Fourth, the leadership who visited the primary site was consistent in the NICUs. Fifth, clinical application of new knowledge was emphasized in the unit so that there was a balance between didactic lecture and clinical experience. Sixth, both units served as training sites for nurses and physicians from other areas of the country and there was a general interest in acquiring new knowledge. Finally, there was limited university faculty interactions in the unit and varying levels of outside consultants.

Originally, three nurses and one director of the unit had gone to the primary site for 6 months at the invitation of a physician and nurse from the primary institution who visited the hospital in 1989. Two attended training sessions in 1989 and two in 1990. At that time, there was limited classroom training at the primary site. with the exception of the "blue books" so they were taught primarily in the clinical setting with the use of the book. When they returned from their learning experience at the primary site, the nurses and physicians set up a NICU separate from the PICU in 1990.

During the observation, the staffing had improved since the beginning of the educational program. There were 14 nurses and six physicians and at that time the staffing pattern for nurses was six on days, two evenings and two on nights. The physician staffing was four on days, and one on evenings and one on nights. Previously nurses were accepted into the unit once they had 2 years of experience but in 1995, due to a shortage, nurses had been accepted with less practical experience.

By the time of the final observation, there were still key educational strategies in place. A NICU education program was developed for the nurses

that included using the "blue books", special lectures and additional material from accumulated experiences on such topics as oxygen therapy, respiratory support and thermoregulation. The head nurse and the senior nurses trained the new nurses then gave an exam consisting of questions from the "blue books" and questions they developed independently based on the conditions in their NICU. The nurses indicated that the key concepts they learned from the primary site program included : patient assessment, nursing care plans, documentation and the basic system for implementing care for critically ill neonates using process and procedures. When a trainer was uncertain about a procedure the head nurse indicated that either the senior nurse would teach the trainee herself or would direct the new nurse to the policy and procedure manual if it was not an emergency.

Continuing education was also being offered by the hospital and, in fact, it was two nurses who were responsible for education in the hospital. Staff could attend training for 1 week to 10 days to focus on specialized education and, in special cases such as the neonatal education course in 1989-90 they could study for 6 months. Some nurses in the NICU had been sent to learn how to do an electrocardiogram (ECG) while others had learned from technicians how to do blood gases. Also, teachers from the nursing school offered lectures in the NICU periodically. Nurses had also been offered the opportunity to study English but they were required to pay for it. In 1996, for the first time selected nursing students would receive their clinical instruction in the unit for 7 weeks. One positive outcome was reported by the head nurse : there was no difficulty retaining nursing staff in the unit because the nurses had more access to continuing education in the NICU than in other wards of the hospital

Shift report was done with nurses and physicians every morning in a circle. Later in the day attending physicians conducted rounds with the resident physicians and nurses having their own separate rounds. The head nurse made the daily assignments and staff nurses had the same patient for 1 month.

There were indications also of outreach education. For example, a few nurses visited another site, NICU C, to receive training, but the nurses indicated that there was only one visit to the site from NICU A because they could not see or learn anything new. They felt the primary site offered an opportunity to learn a systematic approach to neonatal care ; documentation, nursing care plans, patient notes, physical assessment. NICU A served as a training center itself. In fact, the nurses were able to identify 15 cities that physicians and nurses had visited from both from within the city and from outside province. The same formal orientation program was given to the visitors which included the " blue books", lectures and clinical practicum.

This unit was large, neat and clean with a long nurses desk located at the entrance. The facilities appeared newer than the primary site but slightly older than NICU B. The nurses wore colored uniforms and all were required to wear watches pinned to their uniform to remind about and to promote hand washing and therefore prevent infecting the neonates.

There were signs that written information was also important. The physician's room, for example, had both nursing and medical books located in it and there were procedure manuals for physicians and nurses. New written educational information was located on a white board next to the nursing station. The head nurse indicated that this information was offered to the experienced nurses for continuing education and that the new nurses were expected to read it since there was a possibility questions from it would be included on their test.

In the care of the neonates, procedures showed the retention of post training. In the NICU room all infants were positioned on their sides with a neck roll, they were not restrained, and the intermediate care infants were held and rocked by the nurses. There were also flow sheets at each bedside which resembled the ones in the primary site and NICU B and each room had a nursing desk for charting. Vital signs were being taken on the neonate every two hours and nurses documented the infant's status each hour on every patient.

Modern equipment, for example, oxygen satura-

tion machines and bedside monitors were in use in the NICU rooms. There was also locally-made equipment visible such as oxygen cannulas, Ambu bags and the syringe pump made in the same city as the primary site. The main room had a sink with an automatic disinfectant machine, but the secondary room had a sink without a soap dispenser.

Concern for families also showed teaching influence. Now parents were allowed to visit in the unit twice a week but if the neonate was sick they were only permitted to visit for a brief period of time. The physicians talked with the families outside the unit.

During the visit a nurse visiting from another province was interviewed. She had been studying in the unit for 6 months and indicated that during the time she learned about new equipment, new skills and how to practice as a NICU nurse. She had taken part in the formal education program in the NICU and was departing the next day to start a new NICU in her sponsoring hospital. There, she would assume the position of head nurse. She noted that she had received a copy of the written materials including the "blue books" and a copy of the policy and procedure manual originally from the primary site. It was clear that the dissemination of information to other institutions was vital and continuing.

In 1991, a nurse and a physician in NICU B had visited the primary site for training for 4 months. They had 1 month of formal instruction with the "blue books" and 3 months clinical practice with preceptors. Prior to the staff's study, high risk neonates were cared for on the ward but after the program the physician and nurse returned to the hospital and in one year established a new NICU.

In 1995, there were 16 beds in the NICU and the medical staff consisted of 15 nurses and seven to eight physicians. There were currently three senior nurses with more than 12 years experience in the hospital. Nurses generally needed previous experience in the ward prior to training in the NICU but due to the shortage of nurses there were four new graduates in the unit at the time of the interview. The nursing staffing pattern included seven nurses on days, two on evenings and two on nights and the physicians generally had four on days and one on evenings and one on nights.

There were visible signs of the continued strength of the written work done in 1985-1986. One week after the team had returned, in 1991 they began to train and to date 25 nurses had received the specialized training using the "blue books" and the fourth group started the week after the 1996 site visit. The head nurse and the physician continued to use the "blue books" from the program : they had two copies of the nursing modules and two copies of the physicians' books. The head nurse had also established a nursing orientation program and cited the most helpful books as respiratory and oxygen therapy, nasogastric feedings, intravenous therapy, thermoregulation and infection control. She described the books as simple, precise and to the point and requested additional copies for the unit.

The nurse had also established an orientation schedule with assigned preceptors. They used the modules which had changed based on the differences in equipment, supplies and procedures in the capital city and each group of new nurses was tested using some questions from the "blue books" and new questions developed by the head nurse. When questioned, the nurses recommended that other specific modules could be updated such as infection control but they had not as yet undertaken the task.

Continuing education also existed in the NICU for the nurses. Although the NICU had not benefited from any external international nursing education support and nurses had not been afforded the opportunity to date to study abroad, they learned new skills from their physicians and nurses in the hospital. Nursing rounds were conducted every month, and occasionally in-services were offered on special patient cases, and head nurses, physicians, and the unit director gave lectures once a week. Also, head nurses and senior nurses had studied the advanced modules from the original program at the primary site. The physician group had lectures once a week on specific diseases, but they did not have a formal education program. About five to six nurses in the NICU spoke English and there was opportunity for

nurses to receive full-time English training for 6 months. The nurses wanted more education and commented that they would be able to receive new knowledge once they have the ability to read new books and journals.

The physicians and nurses had continued many procedures introduced by the original education program. For example, clinical practice was evaluated by the head nurse. Each morning the she arrived at 7 : 40 a.m, examined the patient care of the night shift and wrote suggestions for the day shift nurses. Also, every three months new nurses are evaluated by the head nurse and the senior nurses. Another sustained influence was that patient information was shared between shifts. The physician, assigned to night shift, worked until the lunch hour the next day, then physicians and nurses gave report together in a circle each morning. They stated that it was an interactive discussion, particularly in critical cases. The flow sheet from the primary site was revised and adapted for the unit and was used by both nurses and physicians.

This unit had served as a training center for other hospitals in the city and other provinces since 1991. They were able to highlight four sites that had visited their NICU. The medical visitors generally stayed at the unit for 3-6 months and the visiting nurses were expected to read the "blue books" during the first 3 months.

This unit was new and very spacious and all visitors were instructed to gown and put shoe covers on prior to entering the unit. There was a designated head nurse office that served as a learning resource center and there the head nurse showed the team the "blue books" and some of the revisions. She also had an outline developed for each trainee, and had a schedule showing the plan for each nurse that included the designated lecturer. She made available a recent test that she used for the new nursing orientees. Again, it was clear that education was still playing a major role in this NICU B.

Supplies and equipment were modernized. There was a large critical care room with wall oxygen and suction and pedal sinks with automatic soap disinfectant and paper towels. Also, there was advanced neonatal equipment in the unit such as respirators, oxygen saturation machines and medical supplies. Both a procedure and an IV cart were located in the room and air conditioner was on and the windows closed.

There was direct evidence of transfer and retention of information on critical care. Not only did each bed have a bedside monitor, name card and a patient chart, but a flow sheet was also clipped to the chart which resembled the one at the primary site and the one seen at NICU A. Each of the five beds there at the time had a locally-made Ambu bag and an IV syringe pump. The nurse and physician indicated that they learned about both pieces of equipment from their trip to the primary site, so when they returned to the NICU they ordered the equipment from the same company. The nurse also showed a bulb syringe which was cut and taped to be used for chest physiotherapy on the infants. Again, this modification again was learned by the nurse at the primary site.

The nurse indicated that they had learned many procedures and systems from the primary site. For example, intravenous lines were changed every day by the staff nurses and syringes for the pumps were changed each time a new medication was administered. The IV tubing had ports available for giving medication so the nurses would not have to disconnect the lines each time they gave medicine and oxygen was being periodically monitored in an O2 Hood of one neonate. Other observations were that all the infants were positioned on their sides with no noticeable restraints. Nasogastric tubes were taped to the nose. In the center of the room was a desk where nurses wrote their notes, they checked the vital signs every two hours and documented on the neonate each hour.

The second room was used as an intermediate room. Here, the infants were discharged and were bundled lying on their sides with no restraints. The facility was similar to the critical care room but there were a few exceptions including open windows and the absence of towels at the pedal sink.

As previously explained the interview and the observation time at NICU C overlapped at the

hospital. There was minimal time to speak with the director of the unit and the head nurse. This unit did not have the same themes as the other secondary sites. The director of the unit had visited the primary site for 2 weeks and Germany many times over a 4 year period. The head nurse had received training in the US for 3 months, but the visit was not part of an educational program but was the result of a relationship between a university and the hospital.

Here, the nurses rotated through the unit every 3 years and there was limited continuing education in the unit for nurses. Although physicians offered lectures once a week and nurses were able to attend, there was no special training for new or experienced nurses in the unit. For their orientation, new nurses worked for 2 weeks with senior nurses.

The unit was large and neat and relatively new and the infants were lying on colored bed sheets. The windows were open and the air-conditioner, although present, was not operating. There was some advanced equipment in the unit such as monitors and ventilators and there was some locally-made tubing available in the unit. The director of the unit noted that the difference between this NICU and the primary site was the volume of disposables the primary unit had in it and he believed this was important.

Political Influences

A common theme of all the sites was the strong support from the university and hospital for the development of the NICU. In the 1980's and 90's the country's government was encouraging the development of high technology units such as a NICU. In fact, the health care reform focused on the development of tertiary care centers and de-emphasized the primary care settings. For example, requests from the government and the universities were made to external agencies for support in building the technological capabilities and the government backed the continuing replication of NICUs throughout the country. Because these units were located in the capital city they were in a strong political position in the country and therefore were offered more opportunities than the primary sites to build new modern facilities. Due to NICU C's relationship with universities and governments outside the country, they too were able to develop modern NICU.

Internal hospital politics had differing effects on the units. In the primary NICU, NICU A and NICU B the medical director and the head nurse of the units have taught others as they were taught in the original program demonstrating a trainer of trainers model however, NICU C demonstrated less of this teaching philosophy as it relates to the educational program. There was strong medical direction in all the units with more collaborative activities outlined in the primary site and the 2 secondary sites, A and B.

Politics did not seem to influence equipment purchase. In fact, all units described the same system for the procurement of equipment and the directors of the hospitals indicated that they did not have a choice as to the price of equipment as all of it was a fixed price.

Economic Factors

There were common themes noted with all the institutions regarding funding. The hospital directors controlled the budget for each hospital ward, and were continuing to be supportive of the NICUs educational programs. However, the unit budgets varied between the NICUs studied. Medical and nursing staffing had improved since the beginning of the units.

In all institutions selected nurses were afforded the opportunity to take courses within the country, that a few studied abroad. In each unit visited, at least one physician had the opportunity to study overseas. There were limited external financial and material resources placed in each unit. There was a standard patient charging system that each unit director was able to define.

One major result of the change introduced in 1984 was the expense involved in continued efforts to use the specialized supplies. After the termination of external support the head nurse and the medical director of the primary unit realized that they could

not afford to continue to use all foreign made medical supplies. Unfortunately, this issue had not been addressed prior to the program being transitioned. So, the team, with samples in hand, visited factories in the province and showed them NICU specific supplies required to care for the neonates. After many trials the factories in the province began to make electrocardiogram (ECG) pads, T connectors, NG tubes, Ambu bags and IV tubing. During the original education program a company in the city began making a syringe pump. This new product was significant because the locally-made syringes did not fit on the foreign pumps, thus requiring the purchase of expensive syringes from outside the country. In the case of the primary site, a lack of finances prevented supply purchases outside the country.

The locally-made syringe pumps were also used in NICU A and NICU B. In both units the staff indicated that they learned about these devices during their studies at the primary site. Financially, NICU A was able to purchase a great deal of foreign supplies including IV catheters, but smaller items such as NG tubes, suction tubing and syringes were procured inside the country. NICU B also used supplies made in China but indicated, possibly to stress perceived better quality, most products they used were foreign made. NICU C used a small amount of locally-made but referred and had the capability to purchase foreign equipment and supplies. This unit was financially supported by UNICEF for five years from 1984-1989 and during that time a major focus of the program was the procurement of technology. Thus each unit had elected locally-made equipment and supplies although the budgets of NICU A , NICU B and NICU C were much larger than the primary site.

Educational resources were directly impacted by financial resources. For example, the primary site had limited educational resources and though they continued to use the "blue books" they had only a few remaining copies of each. The head nurse indicated that the cost of copying was $ .50 /page which they considered too expensive within the confines of the unit's budget. NICU A and B had learning resources available and were able to develop new materials but they also had concerns about the costs of copying. NICU C had only what the medical director received during her visits overseas.

The primary site was conducting training programs for outside physician and nurse teams until 1994 and was a source of some income. Each pair received one set of books and the hospital charged for the dormitory room and the "blue books". Actually, the course had been stopped for a few years due to the shortage of staff in the NICU but the medical director indicated that it would be restarted in 1996. NICU A and B also hosted many trainees from other parts of the country and it is assumed that they charged the hospital for the same expenses as this is not an unusual practice host teaching facilities.

Finances also directly impacted on the personnel. For instance, there was a problem of retention of nursing staff in the NICU at the primary site. Nurses were paid less in the NICU than nurses in the general ward because bonuses in the hospital were based on the number of patients cared for the ward nurses would receive monthly bonuses of 200-400 RMB while the NICU nurse would receive 100 RMB. This was not cited as a problem in other NICUs, in fact, they indicated that they had better retention because, unlike the rest of the hospital wards, nurses were offered educational programs in the NICU.

In some of the sites B.M.E. services existed and in its absence the nurses were expected to perform preventative maintenance. The trained B.M.Es from the primary site program continued to repair broken equipment but due to the shortage, (there are 3 BMEs for the hospital), they were unable to do preventative maintenance. If there were larger problems in the NICU the head nurse called the B.M.E. department and they would either look at it the same day or get the manufacturer to look at it. NICU A had two nurses who took care of minor repairs but primarily focused on preventative maintenance. One of the nurses graduated from a 3-year B.M.E. course and the other nurse has been trained

by the manufacturer. (Actually, these nurses did not count in the staff nurse numbers as they do not care for patients). They were also responsible for working with ECG machines, sterilization etc. In NICU B, B.M.Es had a maximum of 3 days to fix broken equipment and if it could not be done the manufacturer would be called in. The B.M.Es did preventative maintenance every 3 months while nurses were also expected to do regular maintenance. NICU C did not describe any BME services.

There were also internal and external finances that influenced continuing programs. At the primary site, the director of the hospital controlled the budget and if the unit needed more equipment it made a request to the director. Despite the fact that it was expensive to operate, the director cited her support for the unit. At all sites the sources of revenue came from the government and from patient care, which included the use of equipment and the pharmacy so, the larger the hospital the greater the financial resources for the program. As an example, the cost of a respirator was 280,000 RMB or approximately $50,000 and the patient use was 2.5 RMB/hour/respirator or $.50. These patient charges were consistent at each site. The patient's and hospitals ability to pay varied between the sites.

At NICU A budget control rested with the hospital directors committee and the unit requested equipment and supplies when needed. NICU B noted that there was strong of support from the president of the university because the Ministry of Public Health supported the affiliated university. NICU C had equipment funded by the health bureau, the director of the unit was supported by the hospital director and they received support from UNICEF and other foreign universities.

Interviews and Observations :

Primary Site , NICU's A, B, C

In 1983, the funding international organization was invited to the primary hospital by the President of the university and in 1983 to 1984, following an assessment team visit and negotiations on program goals and objectives, the program was initiated. In the 1995 interviews the medical director indicated that she had felt a part of the initial team with foreign medical faculty in the planning and implementation phases. But, the reports indicated that this was not true prior to the 18 month evaluation and revision of the curriculum. She reported in 1995 that she had been able initially to disagree with the organization if what was planned did not agree with the local culture. She noted that all the physicians and nurses from the outside organization wanted to be helpful and see the program succeed.

At the primary site, the head nurse had been actively involved in the development of the first nursing modules. She not only assisted in adapting the content to make it culturally appropriate but she was involved in back translating the modules after they had been translated into the native language by a firm outside the country. She also helped design the teaching schedule for the trainees in the unit. On the other hand, the medical director played less of a role in the detailed development of the educational program but approved of the program when completed.

In NICU A and B the medical directors and the nurses had coordinated their efforts in developing initial educational programs. In fact, those who were trained at the site needed to work with the administration of the hospital when designing, developing and implementing the new program. Lectures and tests were reviewed by the medical department and, if required, by the chief of nursing education. NICU C also had to work with other departments in the hospital when they established the unit. In all, the various educators had worked together to implement an education program and establish a NICU.

A common theme in all units was the negative impact on finances due to the expansion of other NICUS in the country. Also, referral systems remained primitive, in part due to the cost of the infant's health care which parents were required to pay. Despite this, NICU A and B had strong economic context due to interrelation of other factors such as the political context.

It was evident through both observation and inter-

view that the primary site had the least in financial resources ; all the secondary sites had more financial, material and human resources. In all units the staffing was considered by the staff itself to be fair while the salary was thought poor. The primary site was the only site that discussed severe problems with retention due to salary and bonuses.

Each site discussed patient census and unit financial loss based on the numbers of patients and location of site. For example, the hospital director of the NICU at the primary site indicated that the rural patient population could pay for care but the families who live in the mountains can not and in their hospital this caused great difficulty. In 1995, the BOPH and the Bureau of Finance (BOF) helped support the needs of the primary unit at a level of about 1 million RMB per year but this hospital was the only children's hospital in the province. The director stated that the province is one of the poorer ones and therefore if children need treatment they would come to the hospital but may not be able to pay the expensive costs of the NICU so the hospital was left with the financial loss. In consensus with these observations, the hospital administrator at the primary site said intensive care units in China could lose money depending on the location of the hospital. Other sites noted the loss of money if patients could not pay. Costs for equipment and patient care services were the same at all sites.

All sites noted that sometimes children were taken home if their parents could not afford the cost of the care. Physicians indicated at all institutions that they could not have private practice with the exception of the surgeons.

The hospitals all identified the adverse effect of increased expansion of NICUs in the country on their own patient census. With decreased census in these units there was no income. Some institutions noted the change in the level of acuity in the units with intermediate infants occupying critical care beds. This may have been a result of the changes in census.

Strength of Implementing Institutions and Program Integration (administrative)

Themes identified in the selected institutions included the long term retention of the hospital directors, medical directors and head nurses. Senior nurses were present in many of the units. All the sites were serving a referral and training centers although in NICU C there was no formal education program for visitors.

At the primary site the head nurse began working in the hospital in 1976 assumed the role of nurse educator in 1984 and became the NICU nurse manager in 1989. The medical director of the unit started in 1983. The hospital director had been in that position for 7 years. The NICU at the primary site had four senior nurses and three physicians with 5 years experience and one with 10 years. The medical director and the head nurse were present throughout the implementation of the educational program. They both indicated they had a strong collaborative relationship despite the fact that physicians and nurses did not have equal positions in the country. During the visit a positive relationship was noted between the hospital and medical director and the head nurse.

In the primary NICU there were now support staff available. Two women had been hired to do cleaning in the unit. Prior to the educational program, this was the primary responsibility of the nurses.

The primary site had an admission rate of 400 neonates per year. Most neonates come from the same province, but some come from other provinces. The plans at the time of the visit were to expand the neonatal beds. Since the conclusion of the program a coronary care unit has been started separate from the NICU. The CCU was using similar procedures, documentation and equipment and supplies. The "blue books" were available for the staff in the NICU.

As the only pediatric institution in the province, the hospital director noted it was very powerful. The hospital though, was the lowest in the priorities for the local government due to the size and the income of the adult hospitals.

When questioned about the educational program, the medical director indicated the reason they believed the program succeeded was that the head nurse and the director were willing to accept change, the leadership was stable and the relationships between the staff were positive. The head nurse indicated that there continued to be challenges working with other units in the hospital, with the exception of radiology. Blood gases continued to be done in the NICU as they were when the collaborative program was operational. They felt that since they have friends in certain departments they were able to get laboratory results and medications from the pharmacy.

The primary site has served as a training center for physician and nurse teams from within and outside the province. By July 1995, the unit had trained 60 medical and nursing staff. At least three secondary units had been started as a result of the visits. The medical director and the head nurse of the NICU had given lectures and made visits to other units in the country as well.

NICU A had a head nurse with 10 years clinical experience and had been in the current position for two years. The previous head nurse was getting her associate degree in nursing. A medical director had been in the unit since 1989. At the time of the visit the hospital director who used to be the Director of the NICU 5 years ago is now both the hospital director and the director of the ICU which includes the Pediatric Intensive Care Unit (PICU) and the NICU. The unit had two people that helped with cleaning and delivery of laboratory tests although nurses still did some cleaning in the unit. They attempted to hire two retired nurses to clean but indicated it did not work out. NICU A has served as a training site for nurses and physicians. They have traveled from over 15 cities in the country. The unit was also a referral hospital admitting neonates from nationwide locations.

NICU B started their unit within a year after their visit to the primary site. The unit was new, well equipped and well staffed. There were three people that served as aides in the unit. The nurses continued to clean medical equipment but do not clean floors and laundry. The unit had consistent B. M.E. support. Most neonates were admitted from the outpatient clinic or the maternity ward. Some infants came from the country side and other provinces. The unit had served as a training center for primarily physicians and some nurses. The medical director was able to identify at least four cities that have sent medical and nursing staff for training.

NICU C had a head nurse with greater than 6 years experience and the physician had 10 years experience. There were senior nurses in the unit. Neonates were admitted from rural areas surrounding the city, but there was significant competition in that there are three other NICUs in the city. The medical director indicated that nurses and physicians have visited the unit. They did not have a formal education program for the medical or for nursing staff.

Mutually Respectful Negotiation Process

A common theme with the primary site and NICU A and B was the importance of coordination between the medical and nursing leaders in developing and implementing the education program. It was essential that the primary site and the external PVO established mutually agreed upon goals and expectations and worked as partners in the development, implementation and evaluation of the program. Also, interdepartmental cooperation was key at each site when introducing the technology intensive unit.

In 1983, the international organization was invited to the hospital by the President of the university. Following an assessment team visit and negotiations on the program goals and objectives, the program was initiated. Although the medical director during the interviews indicated that she felt a part of the team with foreign medical faculty in the planning and implementation phases the reports indicated that this was not true prior to the 18 month evaluation and revision of the curriculum. The director felt she was able to disagree with the organization if what was planned did not agree with the local culture. She noted that all the physicians and nurses from the outside organization wanted to

be helpful and see the program succeed.

At the primary site, the head nurse was actively involved in the development of the nursing modules. She not only assisted in adapting the content to make it culturally appropriate but she was involved in back translating the modules after they had been translated into the native language. The head nurse helped design the teaching schedule for the trainees in the unit. The medical director played less of a role in the detailed development of the educational program but approved of the program when completed.

In NICU A and B the medical directors and the nurses coordinated their efforts in developing educational programs. Those who were trained at the site needed to work with the administration of the hospital when designing, developing and implementing the new program. Lectures and tests were reviewed by the medical department and the chief of nursing education. NICU C also had to work with other departments in the hospital when they designed the NICU but educational activities and coordination were limited.

Study of these units provided support for the sustainability of transfer of a high technology program. The concepts essential for the development and operation of the program were not only transfer to the original site but also to many sites throughout the country from teams who came to study at the primary site. Each of the NICU programs that have developed have different characteristics which verifies the concept of equifinality. This is significant in consideration of development of international programs for sustainability in addition to the ongoing evaluations. The concept of negentropy was critical in the success and sustainability. Evaluation and education are essential as was seen in these programs. The effect of mutual respect and negotiations were imperative between the partners as well as within the political context in which the programs operate.[71]

CONCLUSIONS

The evaluations for the neonatal and pediatric intensive care units were conducted at the primary site for the program and at four of the twenty-five sites that have been developed from teams who came to study in this project. The evaluations of the faculty preparation program were conducted at eighteen of the sites that sent participants to the initial program site. For both programs in addition to the interview schedule observations were done in the clinical sites for both programs and in the classrooms of the faculty preparation program.

Interviews were conducted with past participants of both programs. The interviews were conducted by teams consisting of representation from the donor agency and from the host country. Questionnaires were completed by past participants. The questions asked were as follows : the relevance of the material taught ; what types of support was needed when the participants returned to their institutions to implement what they had learned ; what changes have they seen since the program has been implemented ; economic problems ; supply and equipment problems ; administrative support and other outcomes ; the length of the program ; what changes would they suggest ; what follow-up do they recommend.

Since sustainability is the goal of the donor and the host country the continuation and enrichment of the transfer of knowledge provides evidence. Questions asked in the interview schedule are as follows : has there been a transfer of what was learned to others? Has there been maintenance of equipment? Have their been other needs recognized as a result of this program? How have they been addressed? How were economic factors addressed and recurrent costs planned for? What type of administrative support was provided? What political factors influenced the programs? What types of negotiations were necessary to facilitate the sustainability of the programs? What factors in the educational process promoted sustainability?

These questions were addressed to administrators, participants of the program, counterparts from the donor agency and the host country. The questions were translated into Chinese and the study was conducted by visiting the sites.

Both programs revealed that the initial program responded to evaluation data that identified problems for the participants from the host country. This was supported by the reports. For example, the neonatal and pediatric intensive care program initially planned for only short term visits from experts in each discipline. The host country identified after their initial visit to the donor country expert's clinical facility that to attain the goals, they would need long term members from each discipline to work with them as they initiated the new clinical unit. Culturally doctors and nurses do not study together. Skillful negotiation overcame that obstacle when the host participants recognized that the content was new content for their country. This was true for both the neonatal and the faculty preparation program. The concept of working as an interdisciplinary team was new and became accepted by the Chinese.

There was strong evidence that the participants from both programs had returned and taught others. Each had records for the number of participants and where they were from who attended courses and what they did upon their return to their institutions.

Both of these projects reflected concepts from the literature related to program sustainability. The need for ongoing negotiation between partners in international development is essential. The host country has the knowledge of their systems, people, culture and subtilties in language which are critical in planning, mutual goal setting, and evaluation. The findings related to the questions of the study：

Are there identifiable factors that influence sustainability of international development projects？

Evaluation before as well as during the implementation of the program greatly facilitates the development and implementation of an international project. The NICU project evaluation was not done for 18 months but at least it provided for the revision of problems before it was too late. The Faculty Preparation program on the other hand used the evaluation model from the development and allowed for early corrections. The site visits provided insights for the continuation during the last two years of the project and have influenced the continuation over the past 10 years without external support. Currently, the center provides opportunity for 60 participants from all over China to come to study each year with mentors on the faculty. In addition, courses are being offered in all regions since the evaluation was done. Initially, the programs were conducted with the donor agency support, but now are being done by the past participants. Books and journal articles are being published at most of the sites who sent participants to Beijing. As the nursing leaders projected the nurses from the baccalaureate nursing programs are teaching in nursing programs and only a few of the universities have medical faculty. Curriculum has been revised for the secondary schools of nursing. Changes have occurred in the practice of nursing in clinical settings throughout China. Currently a major curriculum revision is in process in Beijing reducing the curriculum to four years with the application of the theory in the clinical settings at the time it is taught.

Planning for recurrent costs began early in both of the programs. Economics must be considered both in medicine and nursing education. What seemed impossible to the Chinese counterparts has become a reality. The political support within the institution and in the political systems are critical in issues related to sustainability.

Values of the society are important in all phases of international development. Adaptation to changes in the major elements affecting programs is critical. Ability to determine readiness, resistance and opportunities.

Education appropriate for the program must not be forgotten in the language of the country. Empowering the counterparts to let others know what they know is of value to innovations and can make the difference between a project that is sustainable or not.

Capacity building within the country is mandatory. Developing countries cannot rely on outside aid as it continues to reduce. The inverse relationship between need and resources seems to become greater over time.

1. What is the importance of the application of multidisciplniary theories to implement inter-

national development projects?

The use of multidisciplinary theories along with technical competence is essential since innovations occur within a microcosm of society. Societal factors, government policies, economics, population trends, health level are but a few of the factors that impinge upon international development projects. Knowing the theories of change and general systems theory and how to apply them is essential.

Negotiation theory and communication theory cannot be minimized in their impact on sustainability. In both projects the negotiation factor was important. At the primary site of the NICU both externally and internally this was a major factor. Prior to the 18 month evaluation at the primary site the educational program was not achieving its stated goals. Following the recommendations of the evaluation team however the counterparts were involved in the redesign and the implementation of the program and at the 5 year evaluation the program was evaluated positively. At the same time, NICU A and B needed internal negotiation within their institutions to achieve both the development and sustainability of the units

2. Is there a role for monitoring of factors for sustainability that can be measured?

The evaluation model used supports that there is a role for monitoring factors known to support factors of sustainability. Sustainability is directly related to the monitoring of the factors that affect project sustainability. The negotiation of objectives for mutually agreed outcomes was demonstrated in the NICU. Evaluation identified significant problems that needed to be addressed and negotiated before continuation of the project. The lack of support by the university for a program such as the rural maternal child health project caused them to lose a very successful program. The sensitivity of the program directors politically aligned with administrative support and the combination produced a project greater than ever imagined. This is related to the readiness factor or timing that it critical in international development. There is often a window of opportunity. Timing requires international development specialists to be sensitive to changes, not only at the local level but also globally and use that data effectively.

Project to be implemented must take into account the internal and external system relationships. For example, the brightest most talented person cannot maintain a program in isolation. There are diverse factors that impinge upon any system and can support or destroy. In the projects studied it revealed in the site visits that the principle of equifinality was present in these evaluations. There was a different mix of elements and the mix of the elements had varying impacts on the sustainability. For example, one program was rich in external resources while another was poor, political support varied, educational opportunities and resources also were different. However, the major goals of the original project were being sustained. The ability of transfer of a project from one site to another was apparent in both evaluations. The new programs varied based on the mix of elements. The evaluations clearly demonstrate that the commitment was a major factor in sustainability. Recent visits to some of the original sites visited in the faculty evaluation program reveal that while the initial support of administration was not present, the participants were able to develop within their institutions over time sustainable changes in education and practice. Both the role of educational programs in the transfer of new knowledge and technology and concepts that begin to support a theory for international sustainable development have been evident.

Creative or adaptive ability allowed the programs to become sustainable. Determining how to plan for fiscal viability is imperative for program sustainability. The approaches varied, the requirement of counterparts to be responsible for fiscal and human resources from the beginning breaks the dependency cycle created by many international development projects. Dependency created by the donor in international development is a factor that facilitates failure. Partnership with planned weaning provides the opportunity for time and ability to access or implement measures to provide for program transfer.

Ability to negotiate effectively within the culture of a project is essential. In both projects during the interviews changes had to be made in foreign consultants because of personality or inability to adapt to another culture. Notable experts can often only function in their familiar setting, when removed to another setting, the frustrations and deficits prevent them from being effective and rather than communicate effectively their knowledge their lack of resiliency may create an international incident and certainly guarantee the lack of sustainability.

3. What is the role of educational programs in the transfer of new knowledge and technology?

Education played an even larger role in the system than anticipated and identified leaders/change agents were necessary in the education program. In many instances these leaders demonstrated their advanced understanding of education by recognizing the need to revise the program based on the cultural differences in the particular site. Educational design and presentation were major factors in the sustainability of both projects. Clinical outcomes seen from both programs demonstrate that learning new concepts can influence change in health care. In site visits to NICU units that were developed from participants in the original program revealed equipment adaptation and research results on the improved outcomes of care. This was true in the site visits from the faculty preparation program also. The concepts learned were applied within the culture and with culturally appropriate adaptations, a testimony to the exposure to the education.

The massive changes occurring today in nursing education in China are related to the opportunity for the dissemination of information by the initial participants in the programs and their teaching others and making improvements in the health care of the population. The development of inquiry active participation in the learning process, the opportunity to test out new ideas in a non-threatening way are integral in dynamic education. Outcomes of education can be measured not only by examinations but more importantly in international development by changes in the system.

The introduction of high technology programs like the NICU required education also of support personnel such as laboratory and equipment repair and maintenance. In developing countries donors often introduce technical equipment that needs to be serviced and parts need to be available. All too often in international development projects equipment is used until it needs serviced or consumables need to be replaced. In both of these programs part of the education focused on equipment needed and importance of educating individuals to maintain or repair. For the development of additional NICU units, equipment needed to be manufactured in country. Supplies also needed to be produced in country. Education is not only the immediate participants but also others within the system. Again the knowledge of the system, political factors and interactions cannot be minimized.

In summary, it is critical in an international training program that leaders in the clinical setting be identified to assist in the design and implementation of a program. In a technology-intensive program it is also important that the external agency focus on the design of education materials, training of educators and educational methods with equipment being a component of but not the critical element of the program. In this way units with more financial capability can utilize the advanced technology but not at the expense of good training, and units with minimal resources can learn to be creative in providing good quality care but not be totally dependent on having the most advanced equipment.

Consideration must also be given to the repair and maintenance of equipment once external support is withdrawn. At the primary site the biomedical engineering training program offered by the donor provided the necessary support for the equipment during the time of the donor collaboration and after it had ended. Units A and B also learned about the need for this support for the units and therefore had established their own systems for their equipment repair and maintenance needs. Unit C did not indicate that they had any assistance in this area despite the advanced equipment.

SUMMARY

Factors that emerged demonstrating strong influence for the sustainability of international and are essential in a theory for international development are : evaluation, partnership, negotiation, equifinality, respect, forecasting, transition, adaptability, flexibility, projects included : the involvement of the host country all phases of operation ; application of skillful negotiation ; initiation of transfer of the project from the onset with the acceptance of shared responsibility for the programs ; exploration and the initiation of planning for recurrent costs once foreign aid was no longer available ; adapting new concepts and technology to the culture ; design of the projects with a decision making evaluation model to be used throughout the process allowing for appropriate adjustments during the implementation ; administrative support from government and institutions ; development of education materials in the language of the people that were easily available ; academic exchanges of personnel ; and consistency of consultation

Sustainability will continue to be an area of interest for governments and donors of aid for international development. Sustainability is complex and therefore requires individuals who are knowledgeable not only in a specialty discipline but also well grounded in many disciplines to be effective in implementing sustainable projects. While a number of factors have been identified sensitivity or a sixth sense developed from a broad multidisciplinary theoretical base with the capacity to balance the political and cultural elements in an environment of awareness of an ever changing environment through effective communication, negotiation and education will facilitate sustainability.

A theory for sustainability in international development requires the concepts generated throughout this evaluation a complex interaction of the elements of partnership, mutual negotiation, fiscal viability, change, awareness of political systems in which a program operates and ability to adapt to change, development of capacity within the individuals of the host country, facilitating their recognition of what they bring into a project and the leading elements of a theory would be equifinality, sensitivity and education. The importance of education was consistent throughout the evaluation process and the interviews that were conducted with over four hundred people. Education because it is often not seen as glamorous, requires some risk taking, but reaps great rewards that are often overlook. The concepts are many to be interwoven into the development and implementation of an international development project. It is the weaving of the threads in the many different patterns that create beautiful art. There is no country in the world or individuals who cannot benefit or participate in the implementation of international programs for the improvement of health care, the weaver has to know the outcome of the mixture of the various textures, hues, designs limited only by imagination.

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