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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**PROPOSALS FOR THE RE-ESTABLISHMENT
OF THE MARINE TRAINING SCHOOL IN SIERRA
LEONE AS A SUSTAINABLE DEVELOPMENT**

By

WINWARD INA GANU
Sierra Leone

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

MARITIME EDUCATION AND TRAINING

(Engineering)

1996

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and not necessarily endorsed by the University.



Winward Ina Ganu

10/10/96

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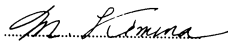


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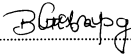
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I am therefore dedicating this work to the following people:

My Beloved Wife: ***Mrs Gracie Modupeh Ganu***

My children: Olubumie, Miatta and Eric.

My parents: Mrs Elizabeth Sophie Vincent, Ms Miranda Lisk-Davis and Mr & Mrs James Ganu.

May God Bless us all.

ABSTRACT

The objective of this dissertation is to establish the need for the re-establishment of the Marine Training School. However, there are many aspects which have to be considered in order to develop a sustainable institution producing trained personnel for the fishing fleet.

The study has been carefully divided into seven chapters, in such a way that each chapter has been specifically dealt with.

Chapter One outlines the present condition of our fishing industry with an overview of the Maritime Legislation.

Chapter Two briefly explains the profile of the Republic of Sierra Leone. These include its geographical location, historical background and the people. It also looks into the current educational establishment, its natural resources which is the governments main source of revenue and the maritime background, particularly the fishing fleet.

Chapter Three introduces the economic activities of the country. In this case an overview of the industrial output which includes mining. It also deals with the principal crops, and the size of the fishing fleet.

Chapter Four briefly surveyed the MET infrastructure. This includes the regional and national legislation and impact of the revised STCW 95. This chapter also deals with the need for upgrading courses in the MTS, Certificate of Competency and emphasis in quality standards of the school.

Chapter Five outlines the need for the re-establishment of the MTS. In this chapter the justification has been clearly outlined with the aims and objectives. It takes into

consideration the existing facilities and resources of the MTS. A framework of the organisational and administrative structures with clearly defined responsibilities is presented and a criteria for staff recruitment and student entry requirements is suggested.

Chapter Six reviews a proposed program. In this chapter the curriculum has been designed with care and imagination and subject hours specifically allocated. .

The last chapter presents the conclusion and recommendations.

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LIST OF ABBREVIATIONS

ADB	African Development Bank
BIMCO	Baltic International Maritime Company
ECOWAS	Economic Commission for West African States
EEZ	Exclusive Economic Zone
FBC	Fourah Bay College
IMO	International Maritime Organisation
ISF	International Shipping Federation
ITF	International Transport Federation
MARAD	Maritime Administration
MET	Maritime Education and Training
MINARCON	Ministerial Council for West and Central African States in Maritime Transport
MRU	Mano River Union
MSA	Maritime Safety Administration
MTS	Marine Training School
OECD	Organisation for Economic Co-operation and Development
QSS	Quality Safety Standards
RMA	Regional Maritime Academy
SFC	Sierra Fishing Company
SFV	Safety of Fishing Vessels
SIEROMCO	Sierra Rutile Mining Company
SOLAS	Safety of Life at Sea
STCW	Standard of Training Certification and Watch Keeping

CHAPTER 1

INTRODUCTION

In September 1980 the Marine Training School (MTS) was established by the Proprietor of the Sierra Fishing Group of Companies, otherwise known as the Sierra Fishing Company (SFC). The aim was to train students who after graduation will be competent enough to Man the fishing vessels which vary between 20 grt to 200 grt. In addition to the SFC there are also other fishing companies like the Mabailer Fishing company, Tombo Fisheries Project, Government Fisheries, Joint Fishing Companies with Sierra Leone Partnership, and indigenous fishing companies, which are operating in the country. The Ministry of Marine Resources is the sole authority in the country that can issue licences to fishing companies and fishing boats to operate in her territorial waters.

Between 1980 and 1993 about 250 students had graduated from the MTS in the following disciplines:

- Fishing Technology
- Refrigeration Engineering
- Marine Engineering
- Navigation

The purpose of this dissertation is to highlight the necessity and the benefits as to why the MTS must be re-established, and to present the program to be included in the National Training Program.

The proposals begin with a short profile of the Republic of Sierra Leone, her economic activities, her maritime education and training infrastructure and a proposed academic program.

The greatest percentage of our population live along the coast. Some of them depend on fishing for their livelihoods, therefore trained maritime specialists could help to give these local fishermen basic training in safety and survival at sea.

There is a need to harvest the living resources of the ocean for food (protein) and the importance of fish as a source of adequate income. The fishing industry creates employment in the post-harvest sector and support industries and government.

In Sierra Leone there is a high percentage of artisanal fishermen who fish close in shore in crafts less than 12 meters in length. There are also fishermen fishing in vessels of between 12 and 24 meters in length. These vessels are fishing further from the shore. The industrial level i.e. the larger offshore vessels section, includes vessels more than 24 meters in length. This project focuses on this sector.

The Fishing Industry, which has a vast maritime potential, will need trained maritime personnel in all the different areas related to fishing. These industries should take an active part in the discussion of future policy and in the curriculum of the school.

The re-established MTS must embark on the principles of accountability and transparency. The purpose of this accountability is to hold someone to account for his/her doings. In my proposals I have considered the accountability relationship between the Board of Governors, the Academic Council and the Administrative Council as the central case in the school.

In the central case the Board will be responsible for outcomes and results, whereas the Councils are accountable to a Code of Practice, that is Codes of Professional Principles. They must accept moral responsibility for their activities.

The curriculum of the MTS has been designed to meet the trends developing in the fishing industries in order to create employment opportunities for the MTS graduates.

The co-operation and support of the Government and fishing companies is necessary to effect the fundamental changes to overcome attitude barriers through policy interaction.

The MTS must have the profile of a technical institution and function according to the principles of higher education in Sierra Leone. This must also be in accordance with the IMO Standards of Training and Certification.

From the authority as a Maritime Instructor and with two years of study at the WMU, I came to the conclusion that Sierra Leone needs to standardise MET in Sierra Leone with an accredited program, keeping in line with technological developments and changes in the fishing industry.

The contents of the course modules take into account the actual state of the art of fishing technology and the latest teaching methods. What is most important is to meet the requirements of International Conventions such as Marpol 73/78, STCW 78 and SOLAS 78. Ratification and implementation of international convention regulations and codes, government policies as regards to MET, and resources must be available to run the MTS effectively. Solving the problem of finance, particularly in the context of the Sierra Leone economy, the author has targeted a number of ways for the MTS. to build up a financial base to ensure a smooth running of the school.

The teaching programs has been updated and modified to ensure that every subject includes the latest developments in a given field.

Our marine potential must be carefully examined and properly analysed. By so doing we must look back to look forward in order to determine, and plan the exploitation of our resources in the most meaningful way.

During the period of developing this project there was constraints with time and getting some materials from home. The latter was due to the socio-economic problems facing the country. As a result of wide research undertaken the study provides considerable background information of the MTS and the ways of sustaining an important educational institution.

CHAPTER 2

THE REPUBLIC OF SIERRA LEONE

2.1 Geographical Location

According to Countries of the World and their Leaders Yearbook, (1985)

Sierra Leone is located on the south-western part of the great bulge of West Africa. It has 340 km Atlantic coastline. Three terrain's characterise Sierra Leone: a coastal belt of mangrove swamps 96 km wide, a stretch of wooded hill country, and an upland plateau, with mountains near the eastern frontier above sea level.

Sierra Leone has an area of 71,740 km², with a population of about 4,5 million people. The capital is Freetown. The principal towns are Freetown, Koidu, Bo, Kenema and Makeni. Sierra Leone has borders with Guinea Conakry to the north and east and Liberia to the south.

2.2 Historical Background

The Countries of the World and their Leaders Yearbook, (1985), also reveals that:

European contacts with Sierra Leone were among the first in West Africa, and Sierra Leone was one of the first West African British colonies. Following a visit in 1462, the Portuguese explorer Pedro De Sintra gave the territory its name Sierra Leone or "Lion Mountain". The first Englishman to arrive, was John Hawkins, who came in search of slaves in 1562. Sir Francis Drake the fabled adventurer, arrived in 1580. The colonial history of Sierra Leone was not entirely placid, as the indigenous peoples mounted several unsuccessful revolts against British rule and to Creole

domination in the territory. The constitution of 1951 provided the framework for decolonisation. Unfortunately for the country and its people as common in most parts of Africa, elected and non elected Governments do not seem ready to work in their own interest in particular and the continent as a whole.

The indigenous population of Sierra Leone comprises 18 ethnic groups of which the Temne in the north and the Mende in the south are the largest. About 60,000 persons are members of the Creole's, descendants of black settlers from Great Britain or North America. The various groups of Sierra Leoneans have been noted for their educational achievements, trading activities, entrepreneurial skills and art and craft work, particularly wood carving. Many are part of larger networks extending into several countries which link West Africa States into this area.

The major ethnic groups also have established their ecological zones in which they have established their domination. The official language is English and the most widespread lingua franca is Krio.

2.3 Current Educational Establishment

The Encyclopaedia of the Third World (1982) states that:

After gaining independence in 1961, the people of Sierra Leone realised that it was time to embark on education in order to pursue the development programs and to decrease the rate of illiteracy in the society. At present Sierra Leone can boast of only one university called the University of Sierra Leone. This was founded in 1967 as a state university.

Fourah Bay College (FBC) was founded by the Church Missionary Society in 1827, has five faculties.

- Njala College was founded in 1963, has three faculties.
- College of Medicine and Allied Health Science was founded in the 1980s.

A Technical Institute is located in Freetown and deals with the City and Guilds Craft and Technical courses and Commercial Education while the three Trade Centres located at Kissy, Kenema and Magburaka offer three year vocational programs at the secondary level.

2.4 Natural Resources

The Encyclopaedia of the Third World (1982) further states that:

Mineral resources, including diamonds, iron ore, rutile, gold and bauxite are produced. Minerals accounted for over 70% of export earnings in the 1980s but have experienced a decline in production during the early 1990s due to rebel incursion.

Sierra Leone is the fourth largest producer of diamonds in the world, and its stones are highly priced in the market.

Sierra Leone is the world's second largest producer of rutile, a form of titanium oxide used in paint pigment and welding rod coatings. Major deposits are found near Gbangbama and in Rotifunk. The main iron ore deposits of 64% pure iron ore is near Marampa in Port Loko district and between Sokoyo and Waka Hills in the Tonkolili district.

Table 2.1 shows a decline in production between 1992 to 1994 of bauxite, ilmentite, diamonds, and an increase in the production of rutile concentrate.

Table 2.1 Mineral export between 1992-1994.

('000 metric tons, unless otherwise indicated)

	1992	1993	1994
Bauxite	1,257	1,165	729
Ilmentite	60	64	54
Rutile Concentrates	149	150	164
Diamonds ('000 metric carat)	312	157	197
Salt ('000 bags)	155	360	166

Source: Department of Mineral Resources Freetown, 1994

2.5 Maritime Background

According to The Europa World Yearbook (1995)

Seafarers along the coast of West Africa could be traced as far back as the 18th century when slaves were returned to settle in and around the coast.

Historically ships trading on the west coast of Africa have trained their seamen and most of them settled in Freetown. In other words seafaring is part of the nation's culture. A triangular trade between Sierra Leone, Guinea and Liberia has been going on successfully by sea. A large population lives on the coast and depends on the sea for their subsistence. They also use the sea for their local and external trade.

Sierra Leone's inland water ways total 800 km in length. Some of the upper reaches of the rivers are only navigable for three months of the year, and many have rapids or falls where only canoes can be used. Most of the river traffic is handled by private launches. Freetown has one of the best natural harbours in the world with a channel more than 11 meters deep and 6 km wide, free from silting. The port has berth facilities for six to eight ships with 58,000m² of storage space. Pepel, on the Sierra Leone river, is a special port for the export of iron ore. The port of point Sam is used for bauxite and rutile. The only major ports are Bonth and Sulima, which together with Freetown, are managed by the Sierra Leone Ports Authority.

The international seaborne trade i.e. goods exported and imported between 1988 to 1990 is shown in Table 2.2

Table 2.2 International Seaborne Trade (freight traffic, '000 metric tons)

	1988	1989	1990
Goods loaded	1,200	1,280	1,802
Goods unloaded	510	527	533

Source: The Europa World Yearbook, 1995, page 2684

Table 2.3 shows the value of export and import. From the table one can see that both export and import increased from 1950 to 1980 and then a sharp drop up to 1990

Table 2.3: Value of Exports and Imports (International Trade in million of US dollars)

	1950	1960	1970	1980	1989	1990	1991	1992	1993
Export	20	83	101	224	138	138	145	149	118
Import	19	74	116	427	183	149	163	146	147

source: Handbook of International Trade and Development Statistics, 1994, pages 18

& 19

CHAPTER 3

ECONOMIC ACTIVITIES

3.1. Introduction

From the Encyclopaedia of the Third World (1982):

Sierra Leone's Gross National Product (GNP) in 1993 was US\$ 647 million equivalent to US\$ 140 per head. During 1985-93, it was estimated that the GNP per head declined, in real terms, at an average annual rate of 0.6%. Over the same period the population increased by an annual average rate of 2.6%. Sierra Leone GNP increased in real terms by an annual average of 1.3% in 1980-92.

Manufacturing contributed an estimated 11.3% of Gross Domestic Product (GDP) in 1993-94. The manufacturing sector consists mainly of the production of palm oil and other agro-based industries, textiles and furniture making.

Energy is derived principally from oil-fire thermal power stations. An hydro-electric dam initiated in early 1990 is underway to reduce the country's dependence on fuel imports. Imports of mineral fuels comprised 18.5% of the value of total imports in 1994. Sierra Leone is a member of the African Development Bank (ADB), the Economic Commission of West African States (ECOWAS) and the Mano River Union (MRU). In the late 1980s, in response to a deterioration in the economy (resulting from the rapid increase in the 1970s of international petroleum prices the government implemented an economic adjustment program, based on the International Monetary Fund (IMF) recommendations. In March 1994 the IMF declared Sierra Leone to be eligible to receive new credits following its payment of

accumulated debt arrears, and subsequently approved loans under a three-year enhanced structural adjustment facility.

3.2 Industrial Output

Sierra Leone's earliest industries in the modern sector were directed towards import substitution. In an order of priorities in the 1975-79 plan, the emphasis was shifted to export oriented industries based on domestic raw materials and agricultural products. Most of the industries established under the Development of Industries Act of 1960 are foreign owned. Under this Act the government also built the Wellington Industrial Estate in the suburbs of Freetown. The Act was revised in 1975, eliminating loopholes, discouraging repatriation of funds, and reducing the load nature of fiscal and tax incentives.

Sierra Leone does not produce any form of energy other than electric power. Energy imports account for 10% of all merchandise imports. Apparently per capita consumption of gasoline is about 60 litres per year. An oil refinery using Nigeria crude has been operating since 1969, producing about 10,000 barrels per day.

Table 3.1 shows the major industrial products in thousand of metric tons between 1990 to 1994.

Table 3.1 Selected Industrial Products ('000 metric tons, unless otherwise indicated)

	1990	1991	1992	1993	1994
Cigarettes (million)	1,200	513	513	344	334
Jet fuels	15	15	17	20	18
Kerosene	18	20	22	18	20
Distillate fuel oils	103	33	35	56	102
Residual fuel oils	88	90	90	94	98
Electric energy (million kWh)	224	230	235	250	270

Source: The Europa World Yearbook, 1995, page 2682

Table 3.2 shows the principal crops in thousands of metric tons produced between 1991 to 1994.

Table 3.2 Principal crops ('000 metric tons)

	1991	1992	1993	1994
Rice (paddy)	544	411	486*	486
Cassava (manioc)*	90	92	97	106
Citrus fruit	77	77	75	79*
Palm Kernels	30	35†	35†	10.8
Palm oil	51	60†	50†	48
Groundnuts (in shell)	21	20†	21†	24†
Coffee (green)	26	29*	36*	38*

* unofficial figure(s). †FAO estimate(s).

Source: The Europa World Yearbook, 1995, page 2682

3.3 Size of the Fishing Fleet

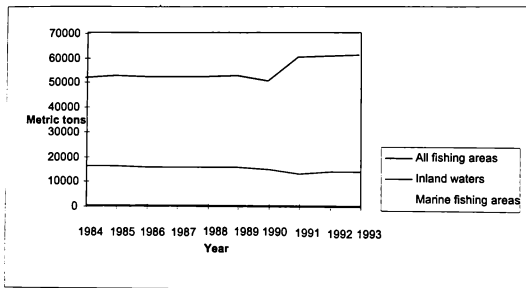
According to Encyclopaedia of the Third World (1982)

Fishing employs over 10,000 fishermen and the fishing fleet consists of about 2,500 canoes and an aggregate of about 50 boats of between 50-200 DWT. The annual catch in 1982 was 65,500 tons, of which Bonga fish and Dines constituted 78%. Most fish marketing is in the hands of women traders who act as money lenders to the trade.

Off shore fishing is conducted mostly by foreign fishermen. The annual per capita consumption of fish is 17.5kg. Agricultural credit is available only through non-institution channels, such as money lenders, who lend money at rates often in excess of 150% per year. Any small holders are perpetually in debt. The average annual indebtedness being estimated at US\$4 per farmer.

The concept Nominal Catches refers to the landings converted to a live weight basis. The annual statistics for a varying series of the 1984-1993 on nominal catches of fish, crustaceans, molluscs and other aquatic animals taken for all purposes (commercial, industrial and subsistence), is given below:

Fig. 3.1: Nominal catches of three specific areas (metric tons)



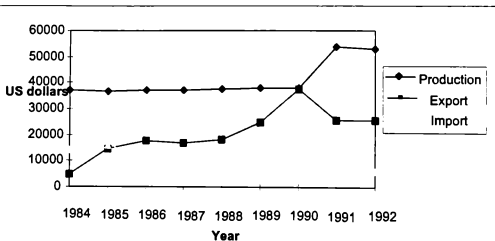
Source: F.A.O. Yearbook, 1993

A varying series of recent years ending in 1993, on the production and international trade of fishery commodities is shown in figure 3.2.

The annual period used is the calendar year (1 Jan-31 Dec).

Data in the quantities of fishery commodities produced, and on imports and exports, are expressed in metric tons and refer to the weight of the commodities.

Fig 3.2: Production, Export and Import of fish between 1984-1992.



Source: F.A.O. Yearbook, 1993

CHAPTER 4

MARITIME EDUCATION AND TRAINING INFRASTRUCTURE

4.1 Regional Legislation

During the 1970s a movement towards economic integration schemes was realised.

The Mano River Union (MRU) was established in 1973 between Sierra Leone, Liberia and Guinea Conakry in 1980. It involved a form of co-operation and customs union. The Economic Commission of West African States (ECOWAS) was established in 1975. All West African states except Cameroon are members. Its main objective is to create a common market with a common external tariff.

To achieve regional maritime co-operation under regional maritime legislation, efforts must be made to achieve an optimality in the use of our marine Resources. A strong commitment of all parties to international co-operation and ratification of international maritime conventions is required. The implementation of the regional policy requires the choice of instrument and the provision of financial resources for carrying out the policy. Market incentives, public investment in infrastructure or productive investment must also be considered.

A Regional Maritime Administration shall carry out the functions of the Maritime Safety Administration for, and on behalf of, contracting member countries to deal with certain activities having largely regional character which are needed to be dealt with at regional level.

The ministerial conference of West and Central African States (MINARCON) deals with specific aspects of shipping. The functions of the Regional Maritime Administration include:

- The safety of ship navigation and fishing vessels, which includes
 - I The conduct of various examinations of seafarers (Master, Mates, Marine Engineers etc.) and their certification according to international standards.
 - II The various types of ship surveys
 - III The tonnage measurement of ships
 - IV Inquires / investigations into shipping casualties.
 - V The national registration of ships
 - VI Implementation of international conventions
 - VII Advisory functions
 - VIII The promotion and maintenance of Regional co-operation in maritime safety/technical matters
 - IX Serving as an expert advisory body to all member states.
 - X Assisting members in ratifying and implementing international conventions.
 - XI Co-ordinating the work of classification societies to whom statutory functions are delegated by government in the region.
- Technical aspects of shipping that should be handled on a regional basis are
- Regional port state control
 - Regional marine pollution combatment centres
 - Regional marine casualty investigation centres and any other technical aspects

4.2 Maritime Administration

The Maritime Administration should have a well defined policy to deal with all aspects of all maritime issues in our territory as well as the sub-region. To sustain the country's merchant shipping and fishing fleet, the maritime education must be reviewed from time to time to suit the present needs and standards. The main duties

would be the implementation of the requirements which are laid down by the international conventions and other instruments to be embodied in our National Legislation which is prepared under our Merchant Shipping Act.

Since Sierra Leone is short of inspecting officers to carry out controls on her fishing boats and also foreign ships, some organisation like the Navy, with its professional expertise, can be provided to carry out inspection of the ships. So to say, the Maritime Administration and the Navy have to co-ordinate their activities in the maritime sector by utilising each others expertise. Senior navy personnel with years of working experience should be employed in the Maritime Administration.

With regards to international Maritime Conventions, Sierra Leone has ratified the following.

IMO	Convention 48
SOLAS	Convention 74
LOADLINE	Convention 66
STCW	Convention 78
CLC	Convention 69
FUND	Convention 71

Fisheries is under the Ministry of Marine Resources. The issuing of fishing licences, collection of royalty fees, registration and collection of licences for sport fishing as prescribed in the Fisheries Act and various regulations are administered.

Sierra Leone Maritime Legislation is divided into those enacted by the British Government up to the attainment of independence (1961) and those enacted by the Sierra Leone Parliament as an independent state. which consists mainly of the ordinance to authorise the collection of fees in respect of matters connected with relevant shipping.

4.3 Impact of the STCW 95

Resolution 1 of the International Conference on Standards of Training, Certification and Watchkeeping for fishing vessel personnel adopted on 7 July 1995.

Article 2 defines "Fishing vessel" as vessel used commercially for catching fish or other living resources of the sea.

This article further defines "Sea going fishing vessel" as a fishing vessel which navigate exclusively in inland waters or in waters within, or closely adjacent to, sheltered waters or areas where port regulations apply.

ANNEX 1 defines "Skipper" as the person having command of a fishing vessel.

"Engineer Officer" is define as an officer in accordance with regulation 11/5 of this Convention.

Regulation 11/3 outlines mandatory minimum requirements for certification of skippers on fishing vessels of 24 meters in length and over operating in limited waters.

Major impact are:

Every skipper on a fishing vessel of 24 metres in length and over operating in limited waters shall, unless they hold certificates issued in compliance with regulation 11/1, hold an appropriate certificate issued in compliance with at least the provisions of this regulation.

Every candidate for certification shall satisfy the party as to medical fitness, particularly regarding eyesight and hearing and meet the requirements for certification as an officer in charge of a navigational watch on fishing vessels of 24 meters in length and over, operating in limited waters.

Must have passed an appropriate examination or examinations for the assessment of competency to the satisfaction of the party.

Regulation 11/5 gives mandatory minimum requirements for certification of chief engineer officers and second engineer officers of fishing vessels powered by main propulsion machinery of 750 kw propulsion power or more.

Every chief engineer officer and second engineer officer serving on a sea going fishing vessels powered by main propulsion machinery of 750 kw propulsion power or more shall hold an appropriate certificate.

Every candidate for certification shall be not less than 18 years of age and satisfy the party as to medical fitness, including eyesight and hearing.

Must have attended an approved practical fire-fighting course and,

Have passed an appropriate examination for the assessment of competency to the satisfaction of the party.

4.4 Upgrading Courses and Certificate of Competency

To provide high standards of excellence in job performance and to respond to and meet the educational and training needs in accordance with the STCW 95.

Upgrading the knowledge of seafarers will enable them to have certain sea experience and skills for operating modern fishing vessels. Table 4.1 shows the upgrading system for MTS graduates after working for one year.

Table 4.1: MTS upgrading system

Section	Class	Applicant Requirements	Training Periods	Certificate	Remarks no. of students
Upgrading Section	4th grade Marine Engineer	Age: 22-26 Holder of Competency for 5th grade Competency	1 Year	Written and Oral examinations for 4th grade Competency	10 students
Upgrading Section	4th grade Mate	Age: 22-26 Holder of Competency for 5th grade Mate	1 Year	Written and Oral examinations for 4th grade Competency	10 Students

Source: MTS, 1994

In order to carry out an effective upgrading course and issue certificates of competency the special courses that need to be upgraded need to be identified. This could be done by taking into consideration the trend of modern technological developments in the fishing industry and the demand of qualified specialists to man the fishing vessels, upgrading courses should follow the following:

1. Courses should be upgraded and developed to comply with the minimum requirements of the STCW Convention.
2. Courses should be upgraded and developed to comply with the mandatory minimum requirements of the STCW Convention.

Admission requirements will differ for each course accordingly. The number of students, period and subject of the upgrading courses and the certificates issued after successfully completion of the course vary in compliance with the aim of the respective course.

The upgrading courses must be designed to give those who possess a licence and want to continue serving in higher capacities and therefore need to obtain higher certificates of competency and deeper knowledge on ship operations

The special training program should be designed to give the necessary education in accordance with the license qualifications prescribed by the law for ships officers.

4.4.2 Examination system for competency.

The licenses must be issued by the MARAD.

Each license for navigation and engineering has its own specific applicability according to the size of the vessel and engine output.

The national examination for maritime officers competency must be executed by ship officer examiners under the supervision of the Ministry of Transport.

The examination shall consists of a physical check-up and an intellectual examination, the latter of which is composed of written and oral parts.

Only those who have passed the written examination and have sufficient sea-service experience, according to each qualification, as prescribed in the ordinance of the Ministry of Transport, can apply for the oral examination. The written examination, on the other hand, can be taken without such sea-going experience.

The validity of the certificate shall be determined by the MARAD.

The STCW 95 Convention has included a new provision where all simulators used in the training of seafarers or in evaluating their skills or competency would be required to meet general performance standards, and personnel using them would have to be appropriately qualified and experienced. These provisions are illustrated in regulation 1/2, code A-1/6 and code A-1/12.

Emphasis should be placed on Computer Technology (e.g. simulator, computer-based and other media based resources). Any new system of education must also apply to instructors as well as students.

In upgrading the system of education the following must be done:

- Development of computer aided learning facilities.
- Intensive faculty development including instructor training.
- Adoption and implementation of a curriculum consistent with IMO standards.

4.5.1: Quality Standards Systems

Introduction

According to Muirhead, (1996):

Quality Standards could be defined as fitness for purpose.

Quality Standards System (QSS) in Maritime Education is about having specific process and procedures in place that are actively used by personal to achieve set objectives.

The description below considers and analyse the new requirements in the STCW convention for internal quality systems and independent external evaluation to identify the challenges and problems that will face the MTS in Sierra Leone.

As other Maritime Institution, a quality standard should be set up at the MTS. It should cover academic and administrative structure, functions and processes.

These standards should be strictly adhere to in accordance with the STCW Convention 95 code A and B.

The QSS will come into force on 1 February 1997 and the proposed model in this dissertation will help our MARAD to comply with the convention in the stipulated period of time.

The Ministry of Transport and Communication, in consultation with the Ministry of Justice and the Ministry of Marine Resources should prepare a draft legislation to incorporate all mandatory provisions of the STCW Convention, Articles, Legislation and Codes into our National Law.

4.5.2 Challenges and Problems facing MTS

Challenges

1. Documentation process must be developed by the MTS. These should include library, delivery methods, list of training equipment's, list of qualified training instructors with their qualification and experiences and written schemes course content including clear learning and assessment objectives.
2. MTS must undergo external evaluation periodically. This can comprise of members not involved in training, examinations and certification or by a private institution designated by the government to carry out such activities, or by some external agencies providing such services.
3. Compare STCW-78 Convention with STCW-95 and determine the extent of inservice, refresher and updating training programs.
4. MTS should be required to send reports to IMO (MSC) via MARAD on MET standards
5. Quality standards are to be applied to all STCW education, Training, Assessment, Certification, Endorsement and Revalidation as well as to Qualifications and experience of instructors and Assessors by government institutions and non governmental institutions.
6. Self assessment system could be conduct by MTS through feed back from students, fishing companies, employers of the maritime industries, and to continue to improve on the fullest spirit of STCW Convention 95, code A.

Difficulties

The MTS is likely to face the following difficulties:

1. Lack of Government institutions like MARAD in meeting or maintaining quality standards in the MET.
2. Sierra Leone needs a lot of resources to meet the quality standards by 1 February 1997.

3. Different Countries interpret quality standards differently according to the national education system, culture, social values, aims and objectives and their maritime background.

4. The quality standard system requirements of the revised convention warrants:

- restructure of the organisation
- acquisition of simulators
- training of the trainers
- review of entry standards where applicable
- allocation of resources
- commitment to achieve the desired objectives of the MTS

4.4.3 QSS Model-MTS

The re-established MTS must comply with the STCW Convention 95. There is a proposed quality standard model with suggestive actions for the revision and inclusion in some areas covering the administrative structure, control, functions and documentation process.

Mission Statement

From Handout Muirhead (1996):

The mission statement of an MTS should broadly cover the strategic intent and objectives. These objectives must specify the role of the school in providing quality Maritime Education and Training to all students in accordance with the IMO STCW Convention Standards in all relevant Maritime Training Programs.

It should also include the implementation and maintenance of a continuous quality standard system and excellence in teaching and assist staff to realise their fullest potential.

4.5.4 General Governance and Control

Advisory Board

The Ministry of Transport and Communications must establish an Advisory Board with a broader representation from the various fishing and shipping interests and benefactors with policy setting functions, taking into consideration the environment and technological changes in the maritime industry and the role of the MTS.

Organisational Structure

The present existing structure does not provide for an internal quality assurance nor any external audit system, therefore a proposed QSS in Fig 4.2 has considered some academic units and their functions.

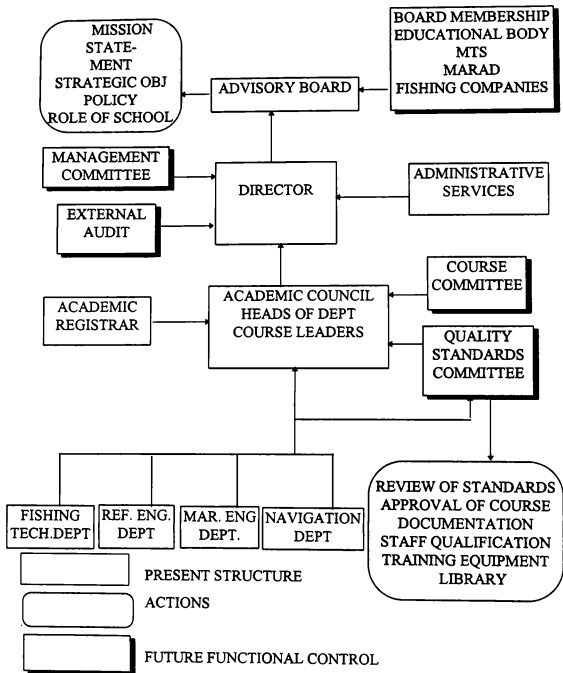


Fig.4.2: Proposed QSS model of the MTS.

Chief Executive

The chief executive of the MTS is the Director. He is usually appointed by the Sierra Fishing Company. The advisory board should take up the responsibility of staff recruitment.

The Academic Council

Provides academic advice to the director on standards relating to content, examination and progression..

It approves of the school program and courses. It maintain and set academic standards according to statutes, rules and regulations and examines all documentation and processes.

Role of MARAD

The MARAD must establish a National Accreditation Board that will be accredited to the Nautical Institute and the Institute of Marine Engineers in London, UK. Parties should ensure that training and assessment activities are administered, supervised and monitored.

At least every 5 years an independent qualified evaluator should verify.

- All management control and follow-up action MUST comply with planned arrangements and procedures.
- Measures must be effective to achieve objectives.
- Evaluation results must be documented
- heads of areas evaluated should be given results
- timely action must be taken to correct deficiencies.

Examinations could be conducted to evaluate candidate's abilities. This could be carried out in the form of precise tests, completion tests, short answer tests, true or false tests, multiple choice tests. This could correctly apply relevant knowledge to performance of practical tests and skills.

Internal Review Process

The Academic Council must use the resources available to the various committees to monitor the extent to which the MTS. has achieved its objectives of the program. These include the inputs such as planning, design preparation, review of programs, teaching, learning and communicating, course content, assessment and examination procedures, documentation, schemes, methods and admission policies.

External Audit

This should be done systematically and of all quality activities according to the defined objectives. All evaluation results should be documented and checked to ensure that timely action is taken to correct any deficiencies.

CHAPTER 5

JUSTIFICATION FOR THE RE-ESTABLISHMENT OF THE MARINE TRAINING SCHOOL (MTS).

5.1 Introduction

There is need for the MTS with clear aims and objectives.

The main objectives of the International Maritime Organisation (IMO) are safer shipping and cleaner oceans. This can only be achieved by a united force i.e. with the full co-operation of all countries and modern technological development in the shipping and fishing industries. Ships are designed according to the requirements of the authorised organisation and classification societies, therefore the required education and training must be given to seamen at all levels. Sierra Leone is no exception to this trend of development. We need to improve our seafarer's education with modern international standards to create better employment opportunities.

The Republic of Sierra Leone has a potential in its fishing industry. The last twenty years have seen foreign vessels poaching in our Exclusive Economic Zone (EEZ). The fishing contract the government signed with the former USSR in the 1980s was a death warrant for our future fishing industry. We are subject to total exploitation and as a result the nation favours nationalisation of all our natural resources including fishing. Nationalising in this context means owning and manning our own fishing vessels. It is obvious that we will need well trained personnel to man the vessels.

Personnel of the Republic of Sierra Leone Military Forces (RSLMF) Naval Division are recruited, 99.5% of whom have no basic maritime education. With the re-establishment of the MTS, these very important people in the society that are doing the job of the Coast Guard could gain formal maritime education locally, thereby protecting the EEZ from poachers, and foreign fishing ships that are engaged in over fishing in our EEZ.

Frequency of casualties, which include fatalities, injuries, grounding of fishing vessels and incidents resulting from human error, can be brought to its lowest level by modern technology, effectiveness, adequate knowledge and responsibility. These could only be achieved through education and training.

Even before and after the establishment of the now defunct MTS Refrigeration plants and fish processing plants have seen a shortage of specialists capable of manning the plants. As a result most of these plants have been shut down and the production has decreased in some plants. The re-establishment of the MTS will be the only way out to maintain these plants through the technical know-how of the graduates.

5.2 Aims

The Aims of the MTS are:

1. To prepare specialists to serve efficiently in our fishing fleet in the areas of:-
 - Fishing Technology
 - Marine Engineering
 - Refrigeration Engineering
 - Navigation
2. To strictly adhere to the Revised STCW 78 Convention and award diplomas to those students who successfully complete the full program of the school.
3. To maximise the safety of fishermen at sea and to protect the marine environment.

4. To meet the needs of present and future modern fishing methods and constantly updated the curriculum, install well equipped laboratories.
5. To review the curriculum periodically in order to keep up with modern technology, new designs of fishing vessels.
6. To educate and bring awareness to all Sierra Leoneans on the importance and obligation to international conventions and their role in the development of our maritime infrastructure and the implementation of maritime polices towards the development of our fishing industry.

5.2.2 Managing the Objectives.

From Rowntree (1985):

The objectives of the MTS can make the job of the lecturers, instructors and technicians difficult. However, it must be achieved and not muddled through. Where it seems difficult to keep aware of the progress of a number of different students towards a number of different objectives, the lecturer should modify the system rather than abandon the statement of purpose. In such a case fuller records on each student must be kept and sometimes some of the tasks of monitoring progress must be delegated to a helper or to the students themselves. Lecturers should be judged by the growth and development among his students. Objectives are not final and immutable: indeed it should make one more, rather than less, aware of the claims of the new objectives that arise urgently according to the demands of the fishing industry.

5.3 Existing Facilities

At present there exist very few facilities in Sierra Leone for the re-establishment of the MTS and formal training of the students. The MTS building, located at Kissy Dock Yard, close to the Sierra Fishing Company (SFC) and the Government fisheries, does not appear adequately suitable for training. It provides very easy access for conductive tours of the fisheries jetty facilities and some practical aspects of training that will be given in the school, such as life boat work.

The school consists of a large workshop with a workbench of twelve vices that could accommodate twelve students at a time. Mechanical tools, equipment, e.g. hacksaws, drilling machines, measuring instruments, etc. are also in existence. There also exists quite a lot of navigational equipment. Fishing nets and fishing gear are also available at the school. Refrigeration equipment like compressors are also available. There are also electrical motors, pumps, centrifuges etc.

The author recommends that the school should be located at the Government Wharf. The Government Wharf is situated in the heart of Freetown behind the Central Police Station. Presently the site is used by local traders of second hand clothing.

The Ministry of Lands which has sole responsibility and authority for land distribution must play a vital role in this regard. The local traders must first be relocated and the site allocated to the MTS. The wharf has a water front area, a ferry dock, jetty for fishing boats and naval ships. The government wharf site is close to the maritime industry like shipping agencies, stevedoring, clearing and forwarding agencies, crew and labour office, shipping companies and the Sierra Leone Port Authority. This will create a conducive atmosphere for training and shipping activities.

The building must have all the training facilities necessary for any Maritime Training Institute, such as: library, classrooms, workshops, offices, rest rooms, laboratories, simulators, reception, conference hall etc.

5.4 Resources

According to Percival and Ellington (1988):

A “Resource” in education or training is a system set of materials or situations that is deliberately created or set up in order to enable the students to learn.

To qualify as a true learning resource, the resource must satisfy all of the following three conditions:

- (a) it must be readily available;
- (b) it must allow students self-pacing; and
- (c) it must be individualised, i.e. it must cater for the needs of students working on their own.

Resource centres such as learning aids laboratories or self-study centres may serve the needs of various departments within the school.

In addition to finance, space, staffing and attitudes, general educational policy are all forms of resources.

The organisation management and operation structures are vital resources of the MTS.

We can conclude that the four main kinds of resource required are human (knowledge and time) material, administrative support and expertise.

5.5 Organisational and Administrative Structure

The Marine Training School must be established within the framework of the Ministry of Marine Resources. Fig 5.1 is the proposed Organisational and Administrative structure of the MTS. As mentioned earlier the MTS is under the Ministry of Marine Resources.

The Board of Governors is comprised of a representative of the Ministry of Education, since it is an academic institution. A representative from the Ministry of Marine Resources should be a member who will act as intermediary between the school and the ministry. The representative from the Ministry of Transport and Communications will implement the policies of MARAD, and the representative of Fishing Companies will see that their interest is protected since they are the benefactors of the school.

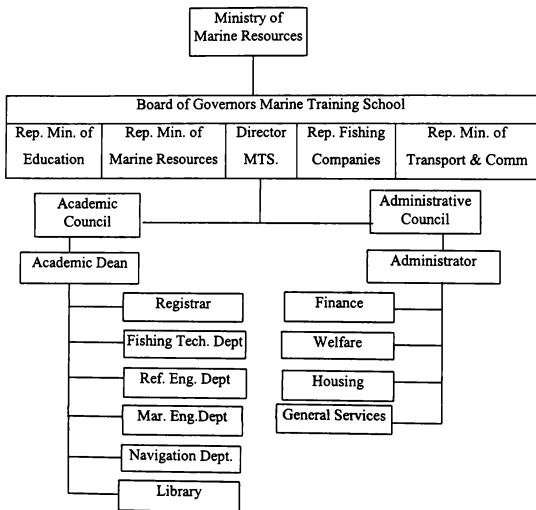


Fig 5.1: Proposed Organisational and Administrative Structure of the MTS.

The Board of Governors of the MTS shall consist of the following:-

- a representative from the Ministry of Marine Resources as Chairman of the board.
- a representative from the Ministry of Transport and Communications
- a representative from the Ministry of Education
- a representative from fishing companies
- the Director of the MTS as secretary to the board

The functions of board will be:

- to promote policy for the present and future of the school
- to take managerial and administrative decision of the school
- to promote and maintain links with other MET establishments abroad
- to determine a developmental program
- to control the finances of the school

The Director is the overall head of the school and is answerable to the Board of Governors.

The functions of the Director will be:

- to implement the policies of the School Board of Governors
- to foster a harmonious working relationship among staff members
- as secretary to the Board he will be responsible to formulate the minutes of the Board meetings
- responsible for the day-to-day administration and management of the school
- to present an annual statement of account to the Board

The Academic Council will comprise the Academic Dean, Registrar, Chief of the Navigation Faculty, Chief of Marine Engineering Faculty, Chief of Refrigeration Engineering Faculty, Chief of the Fishing Technology Faculty and Chief Librarian. The Academic council is answerable to the Director.

The Academic Dean will be the head of the Academic Council.

The functions of the council members are:

- to execute the duties that may be assigned to them by the Director
- curriculum design development and implementation

The Administrative Council shall consists of the Administrator as Chairman of the council a Finance Officer, Welfare Officer, Housing Officer and General Service Officer. The administrative council shall be answerable to the Director of the school.

Our maritime industry must be properly examined. By so doing we can ensure a sustainable marine training school based on constant financial support as part of our developmental program.

Shipping entrepreneurs should take an active part in deciding the marketing policy and specific needs of technical personnel. The fishing industry, which has vast maritime potential in areas such as fish technologists, should also take part in the discussion of future policy and curriculum of the school.

5.6 Staff Criteria

Highly qualified teaching staff is the key to a successful MET program. The duties of the respected staff should be assigned to them in respect of their qualifications and experience.

Teaching methods and techniques should be applied as the teaching strategies. A position to fill any vacancy of the MTS must be published. The board of Governors should be responsible for staff recruitment.

Director and Academic Dean:

Must hold a degree in Engineering plus a Post Graduate Diploma or Degree in Maritime Education and Training with experience in a senior position in a recognised technical institute.

Registrar:

Must hold a degree in Education with at least five years working experience in a senior position.

Lecturers in Fishing Technology:

Must hold a degree in Fishing Technology with experience in net making, fishing gears and fish processing.

Lecturers in Refrigeration Engineering:

Must hold a degree in Engineering with experience as a Senior Refrigeration Mechanic in an industrial refrigeration plant

Lecturers in Marine Engineering:

Must hold a degree in Engineering with a Certificate of Competency of Third Class Engineer.

Lecturers in Navigation:

Must hold a degree in Navigation with a Certificate of Competency of Third Class Officer.

Librarian:

Must hold a degree in Education with working experience as a senior Librarian or a Documentalist.

Administrator:

Must hold a degree in Business Administration with working experience in a reputable organisation.

Finance Officer:

Must hold a degree or Diploma in Economics or Accounts with working experience in a higher technical institute.

Welfare Officer:

Must hold a degree or diploma in Social Sciences with working experience.

5.7 Students Entry Requirements

An Admission Committee should be set up by the Director with the Registrar as Chairman of the Committee.

The Admission Committee must be approved by the Board of Governors.

Entry should be open to candidates who have undertaken an approved course of study at a recognised tertiary institution. The school will also accept applications from candidates who seek admission primarily on the grounds of experience and achievements since leaving school. Such candidates should provide evidence of their experience and achievements.

The educational ladder in Sierra Leone is based on the 6-3-3-4 educational system. This means six years of primary school, three years of junior high school, three years of senior high school or two years of vocational or technical school and four years of university. Fig 5.2 shows the academic ladder to the MTS and the type of examination conducted and Diploma awarded to graduates.

The criteria:

- Must not be more than 26 years of age.
- Must have successfully completed two years at a technical school or three years of senior high school with two "A" Level passes in mathematics and physics.
- Ordinary Technician Diploma (OND), or equivalent.
- A pass in English language at graduate exam in Junior High School.

Selected candidates will take a written examination in mathematics, physics English language and general knowledge.

Interviews will be conducted by the Admission Committee. The Committee will take into consideration the candidate's qualifications, experience and written examination results.

Medical Examination

A licensed medical practitioner should be appointed by the Board of Governors to carry out physical health and medical fitness examinations on successful candidates.

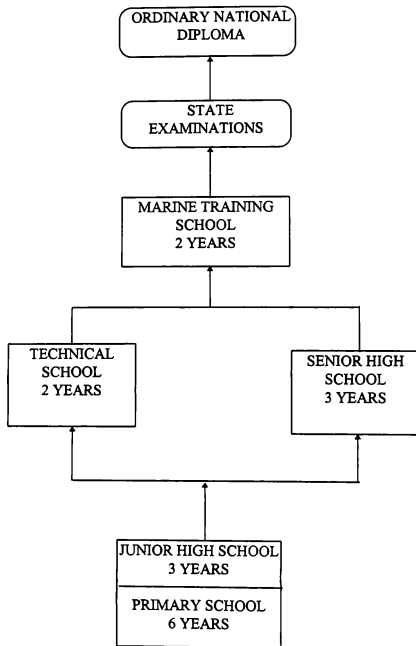


Fig5.2 Academic ladder to the MTS.

5.8 Project Schedule

This method is introduced by Butman(1996).

Aim: To determine the activities necessary to implement the project and the maximum period of implementation.

The re-establishment of the MTS is considered by the government as an important issue. However, the beaurocracy involve has brought about delays in the whole process.

In this sub-topic the author has realised the necessity of an implementation program in a specified period of time.

The activities have been carefully selected by taking into account a number of factors, including the economic, social and political.

In order to implement the program in a stipulated period, the following has been done:

- list of activities
- a table of data set up
- a simplified arrow diagram based on interrelations identified
- and calculation of the latest occurrences
- a bar chart of the project
- a final arrow diagram

List of Activities

1. Enhance existing facilities
2. Assessment of fishing fleet
3. Appraisal of existing program
4. Commencement of project
5. Set staff criteria, students entry requirements and redistribute hours
6. Determine the need for future upgrading courses
7. Determine Certificate of Competency
8. Implementation of Regional and National Legislation

9. Curriculum evaluation
10. Justify accreditation of the program
11. Quality assessment of the program
12. Identify cores of the curriculum
13. Final assessment and completion of project

Table 5.1 List of Activities Identification

Activities	Activities Description	Activity Duration	Preceding Activity	Succeeding Activity
1	Commencement of Project	1	—	2 & 3
2	Assessment of size of Fishing Fleet	7	1	9
3	Enhance Existing Facilities	6	1	7
4	Identify Cores of Curriculum	8	7	6
5	Set Staff Criteria; Students Entry Requirements and Re-distribute Hours	6	6 & 10	12
6	Appraisal of Existing Program	6	4	5 & 11
7	Implementation of Regional and National Legislation	2	3	4
8	Determine the need for future Upgrading Courses	3	9	10
9	Determine Certificate of Competency	5	2	8
10	Justify Accreditation of the Program	5	8	5 & 11
11	Curriculum Evaluation	10	6 & 10	12
12	Quality Assessment of the Program	7	5 & 11	13
13	Final assessment and completion	6	12	-

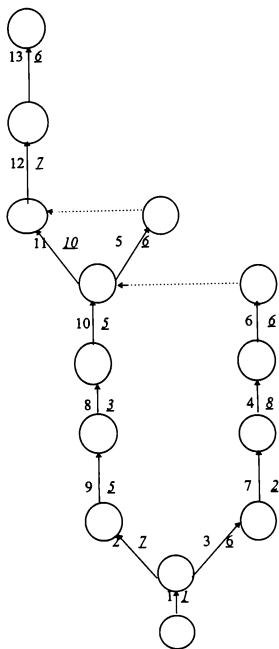


Fig 5.3 Simplified arrow diagram based on interrelations

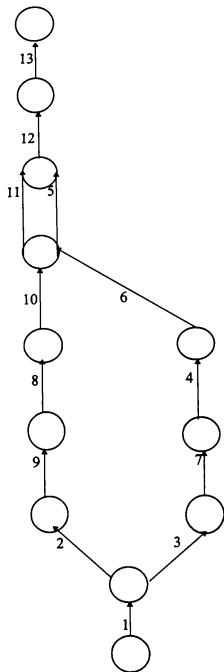


Fig 5.4 Final arrow diagram

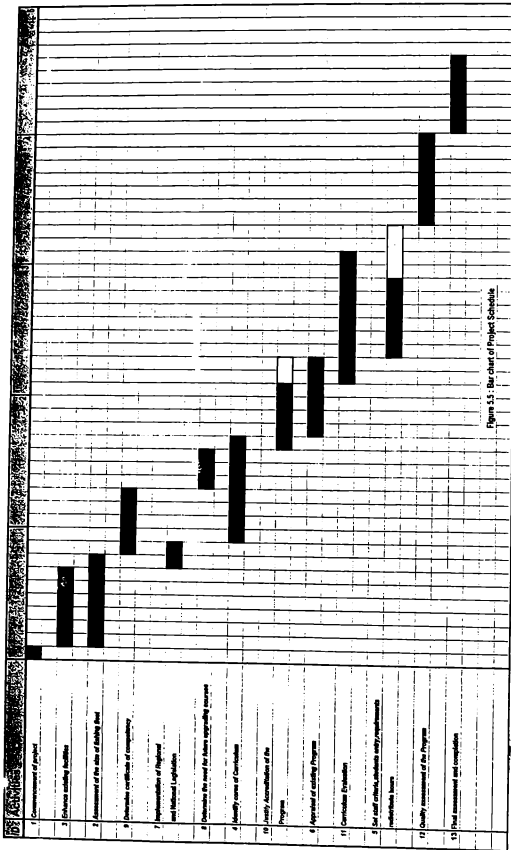


Figure 1.3: Bar chart of Project Schedule

From Table 5.1 we can see that the activities are numbered and described, each having its duration in days and also the preceding and succeeding activities outlined. According to the arrow diagram one can see that activity 1 is the commencement of the project. The duration for activity 1 is only 1 day it is not preceded by any activity because it is the first activity. Activity 1 is succeeded by activities 2 and 3 simultaneously.

Activity 2 has a duration of 7 days and activity 3 has a duration of 6 days.

The earliest and latest time for activity 2 from the start of the project execution will be 1+7 which gives us 8 days with a float of 0. Whereas the earliest and latest time for activity 3 is 7 days with 0 float. Activities 2 and 3 are succeeded by activities 9 and 7 respectively.

Activity 7 has a duration of 2 days with earliest and latest time of 9 days the float being 0, and is succeeded by activity 4.

Activity 9 has a duration of 5 days with earliest and latest time of 13 days and a float of 0 and is succeeded by activity 8.

Activity 8 has a duration of 3 days with the earliest time of 16 days and the latest time of 18 days. As a result of the difference in time we therefore have a float of 2 days. This activity is succeeded by activity 10.

Activity 4 has a duration of 8 days with an earliest and latest time of 23 days. Activity 10 has a duration of 5 days with an earliest time of 21 days.

Note that since activities 11 and 5 will be executed only after the completion of activities 10 and 6, the latest time for activity 10 will then be 23 days. This in turn result in the latest time of 18 days for activity 8, thereby having a float of 2 days.

From activity 10, two activities will be carried out simultaneously. These are activities 11 with a duration of 10 days and activity 5 with a duration of 6 days. Both the earliest and latest time is 33 days with a float of 0. Both are succeeded by activity 12.

Activity 12 has a duration of 7 days with an earliest and latest time of 40 days and a float of 0. It is succeeded by activity 13.

Activity 13 has a duration of 6 days with an earliest and latest occurrence of 46 days with 0 float.

A simplified arrow diagram based on interrelations illustrating one activity been executed after another, and at the same time two activities been executed simultaneously, with each activity duration are shown on Fig 5.3.

The procedure in which the various activities should be finally carried out is illustrated in Fig 5.4

This concludes that the project should be executed in a maximum period of 46 days. Implementation of this project scheduling should begin at most six weeks after the government approval for the re-establishment of the MTS and the formation of the Board of Governors and the appointment of the Director of the School.

CHAPTER 6

PROPOSED PROGRAM

6.1 Proposed Curriculum

In order to guarantee its effectiveness the proposed curriculum has been designed with care and imagination.

There are no doubts that there will be unpredictable changes in the fishing industry e.g. technological developments or amendments to conventions related to ships design. As a result a review of the curriculum should be done periodically.

The present trend in curriculum development of other maritime institutions has provided a correlation between the theoretical aspects, on the job training and practical on board fishing vessels.

According to the needs of the country with regards to the fishing industry, and as a follow-up and development of an already existing curriculum, the following courses are considered appropriate for the re-established MTS.

- Fishing Technology
- Navigation
- Marine Engineering
- Refrigeration Engineering

The total training duration of each course should be two years. The total number of semesters for each course should be four. The Academic year should run from 1 August to 15 June.

Extramural or evening studies should be conducted for those who work at sea and would like to upgrade their qualifications. To this type of study the school should admit candidates who have graduated from the school or have a high school certificate and have worked for at least two years on a fishing vessel.

Table 6.1 shows the on board ship training and on the job training periods.

During their two years of study, Fishing Technology and Refrigeration Engineering students will do a total of six months at sea and six months on the job training on shore based plants.

Marine Engineering and Navigation students will do a total of twelve months at sea.

Table 6.1: On Board Ship and on the Job Training Periods

Course	Time and Period of Sea Training		Total	Time and Period of on the Job Training		Total
	1st yr.	2nd yr.		1st yr.	2nd yr.	
Fishing Technology	1st yr.	2nd yr.	6 months	1st yr.	2nd yr.	6 months
	3 months	3 months		3 months	3 months	
Refrigeration Engineering	1st yr.	2nd yr.	6 months	1st yr.	2nd yr.	6 months
	3 months	3 months		3 months	3 months	
Marine Engineering	1st yr.	2nd yr.	12 months			
	6 months	6 months				
Navigation	1st yr.	2nd yr.	12 months			
	6 months	6 months				

Source: MTS, 1994

The sandwich training program of the MTS is been illustrated in fig 6.1. After a two months pre-sea all the students will attend six months lectures. The Fishing Technology and Refrigeration Engineering students will then go to sea for three months and on the job training for three months on shore based plants. They will go back to school for lectures for six months and then go to sea for three months and an on the job training for three months on shore based plants.

On the other hand the Marine Engineering and Navigation students after their six months in school will go to sea for six months, then back to school for another six months and back to sea for another six months.

FISHING TECHNOLOGY
AND
REFRIGERATION ENGINEERING



MARINE ENGINEERING
AND
NAVIGATION



Fig 6.1: Training Program (sandwich)

The curriculum are to provide students with specialist knowledge and skills required for the efficient and effective exploitation of our marine resources, and to ensure the optimal operation of the fishing vessels from a safety, economic and environmental point of view.

The program has also been designed to meet the trend of new technological changes in the fishing industries, taking into consideration regional and national legislation and the STCW.

6.2 Environmental Impact

The MTS. must be aware of the pollution caused by fishing operations that leads to environmental damage. Therefore environmental protection must be included in the curriculum. This will enable the students to appreciate all the regulations against dumping of chemical or other pollutants at sea. The students will also be taught basic skills in clean-up operations and use of equipment's to recover debris or other floating objects on the sea.

It is quite clear that fishermen are the victims of marine pollution, as fishing areas have closed due to contamination by pollutants.

The students must be aware that loss or abandonment of fishing gear also constitutes a hazard to fishing and navigation, and adds to environmental degradation.

In this respect it should be noted that Annex V of the Convention on the Prevention of Marine Pollution by the Dumping of Wastes and Other Matters (MARPOL) specifically excludes "fishing gear". Nevertheless the guidelines for the implementation of Annex V recommend that the technology for the marketing of fishing gear should be developed and encourages fishing operators to minimise the loss of gears.

The problem of monitoring, controlling and surveillance (MCS) increase with each legislative innovation. The impact of these upon fishing operations must be considered a priority for the MTS.

6.3 Legend of the Courses

T: Lectures in hours

W: Workshop practical in hours

L: Laboratory in hours

Table 6.2: General subjects for all courses

First Semester	T	W
Mathematics	32	0
Physics	20	0
English	15	0
Introduction to computers	16	0
Chemistry	18	6
Environmental Protection	20	0
Ship's Construction	36	0
Ship's Organisation	15	0
Total	172	6

Source: MTS, 1994

6.3.1 Fishing Technology Course (10 students)

The course is designed for students seeking career in fish processing and as future trawl masters.

Aim: To provide students with the specialist knowledge and understanding in fish processing, net making, fishing gears, fish location and catching methods.

Objectives:- On completion of the course students should be able to-

1. understand the different species of fish
2. methods of processing and preservation of fish
3. carry out net making
4. carry out emergency procedures and basic search and rescue operations
5. appreciate the use of computers in the execution of the work

Subjects and Lectures hours are shown in Tables 6.2 and 6.3

On successful completion of the course graduates will be awarded an Ordinary National Diploma in Fishing Technology.

Table 6.3: Fishing Technology Subjects

Second Semester	T	L
Technical Drawing	10	0
Ichthyology	28	0
Fish Systems Mechanisms	30	6
Fish Tactics	10	0
Subtotal	78	6
Third Semester	T	L
Emergency Procedures / Search and Rescue	15	10
Application to Computers	10	15
Fish Finding	24	8
Fish Processing and Preservation	36	10
Fish Species	20	6
Subtotal	105	49
Fourth Semester	T	L
Safety Precaution	10	0
Fire Prevention	16	8
Trawl Fishing	40	6
Purse Seine Fishing	40	6
Fishing Management	15	0
Fishing Publication	10	0
Net Making	20	20
Subtotal	151	40
Total	334	95

Source: MTS, 1994

6.3.2: Refrigeration Engineering Course (10 students)

The course is designed for students seeking a career in refrigeration engineering to enable them to serve on board fishing vessels and shore refrigeration plants.

Aim:- To provide knowledge and understanding of the operation of ships' s refrigeration mechanisms with emphasis on shore refrigeration plants.

Objectives:- On completion of the course students should be able to-

1. carry out brazing, welding and soldering of refrigeration pipes
2. carry out ship repairs and workshop technology
3. appreciate the use of computers in executing their work
4. carry out emergency procedures and search and rescue
5. carry out maintenance on domestic refrigerators and ship refrigeration plants

Subjects and Lecture hours are shown in Tables 6.2 and 6.4

On the successful completion of the course students will be awarded an Ordinary National Diploma in Refrigeration Engineering.

Table 6.4: Refrigeration Engineering Subjects

Second Semester	T	W	L
Technical Drawing	24	0	0
Thermodynamics	24	0	0
Materials	24	0	0
Electrotechnique	16	0	10
Brazing, Welding and Soldering	24	0	10
Workshop Technology	10	20	0
Subtotal	122	20	20
Third Semester	T	W	L
Emergency Procedures / Search and Rescue	15	0	10
Application to Computers	10	0	15
Auxiliary Mechanisms	30	10	0
Electrical Equipment on board ship	24	10	0
Ship Refrigeration Plants and their Maintenance	26	0	10
Air Conditioning and Refrigeration Compressors	26	0	10
Subtotal	131	20	45
Fourth Semester	T	W	L
Safety Precaution	10	0	0
Fire Prevention	16	0	8
Ships Automation	14	0	10
Ship Refrigeration Plant and their Maintenance	10	0	10
Subtotal	50	0	28
Total	303	40	93

Source: MTS, 1994

6.3.3: Marine Engineering Course (10 students)

The course is designed for students seeking career in Marine Engineering i.e. for future Marine Engineers.

Aim:- To develop understanding of ship machinery and propulsion, with emphasis on Internal Combustion Engine and Auxiliary Mechanisms.

Objectives:- On completion of the course students should be able to:

1. carry out emergency procedures and search and rescue operations
2. carry out ship repairs and workshop technology
3. appreciate the effective exploitation of diesel engines and ship steam generators
4. provide in-depth knowledge of the principles of engineering thermodynamics
5. appreciate the use of computers and simulators

Subjects and Lecturing hours are shown in Tables 6.2 and 6.4

On successful completion of the course graduates will be award an Ordinary National Diploma in Marine Engineering

Table 6.4 Marine Engineering Subjects

Second Semester	T	W	L
Technical Drawing	24	0	0
Materials	24	0	0
Workshop Technology	10	20	0
Thermodynamics	24	0	0
Electrotechnique	16	0	10
Propulsion Mechanisms	24	0	10
Subtotal	122	20	20
Third Semester	T	W	L
Emergency Procedures / Search and Rescue	15	0	10
Application to Computers	10	0	15
Auxiliary Mechanisms	30	10	10
Internal Combustion Engine	30	0	10
Electrical Equipment on board ship	24	10	0
Subtotal	109	20	45
Fourth Semester	T	W	L
Safety Precaution and Fire Prevention	26	0	8
Ship Repair Technology	36	10	0
Ships Steam Generators	20	0	10
Internal Combustion Engine	40	0	10
Ships Automation	14	0	10
Subtotal	136	10	38
Total	367	50	103

Source: MTS, 1994

6.3.4 Navigation Course (10 students)

The course is designed for students seeking a career as skipper on fishing vessels.

Aim:- To provide students with knowledge in the use of navigational equipment's and to enable them to apply different types of fishing methods and techniques.

Subject and Lecturing hours are shown in (Tables 6.2 and 6.5)

Objectives:- On completion of the course students should be able to:-

1. navigate the vessels and carry out ship manoeuvring effectively
2. appreciate the use of computers in the execution of their work
3. locate and catch fish by stern and purse seine trawling
4. appreciate the use of navigational charts and raider
5. carry out emergency procedures and search and rescue

On successful completion of the course graduates will be award an Ordinary National Diploma in Navigation.

Table 6.6 Navigation Subjects

Second Semester	T	W	L
Technical Drawing	10	0	0
Geography	20	0	0
Seamanship	30	0	0
Propulsion Mechanisms	30	0	0
Fish System Mechanisms	30	0	0
Subtotal	120	0	0
Third Semester	T	W	L
Emergency Procedures / Search and Rescue	15	0	10
Application to Computers	10	0	15
Coastal Navigation	20	0	0
Ship Manoeuvring	10	0	10
Navigational Charts	15	0	0
Navigational Fishing	30	0	0
Subtotal	100	0	35
Fourth Semester	T	W	L
Safety Precaution and Fire Prevention	26	0	8
Ship Repair Technology	20	10	0
Radar Operation	15	0	10
Trawl Fishing	40	0	6
Purse Seine Fishing	40	0	6
Subtotal	141	10	30
Total	361	10	65

Source: MTS, 1994

6.3.5 Subjects Allocation

Each course has been divided into three groups of subjects. Namely, supporting, professional and safety and survival.

Supporting:- Deals with subjects that can give basic knowledge, and serve as the basis for professional and safety subjects.

Professional:- covers subjects that are directly related to the particular course.

Safety and Survival:- According to the STCW Convention, safety and survival must always be part of the curriculum, since adequate knowledge and skills in this area can help to reduce disasters at sea that can be caused naturally, by mechanical failure and sometimes by human error.

Total hours per course

Fishing Technology-----607

Refrigeration Engineering-----614

Marine Engineering-----698

Navigation-----614

The Pie Charts in Figs 6.2a, b, c and d show the hours (in percentage) allocated to each group of subject.

In fig 6.2a subject hours on Fishing Technology supporting subjects covers a total of 193 hours, survival 59 hours and professional 331 hours.

In fig 6.2b, subject hours on Refrigeration Engineering, supporting subjects covers a total of 255 hours, survival 59 hours and professional 300 hours.

In fig 6.2c, subjects hours on Marine Engineering, supporting subjects covers a total of 255 hours, survival 59 hours and professional 384 hours.

In fig 6.2d, subject hours on Navigation, supporting subjects covers 213 hours, survival 59 hours and professional 342 hours

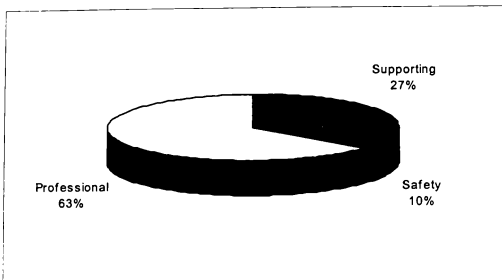


Fig 6.2a: Subject hours Fishing Technology (Percentage allocation)

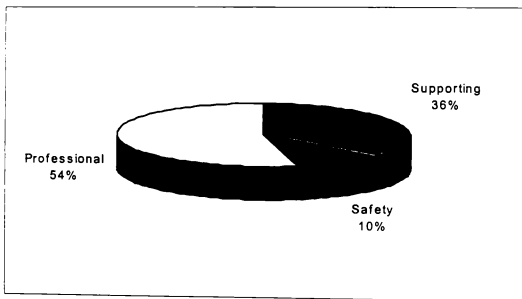


Fig 6.2b: Subject hours Refrigeration Engineering (Percentage allocation)

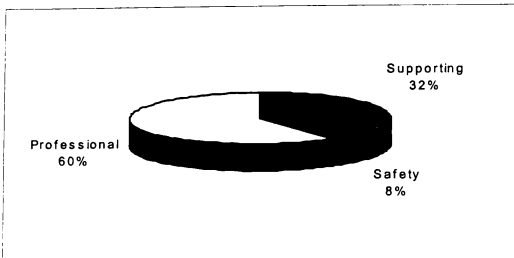


Fig 6.2c: Subject hours Marine Engineering (Percentage allocation)

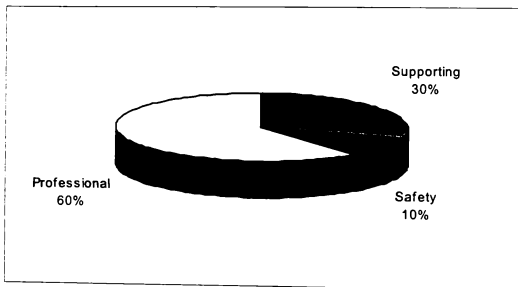


Fig 6.2d: Subject hours Navigation (Percentage allocation)

The Regional Maritime Academy (RMA) in Ghana is a branch of the WMU. Between 1984-1992, a total of seventy Sierra Leoneans from the MTS and other institutions in the country attended and graduated from the RMA. Fifty-three graduated in the nautical discipline which include Skipper/Master Home Trade, Home Trade & Fishing Courses, Tugmaster/Ferrymaster/Master Offshore Pilot. Eleven graduated in Marine Engineering. Fig 6.3 compares the MTS and RMA in terms of percentage of subject content allocated to professional subjects, supporting subjects and safety.

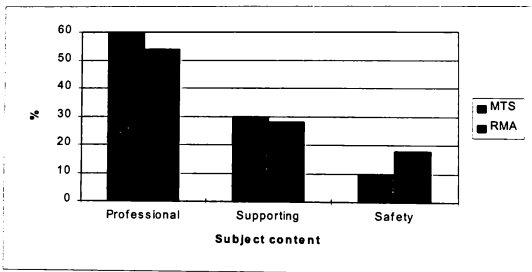


Fig 6.3: Comparison of subject content

6.4 Curriculum Review

The curriculum must be reviewed periodically. A curriculum committee of ten for the MTS must be set up to deal with the matter work with the Institute of Education. Members of the committee must be drawn from MTS and scholars from the Institute of Education with the Director of the MTS as secretary.

The curriculum approach must be programmatic, in other words students should learn what they need to learn. Curriculum development may begin either with a

general assessment of needs. In this case three groups of peoples need to be consulted, Pratt (1980)

1. employers of the fishing industry
2. people whom it is politically expedient to consult
3. people who have a special insight or expertise.

These people should be identified at an early stage, because they may be in a position to affect the implementation of any curriculum that is subsequently developed. Organisations, members of training institute boards, members of vocational institute boards, the board of directors of the Institute of Public Administration and Management, boards of directors of shipping and fishing companies, board of directors of the Sierra Leone Ports authority.

Student might be included by right since they or their successors will be on the receiving end of the proposed curricula. In addition, they often have valuable insights into the curriculum.

Academic specialists: have almost complete control of the curricula in higher education in Sierra Leone. At the technical and vocational levels they have considerable influence through participation in curriculum development.

Evaluating the cost of the Reviewed Curriculum

Cost is an important element in reviewing curriculum. The cost of this exercise should normally be perceived in terms of the monetary value attributable to the resources used in its performance. The capital cost i.e. buildings, furniture and equipment which contribute to the educational and training process over a period of years (in economic terms , fixed capital) should be properly evaluated. If this is to be considered alongside and aggregated with recurrent expenditure such as lecturers and instructions, salaries or consumable materials, it is necessary to express expenditure in terms of an annual payment spread over a number of years.

6.5 Curriculum Evaluation

Internal evaluation of the MTS curriculum must be the first step after being written and revised. This must be done within four weeks after the first draft. The evaluation will almost certainly reveal numerous minor defects. Out of it will emerge a revised draft.

The next stage is expert appraisal: The experts whose assessment of Maritime Education and Training is sought need to be knowledgeable. They must be willing, and encouraged, to deliver a candid judgement.

Curriculum evaluation have a series of step to follow. In Fig 6.4 only the main steps are shown.

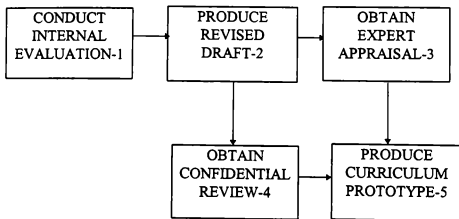


Fig 6.4: Main Steps in Curriculum evaluation

Source: Pratt, 1980, page 410

According to Pratt, 1980

Curriculum evaluation must be guided as follows:

- The aim must have prima facie significance. It should encompass all the main intents of the curriculum.
- The program must be valid, sound and rigorous.
- The objectives must be identified, it must be relevant to its aim, it must be precise, feasible, functional, significant and appropriate when the objectives are achieved, then the aim would be realised. The objectives must be evaluated by an explicit performance criteria .

- The Performance criteria must be congruent, complete, objective, discrete, reliable and efficient.
- The Grading system must be clear and explicit. It must ensure that critical objectives are achieved before credit is awarded.
- The impact on other courses, programs, lecturers and instructors of the school must be identified.
- The instruction schedule must be sufficiently detailed and subject matter motivational. Teaching strategies must be appropriate, varied and creative and all objectives addressed by appropriate, instruction.
- In the area of management of diversity formative evaluation must be frequent, valid, and diagnostic. Remediation must be pre-planned, appropriate, motivational and efficient.
- With regard to logistics, the minimum and maximum numbers of students and groups must be indicated. There must be a contingency plan for surplus or shortfall of students. All materials and equipment specified must meet the criteria. Required facilities must be identified and total time consumption realistically calculated. Instructors, and lecturers qualities competencies, and responsibilities should be defined.
- There must be a provision for ongoing monitoring and revision of the program which must be subject to evaluation with valid measures of effectiveness and acceptability.
- The MTS curriculum evaluation board must create a strategy and timetable for its implementation with the roles and responsibility clearly define. Finally, the curriculum must be free, stylistic with no typographical errors, unsupported assertions, unnecessary jargon, verbosity etc. It must be attractively and professionally produced.

6.6 Student Assessment

Pratt, (1980) introduced the following student Assessment methods.

Assessment means those activities that are designed to measure learner achievement brought about as a result of an instruction program of some sort.

A Desirable Characteristics of Student Assessment Procedures, should ideally be valid, reliable, practicable, fair and useful to the students of the Maritime Training Institute . The validity of assessment procedure will be to test out what it sets out to test. The reliability is a measure of the consistency with which the question, test or examination produces the same results under different but comparable conditions.

Practicability: - assessment procedures should be realistically practical in terms of their cost, time taken, and ease of application.

Fairness and usefulness:. To be fair to all students, an assessment must accurately reflect the range of expected behaviour as described by the course objectives. The students should know exactly how they are to be assessed. They must have a right to information such as the nature of the materials on which they are to be examined (i.e. content and objectives), the form and structure of the examination, and the value in the terms of marks of each component of the course.

Practical tests should be the method to assess psychomotor objectives and include such techniques as project assessment, assessment of laboratory work and other skill tests designed to assess specific manipulative skills. In addition students should be able to use non-cognitive skills (such as decision making skills).

Problem solving questions will be an excellent method of testing some of the middle-to-higher cognitive skills and for demonstrating extended reasoning skills in mathematical, scientific and engineering subjects. Project assessment may be carried out in terms of the students cumulative work over a period of time.

Our students should also be encouraged to become more self critical and more able to judge their own work. Peer assessment should also be encouraged so that students will be able to assess group-based projects or other collaborative exercises.

Grading should be reported as A,B,C,D and F to indicate the following scores. First of all the marks are of 100% then converted to grades.

91-100 = A	Excellent
81 - 90 = A-	Very Good
71 - 80 = B+	Good
61 - 70 = B	Very Satisfactory
51 - 60 = C+	Satisfactory
50 - 59 = C	Average
Less than 50	Probation

6.7 Overall Program Evaluation

We can define evaluation as the means whereby we systematically collect information about the results of students encounters with learning experience and analyse the information and results according to Pratt (1980).

Some of the possible information sources are:

- results from students assessment
- students questionnaires and interviews
- observations of the instructional system in progress
- feedback from teaching staff directly involved with the instructional system
- feedback from people having an indirect link with instructional system
- results from students

The teaching methods must be well matched to the course objectives and the objectives realistic and assessment method suitable

- students questionnaires and interviews

Obtaining feedback from students regarding their experiences and their options of an instructional system is one of the most common approaches to evaluation. The information can be sought through questionnaires and or interviews, and should be treated either objectively or in a more eliminative manner. Students feedback can be obtained through a variety of so-called self-reporting techniques. Students must be allowed to respond freely on topics raised in a questionnaire.

- Interviews with students

Students must be interviewed at the end of each semester, these should be basically in verbal form or student as a questionnaire. A well run interview can, however, probe more deeply and sensitively into specific areas of interest than can formally be done in a written questionnaire

- feedback from teaching staff directly involved with the instructional system

Through questionnaires, interviews and solicited comments, the opinions of staff directly involved in the implementation and operation of an instructional system can be of great value in course evaluation. Their comments may be influential in evaluating all aspects of the system, including the validity of the objectives, the course structure, the teaching sequence, the assessment methods, and day to day organisation and management of the MTS.

- feedback from people having indirect links with the institutional system

People who do not have a direct link with the actual program under investigation may still be able to make an important contribution to its evaluation. Again questionnaire, interviews and solicited comments are appropriate means of gathering information. The opinions of past students, lecturers, sea training instructors, and-on-the-job training instructors will be highly relevant.

External examiners comments can invariably be extremely influential in the course development of the MTS.

CHAPTER 7

RECOMMENDATIONS

In coming to the end of this dissertation, Proposals for the Re-establishment of the Marine Training School in Sierra Leone as a Sustainable Development, the author concludes that sustainable development projects in Maritime Education and Training must be prepared, financed and implemented in order to achieve lasting results in resource management. Training Programs relevant to the development and resource of management needs of the country must be organised with the assistance of international agencies, for example in the production and wide dissemination of audio-visual materials.

The ultimate determination of the quality of the MTS is within the institution itself. It is within the quality of the management, and the ability of those who manage especially at head of departmental level, to meet the goals, and on ethos of quality control.

With the expansion of the Sierra Leone fishing fleet, the Torremolinos International Convention for the Safety of Fishing Vessels, 1977, which was adopted on the 2 April 1977 must be ratified by the Government of the Republic of Sierra Leone.

This Convention contains safety requirements for the construction and equipment of new decked, sea going fishing vessels of 24 meters in length and over.

An extremely important aspect of the future MET system will be the training and staff development of lecturers and instructors. This should probably take place on a regular on going basis rather than on a once off pre-service basis as is usually the case. Such training should be designed to ensure that lecturers and instructors are not only thoroughly familiar with, and proficient in, the use of new techniques that information technology has made available, but are also able to organise the learning activities of their students in a systematic and effective way.

Political, social and economical factors influence MET. Therefore the Authorities concerned must work hand in hand with the related agencies and intergovernmental organisations.

Bilateral and regional agreements must be established with countries in and out of the region to facilitate the exchange of student programs.

A Maritime Education and Training and Development Trust to manage funds received from industry, government and other donors. It is envisaged that this fund could be used as a vehicle to satisfy not only the needs of the MTS but also to make a contribution to addressing the needs in MET in the region.

Funds must also be provided to purchase MET software to support the core curriculum.

Initially the school would need to be subsidised. It is envisaged that the school will be subject to the Ministry of Marine Resources.

Considerable financial and technical assistance must be given by some international organisation e.g. IMO, UNDP, ECOWAS, MINCONWAR and OECD.

In addition to these equipment tools and experts should be contributed by friendly governments, bilateral and multi-national organisations.

Accreditation of the curriculum must be one of the main aims of the MTS to enable the graduates to pursue further education in other higher maritime institutes.

Links must be established between the MTS and the ITF, ISF, BIMCO and classification societies like Lloyds List, in order to provide the school with updated information and materials.

Transparency must be one of the principles of the MTS. Members of the Board of Governors, Council, lecturers, instructors and students must be free to make suggestions and proposals as a team, or as individuals, whenever they consider it necessary.

The MTS. should publish a magazine annually to enable the public to know more about the school and appreciate the existence of the school. The press should be allowed to conduct interviews when necessary.

Maritime Education and Training must be integrated into the general education system. It should remain a national scheme.

A program of training for lecturers and instructors should be initiated to upgrade their pedagogical skills in the use of computer based technology.

Implementation of the following model courses should be undertaken:

IMO Model Course 1.19 Personal Survival

IMO Model Course 1.20 Basic Fire Fighting

IMO Model Course 1.13 Medical Emergency Basic Training

IMO Model Course 1.21 Human Relationships

Legislation must be passed for a new examination system. Internal assessment of the course work must be an important part of the examinations.

Government policy must be devoted to the current examining functions for both written and oral examinations to the school. A full professional approach must be maintained to oversee the standards and frequent audits by the maritime authorities. Written examination must be conducted by the senior school staff and oral by the MARAD.

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