WORLD MARITIME UNIVERSITY
Malmö, Sweden

BEYOND RULES, SKILLS AND KNOWLEDGE

Maritime Education and Training for Optimised Behaviour

By

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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 AFFAIRS

(MARITIME EDUCATION AND TRAINING)

2005

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 are not necessarily endorsed by the University.

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ACKNOWLEDGEMENTS

The Calf Path
(A poem)

One day thru the primeval wood
A calf walked home, as good calves should;
But made a trail, all bent askew,
A crooked trail, as all calves do.
Since then three hundred years have fled,
And I infer the calf is dead.
But still, he left behind his trail
And thereby hangs my mortal tale.

The trail was taken up next day
By a lone dog that passed that way.
And then, a wise bell-wethered sheep
Pursued the trail, o'er vale and steep,
And drew the flocks behind him too
As good bell-wethers always do.
And from that day, o'er hill and glade
Thru those old woods, a path was made.

And many men wound in and out,
And dodged and turned and bent about,
And uttered words of righteous wrath
Because 'twas such a crooked path,
But still they followed, do not laugh,
The first migrations of that calf.

And thru the winding woods they stalked
Because he wobbled when he walked.

This forest path became a lane
That bent and turned and turned again.
This crooked lane became a road
Where many a poor horse with his load
Toiled on beneath the burning sun
And travelled some three miles in one.
And thus a century and a half
They trod the footsteps of that calf.

The years passed on in swiftness fleet,
The road became a village street.
And this, before men were aware,
A city's crowded thoroughfare.
And soon the central street was this
Of a renowned metropolis.
And men, two centuries and a half
Trod the footsteps of that calf.

Each day a hundred thousand route
Followed the zigzag calf about,
And o'er his crooked journey went
The traffic of a continent.
A hundred thousand men were led
By one calf, near three centuries dead.
They followed still his crooked way

And lost a hundred years per day.
For thus such reverence is lent
To well established precedent.

A moral lesson this might teach
Were I ordained, and called to preach.
For men are prone to go it blind
Along the calf paths of the mind,
And work away from sun to sun
To do what other men have done.
They follow in the beaten track,
And out and in and forth and back,
And still their devious course pursue
To keep the paths that others do.

They keep the paths a sacred groove
Along which all their lives they move.
But how all knowing God must laugh
Who saw that first primeval calf.
Ah, many things this tale might teach,
But I am not ordained to preach.

Adapted from a poem by Sam Walter Foss (1895).

My sincere gratitude to all the professors – resident and visiting - who continuously encourage students not only to identify with long held values but also to ask “why?”

I express deep appreciation to Mrs Agatha Manuel (my mother) and Dr. and Mrs McCarthy Snr. (my parents in law) for all the support and encouragement. Thanks too to Mr. Eugene Manuel, Dr. and Mrs McCarthy Jnr. and Miss Miriam McCarthy. Better siblings one could not have.

I would like to thank Captain Aaron Turkson, Principal of the Regional Maritime Academy, Ghana, as well as the International Transport Workers' Federation for initiating and supporting my journey to and through WMU.

My gratitude to the faculty and staff of the WMU and especially the MET faculty. Your understanding, tolerance and help are appreciated.

Profound thanks to Professor Pourzanjani for your patience and encouragement. Your interest in my life and future has meant as much to me as your guidance. Thank you.

A special debt of gratitude is owed to the Library staff, David Moulder, Robert Bauchspies, Susan Wangecki-Ecklow and Cecilia Denne. Thanks for all your patience in acquiring all those books on inter-library loan. Your help was essential.

My deepest thanks to my wife, Angeley, who married me with no assurance of being spared the loneliness known only to the spouses of mariners and encouraged me to complete this study. To our little daughter, Elsie, a special thank you for cheerfully bearing the months without "Daddy". I am truly blessed to have you both in my life.

Finally, and most important of all, my extreme gratitude to God. In ways too numerous to recount, He has been my shield, strength and light. From Him I have had health, blessing and favour. I am forever indebted to Him.

ABSTRACT

Title of dissertation: **Beyond rules, skills and knowledge: Maritime education and training for optimised behaviour**

Degree: **MSc**

Educational objectives concern the acquisition of skills, knowledge and the development of suitable affective dispositions. In the maritime industry an emphasis has been traditionally placed on the gaining of knowledge and skills.

This dissertation seeks to discuss the place of the affective domain in maritime education. The history of maritime education is briefly examined together with theories of learning and motivation.

The study examines the nature of the safety culture as it relates to attitudes and behaviour and through a survey, case studies and a review of the literature, analyses the importance of the affective domain of education to the maritime industry. The challenges of affective education are investigated together with possible ways of enhancing the achievement of objectives in this domain.

The roles of different key industry players are examined in this context and the possibility for and suitability of achieving a global standard discussed.

Conclusions are drawn based on the results of the analyses and survey and subsequently recommendations are made regarding the need for commitment to these educational objectives and for further investigation into the domain of the affective education.

KEYWORDS: Affective education, safety culture, educational objectives, attitudes, values, ethics, behaviour modification.

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LIST OF ABBREVIATIONS

ABC	Antecedents, Behaviour, Consequences
AMETIAP	Association of Maritime Education Institutions in Asia Pacific
DOC	Document of Compliance
ECS	Ethics Compliance Standard *2000*
ERG	Existence, Relatedness and Growth
FSA	Formal Safety Assessment
HSE	Health and Safety Executive
IAMU	International Association of Maritime Universities
ILO	International Labour Organization
IMO	International Maritime Organisation
ISM	International Safety Management *Code*
MET	Maritime Education and Training
METI	Maritime Education and Training Institutions
METNET	Thematic Network on Maritime Education, Training and Mobility of Seafarers
NTSB	National Transportation Safety Board (US)
OECD	Organisation for Economic Co-operation and Development
SIRC	Seafarers International Research Centre
SMC	Safety Management Certificate
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended.
UK P & I	United Kingdom Protection and Indemnity *Club*
WMU	World Maritime University

CHAPTER 1 - INTRODUCTION

It is indisputable that good education and training in any industry is critical to the success of that industry. New entrants have to be educated and trained to industry accepted levels and people already in the field have to have their knowledge updated with changing times, knowledge and innovation. It is no different in the maritime sector and like most other industries, general principles of education and training apply, for improving the quality and expertise of the human resource.

> The shipping industry today is the result of a steady evolutionary process over the years, and it remains as vital to world trade today as it was in the last century. The success of this ever-changing industry rests on two essential factors: technology and the human element. But even the best designed and equipped ship is sub-standard if her crew is under trained, poorly accommodated, and overworked. The future of shipping is ultimately dependent not on state-of-art technology, but rather on the quality and expertise of the person handling that technology.
>
> International Maritime Organisation (IMO), 2005

Though the maritime industry shares many similarities with other industries, it is also unique in many ways. It is a truly global enterprise and education and training to the same standards has long been a challenge. The industry, to a larger extent than most others, has to base its success on people with very varied backgrounds, cooperating

efficiently in excellent teamwork. Again, unlike most other industries, repercussions of a deviation from these principles often have major and disastrous consequences, which tend to gain negative global attention to the detriment of the industry.

As early as 1673[1], some form of organised shore-based instruction in navigation had started in the United Kingdom[2]. Establishments such as the Trinity Houses of Newcastle (1712) and Hull (1785) also offered such instruction (Carver, 1968). Despite this, maritime education was mainly not shore-based. Seafarers learnt the job, as it were, on the job. No shore-based education was mandated and the longer one stayed at sea, the more proficient one was supposed to become. In the early nineteenth century in England, the number of children attending any kind of school was about 7% of the child population. Despite some limited efforts (e.g. in the British Navy), schooling for seafaring was, by and large, not a consideration. With time there grew various fora within which young boys could be given some form of education – moral, vocational and general. This was mainly spearheaded by the Marine Society to give "educated manpower" to the Royal Navy and companies such as the East India Company. Concurrently, merchants and ship owners sought to give potential seafarers an education in the "West India Naval School" (Kverndal, 1986, p. 318).

The impact of these was small, as most seafarers were still without any level of basic education.

Concerns for seafarers' education grew together with a general awareness of the importance of education as a whole and between the late 1700s and mid 1800s, schools were started which not only concentrated on the moral/religious education of potential seafarers but also offered a more general education and elements of navigation. The schools[3] were set up in the various ports – London, Liverpool, Hull, Edinburgh, etc. - of the UK and were mainly patronised by the children of seamen (Kverndal, 1986). Legal requirements for such nautical education started in 1835 with the requirement to carry apprentices on ships followed, in 1836, by a

[1] Establishment of the Royal Mathematical Foundation
[2] The UK is chosen here because of its subsequent merchant shipping prominence
[3] Schools such as the "Marine School" in Hull and "Seamen's Academy" in Edinburgh.

recommendation for the establishment of a Mercantile Board examination for officers, registry for seamen and nautical schools. Examinations were made mandatory in 1851 (Carver, 1968).

As the industry grew and maritime work became more professional and scientific, these schools evolved into colleges where professional and vocational skills were taught, leading to government controlled examination and certification. Maritime education had similarly evolved in other countries.

Globally, at this point, the curricula of maritime education and training (MET) were largely left to the control of the various countries and administrators of such education. These individual approaches were very different and as an increasing number of countries acquired merchant fleets, the diversity increased (Morrison, 1997, p. 11). This was exacerbated by the decline of the dominance of traditional maritime nations as the trend to flag out to more convenient registry regimes increased[4]. The global industry of shipping was becoming even more global. With time it was realised that the way to approach education and training for such an industry was to create a global standard. The first attempt in an international forum was with the establishment of International Labour Organisation (ILO) convention no. 53 in 1936 – Officers' Competency Certificates Convention. In the words of article 3 of this convention,

> No person shall be engaged to perform or shall perform on board any vessel to which this Convention applies, the duties of master or skipper, navigating officer in charge of a watch, chief engineer, or engineer officer in charge of a watch, unless he holds a certificate of competency to perform such duties, issued or approved by the public authority of the territory where the vessel is registered (ILO, 1936).

[4] Flying a flag for convenience is not new. As early as the first decade of the 19th century, British ships were flying flags of obscure German territories to avoid Napoleon's blockade on Britain (Boleslaw, 1962, p. 8). However with the advent of "commercial open registries" and increased economic pressure, the phenomenon has significantly increased.

The convention required that officers be certified post examination by a "competent authority" (article 4). The limitation in this was that the required knowledge content was still not standardised globally. A lot was still left to the discretion and expertise of the various national "competent authorities".

In striving for an international standard in this context, the best medium was found to be the legislative capabilities of the IMO. Work on this begun in 1969, and culminated in the adoption of a new convention in 1978 – the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW 78) - the first international convention agreeing on minimum global standards for seafarer certification.

With time it was realised that STCW 78 was severely limited. It was criticised as being too vague, lacking clear standards of competence, allowing limited port state control, and having no IMO oversight (US Coast Guard, 2002). It had focused on what seafarers needed to know to be deemed competent (Lewarn, 2002). This was deemed to be inadequate in an industry characterised by skill and practicality.

As a result of the ensuing drive for change, the emphasis was broadened from simple demonstration of knowledge to demonstration of knowledge and ability by performance – demonstrated ability. This, together with other important changes resulted in the amendments of 1995 – essentially a complete revision of STCW 1978. Among some of the important changes/additions were requirements for -

- Enhanced port state control procedures
- Defined responsibilities for flag states employing seafarers and administrations issuing certification
- Communication of information to the IMO
- Quality standards
- Simulators
- Compliance with a new STCW Code

STCW 95 has been in existence now for a decade and just like its predecessor, has met with a fair amount of criticisms. It seems that in an industry experiencing so

much change, amendments are a fact of life and if the industry as a whole desires to keep abreast (or on top) of safety and other issues, this reality must be acknowledged and accepted by all.
A study by the Seafarers International Research Centre (SIRC) brings up evidence indicating that the "enforcement of STCW is not achieving its stated aims in improving standards of maritime education and training or seafarer competency" (Sampson, 2003a, p. 44).

Over the last decade, an emphasis has been placed on knowledge and skill acquisition with respect to the training and education of seafarers. Ideally, according to Bloom (1956), three domains should form the objectives of an educational system: cognitive, psychomotor and affective.
There is a perception that the third domain of affective objectives is largely ignored in current MET practices and as required by STCW 95. At best it is done but not specifically acknowledged – certainly not at a global level. Proponents of this view, suggest that attitudes (affective domain) do matter and that there may be a need for the maritime industry to address the affective domain of education as much as it has concentrated on the cognitive (knowledge) and psychomotor (skill) domains.

The aim of this dissertation is to find out to what extent the affective domain is considered relevant to the industry, and whether current training methodologies cover this domain. A valid question to be raised is whether the evolution of the industry vis-à-vis current status and global trends, requires education beyond cognitive and psychomotor skills. If this is indeed required, what is being done in the industry to meet this need?

1.1. Research questions

To this end the questions to be addressed are:

1. Of what relevance is training in the affective domain in the maritime industry?

2. Do current training and educational systems address training in this domain?
3. How can existing methodologies of teaching, assessing and certifying education in the affective domain be optimised (or incorporated if non-existent)?

1.2. Research methodology and ethics

- Questionnaires were designed to solicit information regarding the first two research questions.
- The questionnaires were targeted at specific MET institutions (METI) and other identifiable and relevant bodies. The criteria for choosing the institutions were:
    - Perceived leadership and input in industry
    - Regional representation
    - Role of nation or region in manpower provision and/or training

- In developing the final questionnaires, pilot questionnaires were sent to 13 MET students of the World Maritime University, 10 other students of the same institution with varied backgrounds and countries of origin and 2 professors.
- Amendments were made to the final questionnaires based on comments from the pilot questionnaires.
- In addressing the third research question a critical analysis was undertaken (using library and web based resource as well as interviews) of existing views and ideas expressed by different writers and the industry as a whole.
- Some case studies have been used to further examine the relevance of attitude training in the maritime industry.

- Conclusions are drawn based on all of the above and recommendations have been made in the light of these findings.
- This dissertation does not seek to make any religious, racial, national or cultural inferences whatsoever. The thesis is on the basis that one does not have to be of any particular faith, race, nationality or culture to "own" the values and goals of the IMO, namely safe and secure shipping on clean oceans, or (as in the specific case of this dissertation) to work for the enhancement of education and training to achieve these objectives.
- This dissertation does not seek to imply that the current training emphasis on competence is misplaced. The author is of the firm view that there are many positive attainments in the STCW with its emphasis on cognition, skills and demonstrated ability. What the study seeks to do is to discuss the inclusion of the affective domain (in a more specific way) in the consideration of competence. The basis of this is the argument that all the knowledge and ability is irrelevant and practically limited in use if individuals, for one reason or the other, will not or are unable to use them.
- The results of the survey are in Appendix 1.

1.3. Literature review

The literature covering learning and motivational theories, domains of educational objectives and research into the safety culture, have been extensively reviewed. Resources used include the World Maritime University (WMU) library with extra literature obtained by inter-library loan and library databases. Web-based material was also used. The text of the dissertation incorporates this review as part of various analyses and development of answers to the research questions.

1.4. Use of words/definitions

1.4.1. Training

Muirhead (2001, p. 2) cites Stammers as defining training as "the systematic development of the skill behaviour pattern required by an individual in order to perform adequately a given task or job". The definition offered by the Department of Employment Glossary of Training Terms as cited by Bramley (1996, p. xvii) is "the systematic development of the attitude/knowledge/skill/behaviour pattern required by an individual to perform adequately a given task or job". Muirhead adds that this involves the "exposure to relevant experience or by repetition in a training module". In Bramley's view essential to training is the context in which it is undertaken. Training should therefore concern itself with the individual and how he functions in a group together with the training of groups as a whole. That is the reality of most industries. Ringness (1975) is of the opinion that training connotes conformity to a set pattern or desired behaviour common to all and is essentially imposed; 'this is how it is done – now repeat after me' way of learning.

1.4.2. Education

Education on the other hand is seen by Ringness (1975) as connoting inner decision-making. It is developing the ability to think through situations and come to conclusions that are in tune with inner convictions and values. One definition given by the Merriam-Webster dictionary (1996) is the process of "developing mentally, morally or aesthetically, especially by instruction"

1.4.3. Cognitive domain objectives

The largest proportion of educational objectives is cognitive in nature. Bloom, Krathwohl & Masia (1964, p. 6) define these objectives as:

Objectives which emphasise remembering or reproducing something which has presumably been learned, as well as objectives which involve the solving of some intellective task for which the individual has to determine the essential problem and then reorder given material or combine it with ideas, methods or procedures previously learnt.

1.4.4. Psychomotor domain objectives

Bloom et al (1964, p. 7) again define these as "objectives which emphasise some muscular or motor skill, some manipulation of material and objects, or some act which requires a neuromuscular co-ordination".
Various skills such as using sextants for navigation, steering a ship etc are examples in the maritime industry.

1.4.5. Affective domain

In this study, the affective domain (of attitudes, values and ethics) is broadly defined as covering those issues that relate to, arise from or influence feelings or emotions (Merriam-Webster, 1996) or an individual's inclination to act or refrain from acting in a certain manner due to personal convictions, quality of character and of conscience. In this context, the domain is deemed to include such values as honour, rule keeping, responsibility, loyalty, truth, integrity, safety consciousness, respect for social order, respect for the dignity and right of others, social interaction and similar values. Educational objectives in this domain are defined by Bloom et al as "objectives which emphasise a feeling tone, an emotion or a degree of acceptance or rejection. Affective objectives vary from simple attention to selected phenomenon to complex but internally consistent qualities of character and conscience." (Bloom et al, 1964, p. 7). Ringness (1975, p. 20) includes "interests, tastes, preferences, attitudes, values, morals, character and personality adjustment" as important parts of the affective domain.

1.4.6. Affective education

There are varied definitions for and a wide range of words used to describe affective education. In 1994, a conference to discuss this domain as evidenced in different educational systems in Europe, came up with the following definition:

> By affective education is meant that part of the educational process that concerns itself with attitudes, feelings, beliefs and emotions of students. This involves a concern for the personal and social development of *students*[5] and their self-esteem … A further important dimension goes beyond the individual students and concerns the effectiveness of their relationships with others, thus interpersonal relationships and social skills are recognised as central to affective education. *(emphasis added)*
>
> (Lang, 1998, p. 5).

1.4.7. Attitude

"A mental position with regard to a fact or state" or "a feeling or emotion toward a fact or state" – Merriam-Webster (1996)

McLeod (1991) cites Allport as defining attitudes as "a mental or neural state of readiness, organised through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situation with which it is related". This definition leads to two important conclusions about the nature of attitudes:

- They are the results of experiences
- They are indicative of underlying response tendencies - a readiness to respond to situations in certain ways but are not responses in themselves

There are three components of attitudes, namely affect, behaviour and cognition (McLeod, 1991; Gagné, 1985).

[5] The original word used is "pupils"

In “affect” the individual has a “feeling” regarding a thing or situation – labelling it positive or negative

“Behaviour” is the active response - a result of inherent attitudes.

“Cognition” is the mental assent to a set of beliefs and values resulting from our attitudes.

Oppenheim’s understanding of attitudes is similar although he uses different words: beliefs (the cognitive component), feelings (the emotional component) and behavioural intents (the action tendency component) (2001, p. 175).

1.4.8. Ethics

“A set of moral principles”, “the principles of conduct governing an individual or group”, “a guiding philosophy” (Merriam-Webster, 1996). It encompasses what is seen as right or wrong by individuals, social groups or the global community. Drawing on the definition given by the Business Ethics Research Project (1999), ethical standards are defined here as the system of values which an organisation (or individual) pursues under their own volition, and not due to the unilateral and external demands of laws and regulations.

1.4.9. Values

“Something intrinsically valuable or desirable” (Merriam-Webster, 1996).

Unlike virtue, values may be negative or positive and are determined by individuals, organisations and/or society at large. They are core beliefs that these individuals, organisations and/or society hold from experience, education or thought.

“Education is not the filling of a pail, but the lighting of a fire”

William Butler Yeats (n.d.)

CHAPTER 2 - LEARNING THEORIES AND BEHAVIOUR MODIFICATION

2.1. Historical trends in achieving desired behavioural patterns in shipping

In shipping, attempts to achieve desired behavioural patterns in students have historically taken different forms. Merchant Navy training (on board ship) from the early 19th century has been run, in most countries, along the lines of the military to achieve goals in the affective domain of discipline, rule-keeping and observance of hierarchical rankings. Discipline was defined in one word - "obedience" (Admiral Lord St Vincent in 1797 as cited by Sadler, 1983, p. 1) - whether or not the command to be obeyed was understood etc.

The attempt to control the behaviour of a seaman was certainly by punishment. Sanders (1983, p. 19) cites one such punishment from a book of orders from the time of King Henry VIII of the UK:

> If any man within a ship had slept upon his watch four times and so proved, this be his punishment. The first time he shall be headed at the mainmast with a bucket of water poured upon his head. The second, he shall be armed, his hands held by a rope and two buckets of water poured into his sleeves. The third time he shall be bound to the mainmast with gun chambers tied to his arms and with as much pain to his body as the captain will. Been taken asleep the fourth time he shall be hanged to the bowsprit end of the ship in a

basket, with beer, a loaf of bread and a sharp knife, and choose to hang there until he starve or cut himself into the sea.

The trend to deter by punishment is still very alive as seen in the recent emphasis on the criminalization of seafarers. In such a setting, education is geared towards teaching people the rules and compliance to avoid undesirable consequences of falling foul of the law. This mindset often results in an equally undesirable consequence of increased legislation - the victimisation mentality or the blame culture that is so detrimental to the achievement of a safety culture.

Figure 2-1 shows the dramatic increase in regulations regarding maritime safety (which is only one aspect of the many areas of legislation) over the last half century. This has come with significant increase in financial costs.

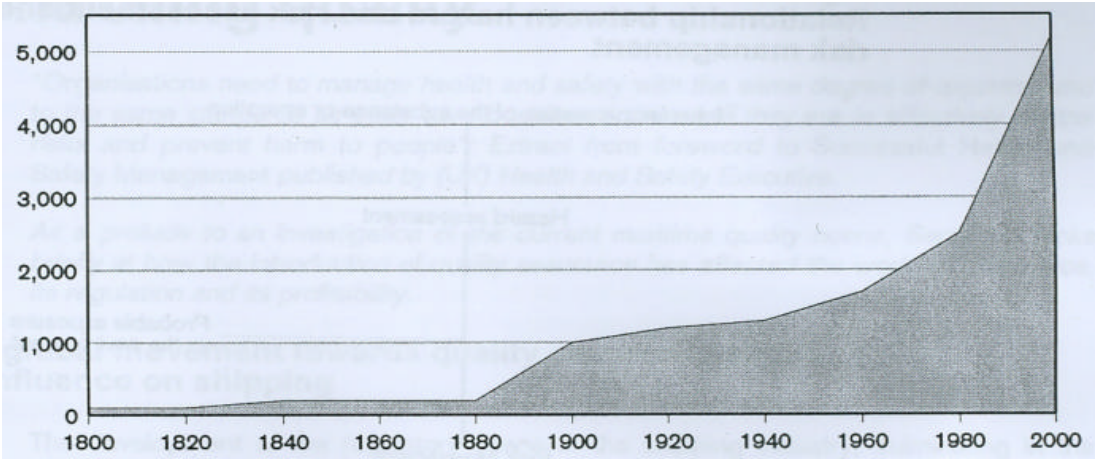

Figure 2-1: Rise of maritime safety regulations (index 1800 = 100)

Source: Drewry Shipping consultants (1998)

It is acknowledged that regulations do have many positive sides and in a global industry some legislation remains indispensable. Increased regulation seems to also have led to decreased levels of accidents etc. as shown in figures 2-2, 2-3 and 2-4.

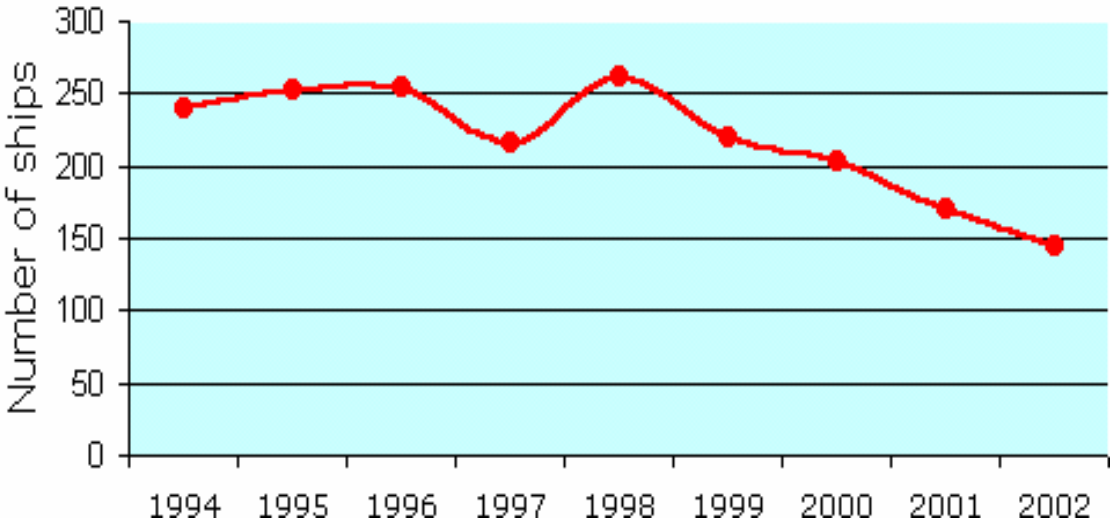

Figure 2-2: Total number of losses (ships over 100gt)

Source: Lloyd's Register Fairplay as cited *by* *www.shippingfacts.com*

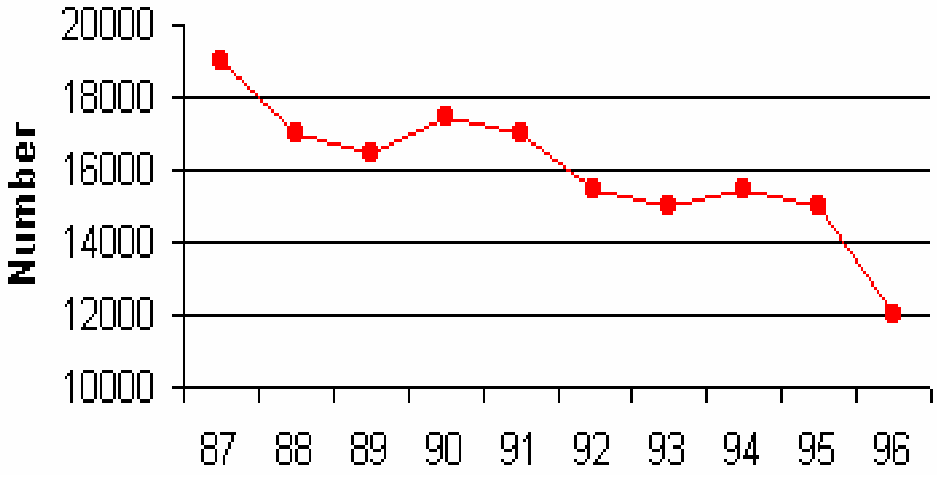

Figure 2-3: All insurance claims – frequency.

Source UK P & I Club[6] as cited by www.shippingfacts.com.

[6] Insures 20% of world's fleet. The graph is fairly representative of the industry

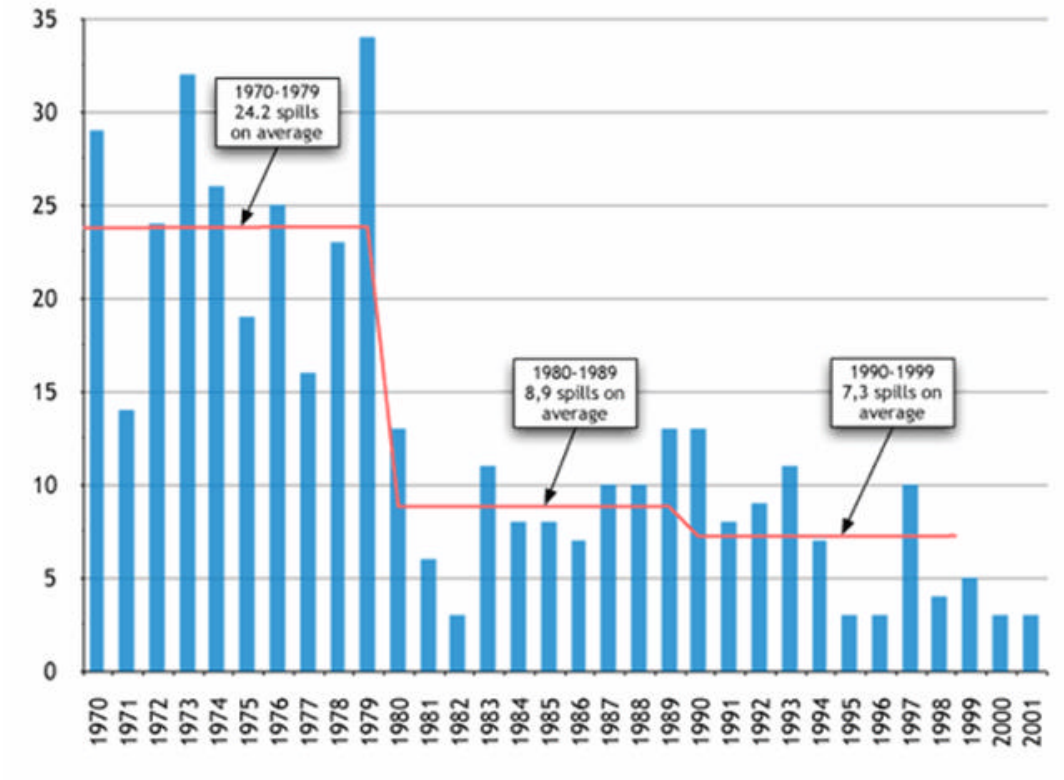

Figure 2-4: Number of spills > 700 tonnes per year.

Source: ITOPF / WMU Journal of Maritime Affairs.

As cited by IMO Marine Casualty Investigation e-course (2004).

There definitely is a lot to be said for the presence of good rules (especially proactive ones) and the ability to enforce them. However in the drive to optimise the safety profile of the industry all other "pillars" of the global safety system that will complement the improvement of the situation should be considered. Legislation is driven by the perception of risk – whether as a reaction or proactively. Though a situation may be detrimental to an industry, comprehensive legislation will only be accepted when it is proved as being relevant, necessary and economical. It is not always possible to implement a wide scope of legislation because of economic implications. Legislation has economic dimensions that limit what can be achieved through this means (Ma, 2002). Additionally, externally produced and "imposed"

safety protocols and procedures often fail to be internalised, resulting in lip-service being paid to regulations rather than whole-hearted compliance (Sampson, 2003a).

It is for reasons like this that education and training should look beyond compliance to competency that reinforces or complements the spirit of the various legislations.

The literature reveals a clear agreement of the place and importance of motivation in generating consistent desirable behaviour. An understanding of the fundamental needs of humans and an ability to influence the definition and attainment of those needs in the educational setting, may help to offer more positive incentives for compliance.

While regulations - and the punishments associated with breaching them - works most of the time and certainly have their place in the control of a global industry, the motivation to comply remains the fear of consequences of non-compliance. When those consequences are removed or can be circumvented, the result will invariably be deviant behaviour which will compromise the larger international goals.

This mindset not only breeds hostility to rules and those who seek to implement them, but also complicates the investigation of the root causes for deviant behaviour. It is epitomised in the conflict in marine casualty investigation between finding root causes and imposing penalties for accidents – a difficult question which few agree on.

It is therefore, necessary that prospective seafarers are educated in such a way that they are motivated to act appropriately and consistently irrespective of the presence/absence of external factors that enforce legislation. Motivation may be extrinsic or intrinsic. In most people it is possible for these two kinds of motivation to exist side by side. However intrinsic motivation and self direction are more powerful than extrinsic (Muirhead, 2001; Baillie, 1997; Nicholls, 1983). The kind of education that seeks to make intrinsic motivation fundamental in students, must treat the human as a whole. It is from this total personality – the whole man (Moreby, 1968) - that attitudes, opinions and values emanate (Oppenheim, 2001).

Affective objectives seem to be the underlying assumption and goal of almost every teacher. It is however debatable the extent to which this goal/assumption is verbalised and categorically stated as an educational objective.

Research into the place of the affective domain is minimal in the maritime domain especially in maritime education and training. The idea of the importance of attitudes has been given some prominence by the IMO's International Safety Management (ISM) Code. However it has not achieved the status of the drive to attain cognitive and psychomotor objectives in MET. The STCW almost exclusively focuses on these two domains and raises the question whether affective training is considered relevant. The general thinking seems to be that the achievement of the desired affective goals will be a by product of efforts to develop students in the other two domains.

There have been many approaches to learning. The cognitive bias in most of them is clear, with the affective domain being acknowledged to different degrees. These learning theories have some application to the maritime industry and are now briefly examined.

2.2. Theories of learning/teaching

2.2.1. Piaget

Piaget was a Swiss biologist who saw the process of development in learning as a transition from the sensori-motor stage, to preoperational, concrete operational and then formal operational stages (Fisher, 2004). These stages, in his opinion, were characterised by 4 factors:

1. Nervous maturation – where the capacity to learn in mental and nervous terms increases with age.
2. Encounters with experience – where learning results from encounters with real life experiences
3. Social transmission – stage where learning is the result of the influence and interaction with others.

4. Equilibration is the final stage characterised by the mental adjustment that occurs when new experiences are encountered.

Though this process was dependant on age, the rate of attainment of the different stages was considered to differ from individual to individual. It was Piaget's expectation that most well developed adults should function at the level of the "formal" where abstract thinking should be possible in terms of thinking through consequences. The development stages are almost exclusively labelled as cognitive but have clear affective connotations.

2.2.2. Bruner

Jerome Bruner's thinking about how learning occurs was that of building blocks – a "lego" format. His theoretical framework for learning was that learners construct new ideas and learning based on present or past knowledge or perceptions. This process makes them engaged in the learning process. As he puts it (1986, p. 127), the student in effect "becomes party to the negotiatory process by which facts are created and interpreted. He becomes at once an agent of knowledge making as well as a recipient of knowledge transmission".

The stages involved were from the Simple through the Complex to Concrete and finally the Abstract. A distinction of his thinking was a belief that learners learn best by experimentation and discovering principles for themselves – a principle labelled as "discovery learning" (p. 127). Though his earlier work was restricted to social science and maths for young children, his later work (1986 onward) incorporates socio-cultural learning as well as the legal domain.

2.2.3. Ausubel

David Ausubel was greatly influenced by the work of Piaget. He proposed the use of "advance organisers", statements given at the beginning of a learning session to link existing knowledge with what was to be learnt. For him the most important single factor influencing learning is what the learner already knows (Ausubel, 1968). This approach was called reception learning. It involved the use of an organised set of

questions and examples to direct thinking and learning – sowing seeds of thought to influence thinking.

2.2.4. Gagné

Robert Gagné (1985) identified four types of learning: intellectual skills, verbal information, motor skills and attitudes. His best known work is the "conditions of learning" model in which he developed a taxonomy of learning outcomes and nine events of instruction. The taxonomy of learning outcomes included:

- Verbal Information
- Intellectual Skills
- Discriminations
- Concrete concepts
- Defined concepts
- Rules
- Higher order rules
- Cognitive Strategies
- Attitudes
- Motor Skills

This kind of organised and active internal events was part of the thinking collectively known as "information processing learning" and was a reaction to the behavioural theories *(see Appendix 4)*. Because the learning was seen in this organised sequential manner (somewhat like a computer) it was possible to then look for external events that would support these internal events. Nine such events of instruction – external events that would augment what was believed to be happening internally in the learner – were developed (Gagné, 1985; Gagné, Briggs and Wager, 1992, pp. 185-202).

- Gaining Attention
- Informing the learner of the objective
- Stimulating recall of prior learning
- Presenting the stimulus

- Providing learner guidance
- Eliciting performance
- Providing feedback
- Assessing performance
- Enhancing retention and transfer

2.2.5. Vygotsky

Vygotsky (1978) saw the primary source of cognitive and affective learning as being social interaction. He espoused two principles namely:

1. Cognitive development is limited to a certain range at any given age.
2. Full cognitive development requires social interaction.

The second point is clearly an acceptance of the affective dimension needed in cognitive learning.

This approach identifies with the social learning theory.

2.2.6. Operant conditioning theory (a behaviour modification theory)

B. F. Skinner was the main proponent of this theory. The proposition was that learning was basically a stimulus-response (S-R) sequence augmented by reinforcers, positive and negative, that strengthen desired responses (Skinner, 1993). Rewards therefore would be positive reinforcers which condition people to respond as desired. Punishment would be a negative reinforcer which works to condition people for appropriate behaviour when it is withdrawn. This theory has led to the so-called ABC process of behaviour change – Antecedents, Behaviour and Consequences. Behaviourists like Skinner reinforced the notion that consequences are more pronounced as behaviour change agents than antecedents.

2.2.7. Constructivism

In this theory of learning (subscribed to by Bruner and others), students are seen to be active contributors to the learning process. As stated by Dalgarno (2001, p. 184), "within a domain of knowledge, there may be a number of individually constructed knowledge representations that are equally valid". It is based on the notion that students are not "empty buckets" to be filled by the teacher but bring to a learning situation, prior knowledge and attitudes. The teacher is a facilitator whose duty is to help the students make their ideas and attitudes explicit, challenging and building on prior knowledge in an inherently enjoyable and worthwhile way (Fisher & Muirhead, 2001, p. 28). Student input is motivating for the student, enhancing affective development in relation to what is learnt.

2.2.8. Bloom.[7]

Seminal work for the classification of educational objectives was done by a number of researchers in developing what has become known as "Bloom's Taxonomy of Educational Objectives". Numerous educational curricula are based on these taxonomies - affective, psychomotor and cognitive - with the greatest emphasis having being placed on the latter of the three domains. The researchers found that all objectives – irrespective of how obviously they fall in one category – will have components of the other two (Bloom et al, 1964, p. 8).

Almost 50 years after the original work, various reviews have been undertaken. Many other frameworks, models and taxonomies have been developed. Anderson et al (2001) lists and describe nineteen of these. Of these the majority do not make any explicit link to the affective domain. The theories of learning are almost exclusively labelled as "cognitive". It is however recognisable that underlying cognitive learning are dimensions of affective learning. There are no learning experiences that are not determined or do not produce affective effects. Four of the frameworks include aspects of the affective domain or significant affective components (Anderson et al,

[7] See Appendices 2 and 3 for the taxonomies for cognitive and affective domains

2001, p. 286). These four were those of Hauenstein, Stahl, Stahl & Murphy and Romiszowski. Two of these are reproduced.

Stahl and Murphy's domains of cognition show the need for affective development with cognition. Table 2-1 shows the taxonomy they developed.

Table 2-1: Stahl and Murphy's domain of cognition

LEVEL OR STEP NAME	FUNCTION	ILLUSTRATIVE OBJECTIVE	ILLUSTRATIVE BEHAVIOURAL TERM OR LEARNING OUTCOME
1. Preparation	Readying to receive and/or capable of accepting information	None appropriate	Report or indicate a readiness to begin or engage in an activity
→ **Observation**	Taking in and becoming aware of information or stimuli		
2. Reception	Noticing and remembering information just presented	Understands information and facts, recognises details and data	Report a definition, description, explanation, etc or select, match or indicate any of above in relation to just completed lesson
3. Transformation	Understanding laws or theories, comprehending information Applying principles, utilising steps of method, solving problems	Gives meaning to information just received	Report a paraphrasing, translating, rewriting, or other personal version of information presented Classify, combine, compare, condense, convert, etc information presented in just completed lesson

→ **Information acquisition**	Placing information and meaning in long term memory		
4. Retention	Identifying information	Understands information and facts, knows laws, principles or rules of a method	Report a fact, description or any other information that indicates retrieval, explain how rules could be used
5. Transfersion	Using recalled information (guidelines) to deal with new situations	Understands laws or theories, applies	Classify, combine, compare, condense etc or give new examples using information recalled to obtain or explain results
6. Incorporation	Using information (guideline) that has been internalised	Understands guideline so well it becomes an automatic and unconscious basis of thinking	Same as above, except that behaviours have become habitual ones for the student in similar situations
7. Organisation	Interrelating and prioritising all previously understood information	Demonstrates consistent and predictable beliefs, demonstrates commitment to particular perspective, appreciates how a technique works, values a point of view	Initiate, perform, volunteer, modify, support, defend etc or engage in other behaviours that reflect a pervasive, consistent and predictable set of beliefs, values, perceptions or viewpoints
8. Generation	Synthesising previous information to form new ideas and understandings	Formulates a new set of rule or principles, develops a new explanation, formulates new ways of solving a problem	Create, compose, devise, generate etc a new set of rules, principles, methods etc (once mastery of the original rule etc has been demonstrated in the Incorporation level)

. Source: Anderson et al (2001).

Starting from level 6, underlying affective results (that should be present from level 1) become more apparent. Internalisation which is achieved by affective acceptance of what is being taught becomes critical to the attainment of the higher levels.

Romiszowski's expanded skills cycle was designed as a tool for describing instructional design. Figure 2-5 is an adaptation of the cycle showing four behaviours in the inner circle which result from the factors on the outside. The categorisation of the outside elements is shown in table 2-2.

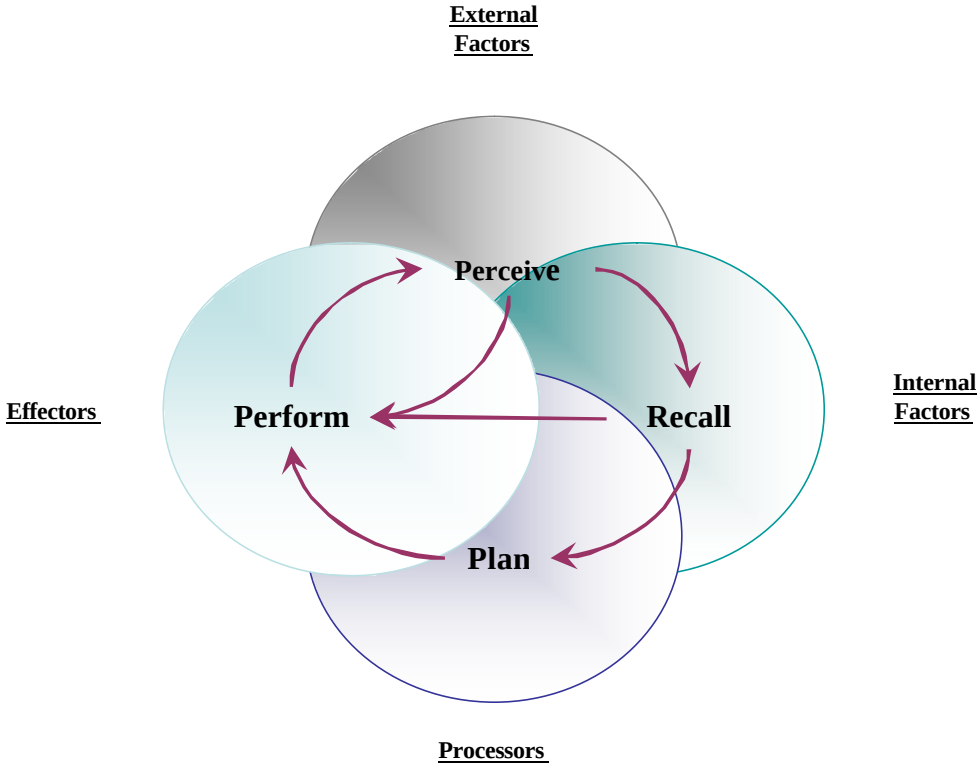

Figure 2-5: An adaptation of Romiszowski's expanded skill cycle.

Source: Romiszowski (1981). Designing instructional systems

Romiszowski determined 12 types of abilities which have to be present (to varying degrees depending on the particular skill) for the efficient performance of any skilled activity (1981, pp. 256-257). No hierarchical dependencies are implied in his cycle. He felt that the cycle was a useful tool in determining "the 'gap' between performance requirements (the 'what should be') and existing trainee abilities (the 'what is'). The 12 abilities are indicated in table 2-2.

Table 2-2: Elaboration of the 12 segments of Romiszowski's expanded skill cycle.

External Factors (Receptors)	**1.** Attention – Ability to concentrate on the task
	2. Perceptual Acuity – Ability to recognise the stimuli[8]
	3. Perceptual discrimination – Ability to identify the stimuli in a "noisy environment"
Internal Factors (Store)	**4.** Interpretation – Knowing the language of the stimuli
	5. Recall Procedures – Having a suitable algorithm[9] "in store"
	6. Recall Schemata[10] – Having relevant concepts and principles "in store"
Processors	**7.** Analysis – Ability to restructure the problem situation
	8. Synthesis - Ability to generate alternate solutions
	9. Evaluation – Ability to think through alternatives and implications

[8] External signals, emanating from objects or people in the environment
[9] Algorithm refers to the procedures which when followed correctly in the appropriate circumstances, result in correct results or outcomes.
[10] Facts and principles

Effectors	**10.** Initiation – Ability to make and to act on a decision
	11. Continuation – Ability to "see through" the action to the end
	12. Control – Ability to "self correct" one's actions automatically

Source: Romiszowski (1981). Designing instructional systems

The accompanying affective domain is manifested in **segments 10-12**, showing a willingness aspect based on prior cognition. Romiszowski (1981, pp. 259-260) indicates that:

> In the affective domain (reactive skills) we have concentrated on imparting knowledge. We have traditionally gone no further that to TELL people that "Beethoven is good" or that "race discrimination is bad". The next step was often to get involved with the processors (*see table 2-2*) by discussing WHY Beethoven is good. It is more seldom that we meet systematically developed programmes that aim to sharpen our students' perception of "good" and "bad" in reality and still less often do we meet systematic programmes to get our students to respond (*the effector stage*)".

This was written in 1981; one wonders whether there has been any pronounced change.

The ideas of these researchers (Stahl, Murphy and Romiszowski) build links between the cognitive and affective domains.

2.3. Motivation and learning

Dixon (2003, p. 115) describes motivation as "the total propensity or level of desire of an individual to behave in a certain manner at a certain time." In an organisational

setting, he defines it as "the willingness of an individual to respond to the organisation's requirements in the short run"

That people are motivated to do what they believe in is not disputed. Some theories of motivation are explored below. These basic principles of motivation are applicable to learning in most situations.

2.3.1. Motivational theories

Abraham Maslow's hierarchy of needs was first developed in 1954. It is one of the most well known of motivational theories. Generalising the tendencies in humans as a whole, he described the motivations of an individual as being built in a hierarchical manner (Maslow, 1987). Lower needs have to be met and as these are met, the individual is motivated to act for the acquisition of the next level of needs in a sequential manner.

The first level of motivational needs is that of the basic biological and physiological needs for air, food, water, shelter, warmth, sleep etc.

The second level consists of safety needs such as protection, security, order, legal limits, stability etc.

The third level is associated with social needs – for belongingness and love; affection, family, relationships, work groupings.

Esteem needs form the fourth level and are characterised by motivation due to needs for achievement, status, responsibility and reputation.

At the top of the hierarchy, Maslow placed self-actualising needs where motivation is for personal development and fulfilment.

This thinking is illustrated in figure 2-6.

Figure 2-6: Maslow's hierarchy of needs.

Source: http://www.accompany.lu/newsAttachment/Maslow%20Pyramid.jpg

In discussing attitudes and values as they relate to motivational needs, Maslow comments that not only are attitudes and values formed by cultural associative learning (similar to Vygotsky's theory of social learning), but they are also affected by intrinsic needs. He suggests that with the satisfaction of needs come affective consequences as "feelings of belongingness, of being one of a group, of identification with group goals and triumphs, of acceptance or having a place" among others (Maslow, 1987, p. 43).

Clayton Alderfer (1972) developed the existence, relatedness and growth (ERG) model in response to criticisms about Maslow's hierarchy of needs. Though similar to Maslow's theory in the notion that individuals' motivation followed a hierarchy, it had three essential differences.

1. There were three levels instead of Maslow's five – existence, relatedness and growth.
    - Existence – physiological and safety needs
    - Relatedness – Social and external esteem needs
    - Growth – Self-actualisation and internal esteem needs
2. Motivation can be simultaneously the result of one or more of these needs.

3. Frustration results when a higher need is not met and the consequence is a regression to seek fulfilment of lower needs again. This principle is known as the frustration-regression principle.

Victor Vroom's addition to the study of motivation was his expectancy theory (1964). According to him, an individual's motivation to act in a particular manner is dependant on the expectation that the act would be followed by a given outcome (instrumentality). The strength of conviction and degree of motivation was in turn dependent on the attractiveness of the outcome to the individual (valence). Simply put, the level/degree/strength of an individual's motivation is dependant on the one's expectations. Vroom's theory can be illustrated with the formula:

$$M = P \mathbf{x} (E_x / E)$$

where M is the strength of the motivation, P is the strength of the preference for the outcome, E is the effort needed to secure outcome and E_x is the expectation that the outcome will occur. P is valence and Ex/E is expectancy.

McGregor (1985, pp. 33-57) separated the managerial styles of individuals (which have accompanying motivational implications) into those covered by Theory X and those by Theory Y.

Theory X Assumptions:

- × "The average human being has an inherent dislike work (*comparable to application of self to learn*) and will avoid it if he can"
- × Because of this dislike for work, "most people must be coerced, controlled, directed, threatened with punishment to get them to put forth adequate effort toward the achievement of organisational objectives"
- × "The average human being prefers to be directed, wishes to avoid responsibility and has relatively little ambition, wants security above all".

Theory Y Assumptions:

- ✓ "The expenditure of physical and mental effort in work is as natural as play or rest"

- ✓ "External control and the threat of punishment are not the only means for bringing about effort toward organisational objectives. People will exercise self-direction and self-control in the service of objectives to which they are committed"
- ✓ "Commitment to objectives is a function of the rewards associated with the achievement"
- ✓ "The average human being learns, under proper conditions, not only to accept but to seek responsibility"

Of particular relevance to the discussion of the affective domain and motivation and learning in the classroom and beyond, is the analysis of **Ryan & Deci** (2000) in what is referred to as the Self-Determination Theory. This dissertation considers the views of **Ryan & Deci** (2000) as extremely important for education and training.
These two authors focus on the role that intrinsic and extrinsic motivation play in human learning and action. This extensive quote from them is appropriate.

> Over three decades of research has shown that the quality of experience and performance can be very different when one is behaving from intrinsic values versus extrinsic reasons…Intrinsic motivation has emerged as an important phenomenon for education – a natural wellspring of learning and achievement that can be systematically catalyzed or undermined by teacher practices….Students (*and seafarers*) can perform extrinsically motivated actions with resentment, resistance, and disinterest or, alternatively, with an attitude of willingness that reflects an inner acceptance of the value or utility of a task. In the former case – the classic case of extrinsic motivation – one feels externally propelled into action; in the latter case, the extrinsic goal is self-endorsed and thus adopted with a sense of volition. Understanding these

> different types of extrinsic motivation, and what fosters each of them, is an important issue for educators who cannot always rely on intrinsic motivation to foster learning (Ryan & Deci, 2000, p. 55).

The process from amotivation to intrinsic motivation shows a continuum of progressive internalisation. With **amotivation**, there is complete unwillingness and a lack of intention to act. It results from not valuing the activity, a feeling of incompetence with regard to the specified activity or not believing the activity will yield the desired outcome.

Extrinsic motivation is the next stage in the continuum. Four levels of extrinsic motivation are defined (Scholl, 2002) as:

- External Regulation - where behaviours are undertaken to satisfy an external demand or reward contingency." This is the kind of motivation recognized by operant theorists like B. F. Skinner.
- Introjection (introjected regulation) - where regulations are taken in but not fully accepted as one's own. Such behaviour is motivated by avoidance of guilt or anxiety or attainment of ego enhancement.
- Identification (identified regulation) – This level reflects a conscious valuing of a behavioural goal or regulation. The action is valued, accepted or owned as personally important.
- Integration (integrated regulation) occurs when identified regulations are fully assimilated to the self, which means they have been evaluated and brought into congruence with one's other values and needs."

The last stage, depicting the highest level of motivation, is **intrinsic motivation.** This is the inherent tendency of seeking and meeting challenges in a spirit of excellence with no recourse to external factors

With these definitions, Ryan & Deci developed the taxonomy shown in figure 2-7.

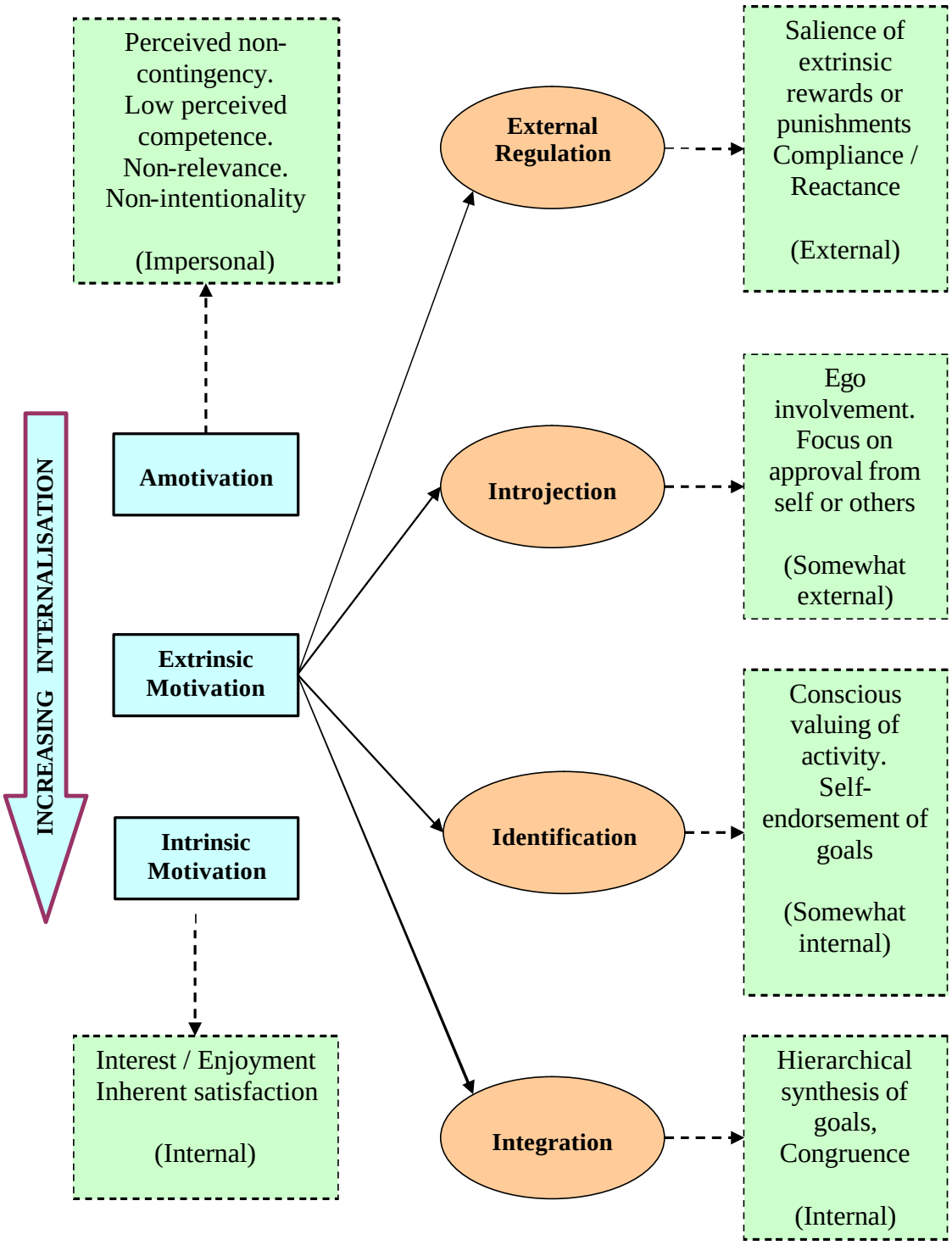

Figure 2-7: A taxonomy of human motivation

Source: Ryan & Deci (2000)

Other motivational theories include

- Herzberg's motivator – hygiene factors theory.
- Mclleland's three needs theory
- Adam's equity theory
- Goal setting theory

The literature acknowledges the role of attitudes in human performance and emphasises the link between attitudes, motivation and the effort that people put into the achievement of goals. In summary all the theories recognise the essential role that motivation plays in human endeavour. To ignore this in education and training could have a negative impact on the quality of students that are turned out from the process. The assumption that students come into the maritime field with enough intrinsic motivation to achieve the goals of the maritime industry (whether stated or not) and therefore only require the addition of cognitive and psychomotor skills may be severely misplaced. Especially in this era, where there is almost universal complaining about the image of the industry, education and training must seriously consider and research ways of motivating prospective seafarers to exhibit the affective characteristics still required[11] for optimum industrial performance and which will ultimately affect the image of the industry positively. The theories of motivation as discussed have a general application to humans. Lecturers must however understand that people are essentially very different, and while the basic principles may apply to all, the specific things that motivate individuals may vary significantly.

While all the theories – learning and motivational – have elements of truth, it is certainly impossible to fit the complexity of human nature into neat little boxes. The theories help to understand general tendencies, but should not (in the opinion of this author) become restrictive paradigms by which the individual characteristics of people are not appreciated or acknowledged.

[11] …despite all the advances in technology

“There is a need to train, not purely for technical skills but to affect attitudes – to instil a safety culture. Obviously the technical skills are necessary and are at the root of both prevention and cure; but to really reduce accidents, improve safety and save lives, the attitudes which seafarers adopt to risk – or put another way, the considerations they give when balancing safety with expediency – need to be given more attention in training and in education”

Winbow, A. (2005, p. 13).

CHAPTER 3 - THE SAFETY CULTURE

The place of the human element has become increasingly accepted in the industry as one of the most significant areas (if not the most significant) needing attention. The cost of the human factor as an input in major risk areas[12] is shown in figure 3-1.

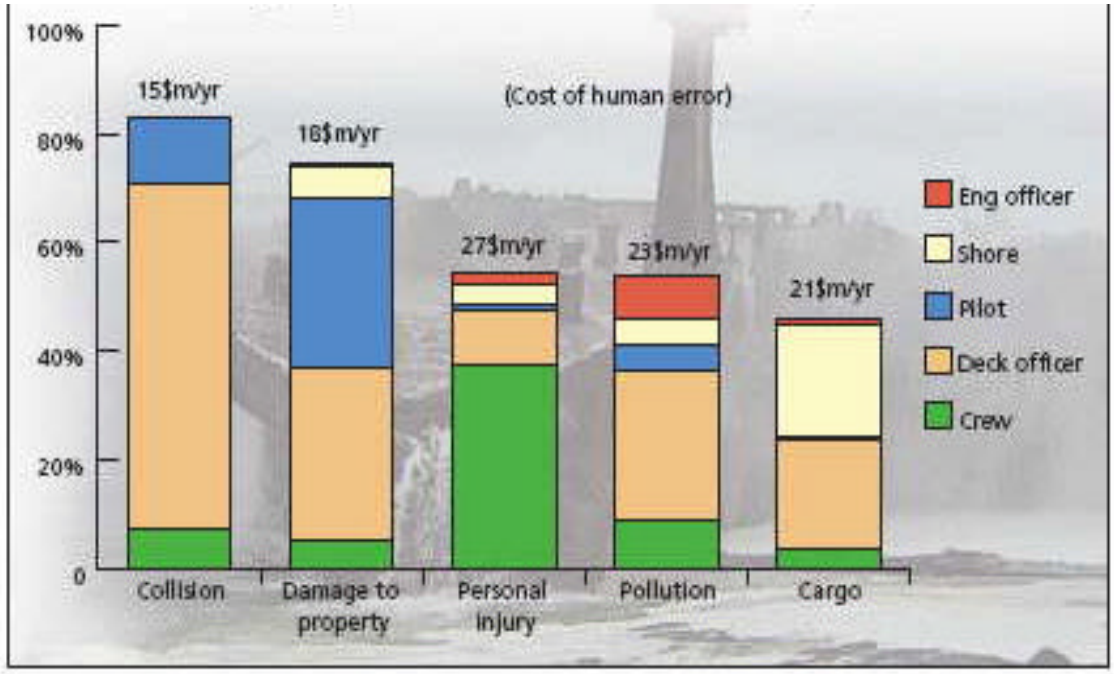

Figure 3-1: Percentage input of human factor in each major risk area

Source: UK P & I Club http://www.ukpandi.com/ukpandi/infopool.nsf/HTML/LP_Init_HElement

Safety has been defined as "a perceived state (quality) which determines to what extent the management, engineering and operation of a system is free from danger to life, property and the environment" (Pourzanjani, 2005a). The human influence on this is indisputable. Though most studies attribute about 80% of all accidents to

[12] For one P & I Club

human factors (Rothblum et al, 2002; IMO, 2004) it has been argued that humans are ultimately 100% responsible for all failings in any safety system (Jönsson, 2003; Anderson, 2003), the deciding factor being where the investigator/researcher stops in tracing the accident causal chain. The degree to which safety is present or absent is influenced by the mix of individuals' knowledge, skills, perceptions, attitudes and commitment to safety at all levels. This is in turn impacted on by the "culture" of the society of which these individuals form a part and externals such as commercial pressure, legislation etc.

3.1. Cultures

It is not easy to define exactly what culture is. This quote is insightful:

> Although 'culture' is a notoriously complex concept, it can be broadly defined in terms of the shared practices, mental habits and norms which shape people's identities and influence their attitudes and behaviours. These practices, habits and norms are generated and assimilated by people in a variety of settings including in the context of particular national or ethnically-based cultures, but also in particular institutional/organisational settings and professional contexts. All cultures are generally seen by academic commentators as being subject to change, contestation and re-formulation over time, rather than being fixed and static.
>
> (Vickers et al, 2003, p. 3)

The group dynamics that end up constituting culture are influenced by the responses of individuals to external and internal challenges and relationships. Any individual attitudes feed into what ultimately becomes the corporate culture.

Culture affects perception of risk, safety and appropriate behaviour. The importance of culture in the maritime industry is accentuated by the increase in the global supply base of manpower. Few ships today are manned by crew from one country. Arguably nationality is one of the most superficial of cultural identifiers. Even where the crew are from one country, culture in a wider sense separates people in attitudes based on other factors as gender, experience, age, education etc.

In any attempt to behaviourally streamline the activities of an industry the results will vary from individual to individual and organisation to organisation. Kelman (1958), in regard to attitudes and how they motivate actions, sees three patterns as compliance, identification and internalisation. This has some similarity to Mathiesen's conception of the three cultures that characterise the maritime industry (Mathiesen 1994; 1996) – evasion, compliant and safety cultures. To these three Sudhakar (2005) adds the "uninformed culture". Carnino (undated) sees these as three stages:

- → Stage I – safety solely based on rules and regulations (comparable to the compliance culture)
- → Stage II – good safety performance becomes an organisational goal
- → Stage III – safety performance can always be improved.

Stages II and III are comparable to different dimensions of the safety culture.

This author is of the view that it is better to see the cultures, not as development stages but as de facto positions that exist in organisations. All organisations, irrespective of developmental stage as an organisation, are best positioned at stage III – a safety culture right from inception.

3.1.1. Uninformed Culture

In this culture there are gaps in knowledge about the requirements of a safe operation and a fatalistic view to accident occurrence. There is possibly a perception that increased focus on safety actually increases accident risk and that no matter what is done, accidents will occur.

3.1.2. Evasion Culture

Those in industry who have this cultural attitude seek to circumvent rules for economic gain. Quality is sacrificed based on the belief that it costs too much. All means are employed to maximise profits by minimum compliance with existing regulations, be they national, regional or international. In all likelihood the number of subscribers to this culture increases/decrease with the rise and fall of economic fortunes on the shipping market cycles. There are scenarios in the shipping cycles when all ships are put in service – even laid up ships are pressed into service to take advantage of an economic boom (Stopford, 1997; Ma, 2004). On the other hand during declines in the market cycles, not all operators wish to invest in stringent safety measures. This kind of culture thrives on a perception of an adversarial relationship between regulators/enforcers and the organisation. The "them versus us" attitude means that all means are used to "win" at the expense of regulations.

3.1.3. Compliance Culture

Those of this culture tend to actively comply with the existing regulatory demands. "At this stage the organisation sees safety as an external requirement and not as an aspect of conduct that will help the organisation to succeed" (Carnino, undated). Motivation to comply is often limited to a desire to avoid the unpleasant or restrictive consequences of non-compliance. This is associated with Kelman's understanding of the attitudinal concept of "compliance". Behaviour is adopted, not because of a belief in content, but because of the expectation of reward or the avoidance of specific punishment. In an interesting and revealing study, Kelman found that "when an individual adopts an induced response through compliance, he tends to perform it only under conditions of surveillance by the influencing agent" (Kelman, 1958, p. 54). It is obvious that if a global industry is characterised by this kind of culture, there will be enormous demands on resources for enforcement and surveillance. It is no wonder that unilateralism of legislation/enforcement as well as criminalisation of seafarers is increasing. Like the evasion culture, the basic compliance culture may be characterised by an adversarial relationship with regulators and enforcers. Although

trying to comply at all costs, rules and regulations are seen as burdens which are not welcome especially when the motivation for compliance is avoidance of punishment and not desire for rewards. The bulk of industry actors are in this category, an observation confirmed by a detailed and broad survey by Anderson (2003). He states (p. 202) with reference to the ISM code that:

> One thing that the survey confirmed is the very wide spectrum of compliance that exists across the industry. It would appear that most companies and ships which require documents of compliance (DOCs) and safety management certificates (SMCs) do have their pieces of paper but few would actually seem to have a functioning safety management system from which all tangible benefits were being derived.

3.1.4. Safety Culture

This is the culture exhibited by quality conscious industry members. It goes over and above the existing legal requirements, subsuming the compliance culture and going beyond it. Behaviour is congruent with a basic value system (Kelman, 1958). In describing the behaviour associated with this kind of culture, Kelman - as a result of his study - found that, "when an individual adopts an induced response through internalisation, he tends to perform it under conditions of relevance of the issue, regardless of surveillance" (p. 54). In education, this corresponds to the higher levels of Bloom's taxonomy in the affective domain – valuing, organisation and characterisation. The pursuit of excellence and quality is done for its own sake in the belief that it is the ethical thing to do and is the best way to achieve long term economic sustainability. Industry standards which sooner or later became law are set by practitioners of this culture – setting benchmarks that even legislators lag behind. This mindset is by far the most progressive and what the industry needs. Those who practise this kind of culture have identified with and internalised values that make them act consistently in an appropriately safe and ethical manner. It will necessarily

mean compliance with the existing regulations, but from a motivation of genuine respect for the underlying values and not necessarily by a fear of the consequences of non-compliance.

Table 3-1 shows a summary of the cultures and their characteristics.

Table 3-1: A summary of industrial cultures.

Uninformed Culture	**Evasion Culture**	**Compliance culture**	**Safety/excellence culture**
		Symptoms	
Gaps in knowledge and skill needed for safe operation	Perfunctory approach	Conversant with rules and focus on compliance	Safety awareness visible throughout
Poor emergency preparedness	Focus on paperwork	Flawless records	Collective approach
Lack of suitable education and training	Appearances are most important	Safe practice is routine	Proactive risk identification
Absence of exercises and drills	Inadequate education and training	Extensive checklists	High degrees of preparedness
	Poor emergency response	Inability to deal with unforeseen emergencies	Cohesive team with foresight

Uninformed Culture	**Evasion Culture**	**Compliance culture**	**Safety/excellence culture**
Culturally driven beliefs, attitudes and behaviour patterns			
Fatalism	Believe that "excessive" safety is "bookish"/only academic	Discipline and obedience to rules; clean record matters most	Clarity of objectives
Safety measures increase risk	"Smart" operations involving cutting corners	Clear definition of roles	Positive group dynamics
No matter what is done accidents will still occur	The chief objective is not to get in trouble with authorities	Pride in doing things right	Professionalism
		Group commitment	Sure of organisational support
			Confident in emergencies

Source: Sudhakar (2005)

The issue of having a common understanding of what a safety culture is has been raised by the UK delegation to the IMO, believing that "a common definition of what a safety culture is" is necessary to allow for administrations and organisations to develop and promote such a culture (IMO, 2003b). O'Neil (2002) finds the following definition particularly appropriate: "The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's safety management".

In a review of theory and research into the nature of safety culture, Guldenmund (2000) lists several definitions in the literature offered for "safety culture". Table 3-2 shows some of these definitions.[13]

Table 3-2: Safety culture definitions

	Reference	Definition of safety culture
1	Cox and Cox (1991)	Safety cultures reflect the attitudes, beliefs, perceptions and values that employees share in relation to safety
2	International Safety Advisory Group (1991) (INSAG-4)	Safety culture is that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, *nuclear plant*[14] safety issues receive the attention warranted by their significance.
3	Pidgeon (1991)	The set of beliefs, norms, attitudes, roles, and social and technical practices that are concerned with minimising the exposure of employees, managers, customers and members of the public to conditions considered dangerous or injurious.
4	Ostrom et al. (1993)	The concept that the organisation's beliefs and attitudes, manifested in actions, policies and procedures, affect its safety performance.
5	Geller (1994)	In a total safety culture everyone feels responsible for safety and pursues it on a daily basis.

[13] References are as cited by Guldenmund (2000).
[14] Though there is a specific reference to "nuclear plant" the definition is considered to be relevant to the maritime industry.

6	Berends (1996)	The collective mental programming towards safety of a group of organisation members.
7	Lee (1996)	The safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies and patterns of behaviour that determine the commitment to and the style and proficiency of an organisation's health and safety management.

Source: Guldenmund (2000)

There are two ways in which the safety culture is viewed. This is also evident from the definitions given in table 3-2. The first sees the culture as a tool which can be used by the organisation to shape what it wants to be – a paradigm for assessment, enhancement and rectification by organisational actions for organisational ends (as in Pidgeon's definition). The other view limits the role of a safety culture as a proactive mechanism for organisational growth, and instead sees it as a state of the organisation; a description and understanding based on the actions and beliefs of the workers (see Cox and Cox's definition). In the opinion of this author, the two need not be mutually exclusive and for all ideal practical purposes are not. The safety culture can be a state of values and beliefs and still remain a proactive organisational methodology for maintaining that state or achieving that desired state. Whichever view is subscribed to, the necessity of right attitudes and behaviour (including suitable behaviour modification) is paramount.

> … To really understand the safety culture of an organisation it is necessary to measure the attitudes of employees and management to safety. This is because most auditing systems only have superficial questions about procedures and safety programme components. There is no check that attitudes and beliefs are in place for an appropriate safety culture. The fact is

that although an organisation may look good on paper, this could hide inappropriate perceptions and beliefs held by management and employees. For example, an assessment of key indicators such as those concerning management's commitment may indicate all is well, but the reality may be that, in day to day decision making, management beliefs and behaviour are very different with production demands having priority over safety. In short there must be a real safety culture in which managers and employees have paramount safety attitudes and beliefs.

Richard Martin (1997).

All the definitions and comments stress attitude. Ultimately it is the attitude of individuals that shape the organisational culture. The challenge is to determine how these individuals get these attitudes and whether such attitudes and the behaviours they lead to can be influenced in any way by the system of education they go through.

Figure 3-2 shows the characteristic influence of different factors on the safety culture.

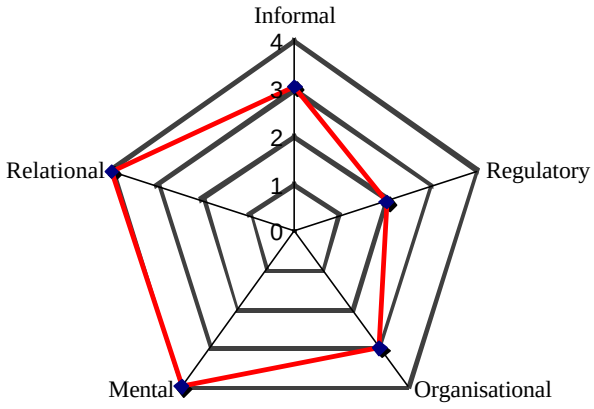

Figure 3-2: Articulation between safety culture components

Source: Belgian Nuclear Research Centre (2003)[15]

[15] The graphic is only illustrative showing the characteristic influence of each component: predominant, relative, minor. No quantitative conclusions can be drawn.

3.2. IMO instruments/methods and the safety culture

The IMO has worked to enact instruments to encourage the safety culture. The ISM code is the epitome of these efforts. It significantly states that "in matters of safety and pollution prevention it is the commitment, competence, attitudes and motivation of individuals at all levels that determines the end result" (IMO, 2002a, p.5). With respect to the operation of ships, the code was a giant leap forward. After 7 years (3 years for the second phase) of ISM enforcement it can be said that some organisations with a compliant culture have evolved to having a safety culture.

The growth of the process of formal safety assessments (FSA) as a risk analysis tool is also indicative of how serious the achievement and maintenance of a safety culture is to the organisation. It has further recognised the vital role the human element plays in the attainment of a consistent culture of safety in all areas of the industry (IMO, 2002b; 2003a).

If the core of a safety culture is the human element, then the source of this element, how they are educated and how they perform is critical.

With the introduction of STCW 95, the IMO has, is to a large extent, meeting the challenge of globally standardised education and training. For METI and the certification process, the guiding convention/regulation remains the STCW – a convention as regulatory as any other. However, in such a diverse world, there is a limit to what can be legislated at an international level. Issues of sovereignty and national preferences are hurdles that the organisation has to contend with. In that context, the STCW 95 can only be the minimum standards to which all agree. As indicated by F. R. Chowdhury (personal communication, 21 February 2005), "it is a skeleton to which national administrations should add flesh".

The STCW 95 basically focuses on education and training in knowledge and skills applicable to watchkeeping officers on ships. To this skeleton may be added the notion that a well rounded ship's officer – a key part of any safety culture - should have education and training beyond knowledge and skills. It is appreciated by many that the need for such officers is real and that attitudes are as necessary as knowledge

and skill in achieving and maintaining the needed safety culture and efficiency. Ho (2004, p. 14), puts it succinctly:

> Speaking English is no longer enough. Knowing maritime technology is no longer sufficient. Reading the manuals is not adequate. Applying traditional management techniques is no longer applicable. The unforgiving demands for excellence and compliance will require training and education beyond skills. What we need is to develop the Seafarer of the Future who is mature, responsible, well-rounded, has a fundamental strength of character, is empowered and aware of how his actions affect the whole.

Education and training beyond knowledge and skill acquisition and "simple" compliance with the STCW, is needed to "grow" the kind of officer suitable for a diverse, dynamic and challenging industry. Knowledge and skill alone never guarantee performance.

Today MET systems and their accompanying processes for certification can be described in similar terms as the shipping industry as a whole: the systems with an evasion culture, those with a compliant culture and those with a safety/excellence culture. By far the greatest segment is the compliance culture systems. The institutions and administrations with an evasion culture will have the proliferation of fraudulent certificates and short-cut methods of being seen to comply or of evading compliance. Compliant systems are unwilling or unable to go beyond the requirements of the STCW. Due to real financial restraints, governmental controls and numerous other factors, a lot of institutions set the STCW as the goal and once that is believed (rightly or wrong) to be complied with, there is lethargy in proceeding further. It can be argued that STCW is necessarily limited in achieving the attitude and behavioural change that facilitates the growth a safety culture.

However an understanding of the inherent issues at stake, should lead to MET striving for systems that not only validate ability to perform but willingness to do so. Such systems may be described as those with a "safety culture attitude". These systems are keen on developing mechanisms that educate for standards not necessarily limited by the STCW. Like in the shipping companies, and as required by any good management system, this too requires commitment from the top. While the evasion culture in industry will have to contend with the numerous safety nets in the industry (such as more regulations and the enforcement of these), education and training can help in limiting the mind set that sees this kind of culture as an option.

- An MET system that falls short of STCW will lead to the "production" of officers, and by extension key personnel in industry, who lack the basic knowledge and skills; individuals who form the building blocks of an "uninformed culture" in shipping.
- A system that meets the minimum standards as required by STCW will produce personnel who have a compliance mentality and perfunctorily work to get by with minimum compliance and seize on every opportunity to evade the regulations when motivated by other factors e.g. financial gain. This results in an evasion culture.
- Systems that seek to go beyond the limitations of STCW by further training in knowledge and skill will produce officers who are compliant and seek to remain compliant whatever it takes. Evasion is avoided, but no effort is made to work beyond the requirements – resulting in a compliance culture.
- The best systems seek to train beyond knowledge and skill and ingrain in the prospective officers, a culture of values and commitment to ideals that see such officers identify fundamentally with the global goals. Such systems are driven by excellence and are only satisfied with continuous efforts to improve, no matter the status quo of global regulation. These form the building blocks of a safety culture.

3.3. Approaches to the safety culture: Top-down versus bottom-up

The ISM - acclaimed by some as a success and others as at best not changing the situation that existed before its implementation (Anderson, 2003) - is basically a top down approach to the introduction and maintenance of a safety culture. It focuses on the obligations and responsibilities of the company with at least twenty five statements preceded by the words "the company should". The necessity for this is real because it would seem that in achieving a safety culture in an industry, it is the systems that should be properly structured. Indeed the UK P & I Club (1996, p. 8) is of the opinion that the safe operation of ships is determined more by good systems than by particular individuals. It is however just as important that attention is given to the individuals operating the systems. In the final analysis it is the individuals who implement the system. Maritime education and training systems, seen in a wider sense, go beyond training only operators of ships in shore institutions, but also encompass the education and training of others in the industry, be they managers, administrators or operators. It should also be seen to cover education and training efforts embarked on by ship owners and managers for their crew.

The place of all personnel involved in the operation of a ship is therefore of relevance to the achieving of a safety culture. Not only should a company's management (top-down) rightly ensure, for example that it employs competent crew and motivates them to work professionally, the crew must also be motivated intrinsically to respond appropriately with the right attitudes (bottom-up). A company most often verifies competence by way of certification. The proof of incompetence is often the occurrence of an accident and therefore the top management of a company often only react to the accident, having accepted the qualifications of an individual from a reputable institution. With the current emphasis on proactive safety mechanisms, the MET systems should add to the safety mechanisms by seeking to address the attitudes engendered in the mariners they produce. Such seafarers, skilful, knowledgeable and with the right attitudes and values, could help raise standards on board by questioning inappropriate practices. They could also help by limiting the apathy and complacency, the lackadaisical

"them and us" attitude that leads to sub-standard performance. This "bottom up" approach will complement the "top down" approach currently being emphasised. A strong safety culture is dependant on both top down and bottom up approaches with self-regulation as much as possible and necessary rules in place. As has been cynically/jokingly said "the trouble with being a leader today is that you can't be sure whether people are following you or chasing you" (unknown source). A bottom up approach helps to ensure that the perception of an adversarial relationship between management and operators is replaced with cooperation as a result of identifying with goals on both sides.

3.4. Behaviour modification

3.4.1. Ethical considerations

The issue of societal change based on attitude change is a controversial subject. In the context of social education, the affective domain is fairly ambiguous, controversial and fraught with arguments emanating from deep-seated cultural values and beliefs. These arguments can be as diverse and different as the global cultures they originate from. The line between positive affective education and indoctrination – even brainwashing – is a thin one.

Fortunately, in the maritime world the issues tend to be less controversial and goals and objectives as presently set by the IMO may be considered global in nature and desirable no matter one's persuasion – cultural, religious or national. It is to these ends that the objectives of affective education should be directed. It would seem that the attainment of comprehensive objectives in the affective domain will be more achievable in the maritime sector than it has been for the wider educational community.

3.4.2. Behaviour change preceding attitude change.

That behaviour modification is necessary for safety is not disputed. In a paper addressed to the 77th session of the MSC, the UK delegation sites evidence from

research on three continents and in a range of industries, which support the notion that behaviour modification techniques can lead to safer behaviour (IMO, 2003c, p. 1).

Contrary to the tone of many approaches to the question of attitudes and behaviour, the Keil Centre in a publication for the UK Health and Safety Executive (HSE), is of the opinion that "the causal link between attitude and behaviour is weak" and that "the link between behaviour and attitude is much stronger" H.S.E (2000, p. 3). They argue that it is behaviour that drives attitude, because "if behaviour changes and attitudes don't, we feel uncomfortable, a state known as "cognitive dissonance". This view is subscribed to my many (Krause, Hidley and Hodson, 1990).

Krause et al (1990) established a "behaviour-based safety process" to reduce the number of accidents in the workplace. While accepting the importance of trying to change attitude in order to change behaviour in the workplace, they are convinced that it is better to try to change behaviour in order to change attitude especially from management point of view (pp. 14 -18). This is because:

1. Behaviour can be easily measured and therefore managed, whereas attitude presents measurement (and therefore control) problems
2. A change in behaviour leads to a change in attitude.

As an example of the latter, the use of seat belts in automobiles was examined. When seat belts were introduced in America, drivers polled tended not to use them (behaviour) believing them to be uncomfortable and unsafe (attitudes). They feared that seat belts would somehow trap them in the car in the event of an accident. Over time, as the use of seat belts became a recommendation, then a requirement by municipalities and nations, behaviour had to change (by law) irrespective of attitude. After only a short time of this regular behavioural pattern, the polled drivers now felt discomfort and unsafe when **not** using seat belts. Behavioural change seems to have led to complete attitudinal change.

Krause et al therefore developed this process which seeks to modify behaviour by:

- Listing behaviour critical to safety
- Actively seeking employee participation in defining this list

- Encouraging this behaviour with appropriate consequences

The consequences were critical to the success of this programme along the lines of B. F. Skinner's theories. This leads to a situation where the active behaviours overtime become identified positively with the attitudes of the employees as in the seat belt example.

It is clear, from this example, the place that regulation/enforcement and other control mechanisms (to focus on consequences) have in this approach.

3.4.3. Attitude change preceding behaviour change

The counter view that changing attitude is the primary thing to do to change behaviour is also shared by many. Wright (2003, p. 242) says, for example, that:

> Individual and collective behaviours are driven by our attitudes, beliefs and values. These are the ingredients of company and industry culture and we therefore need to focus on the drivers in the hidden part of the iceberg and challenge all of our attitudes, beliefs and values, from the boardroom to each crew member.

Supported by very detailed research Berger and Alwitt (1996, p. 556) additionally state that:

> Understanding the strength with which attitudes are held should contribute toward a better understanding of whether or how attitudes can be changed and should contribute to better predictions of behaviour related to the attitudes. If we know whether a person has a strongly held attitude stored in memory, we are better able to select persuasive tactics to maintain or alter

that attitude. Furthermore, we can be more confident about predicting behavioural outcomes, because stronger attitudes are more stable, more resistant to change and thereby result in greater correspondence between attitude direction and behaviour.

The causal link between attitude and behaviour is seen by these writers as not so weak. This supports the notion that attitudes drive behaviour, which when reinforced in turn entrenches or modifies attitudes as shown in figure 3-3. The degree to which behaviour is influenced by and compatible with latent values and attitudes is dependant on the strength of the attitude – "attitude conviction" (Berger and Alwitt, 1996).

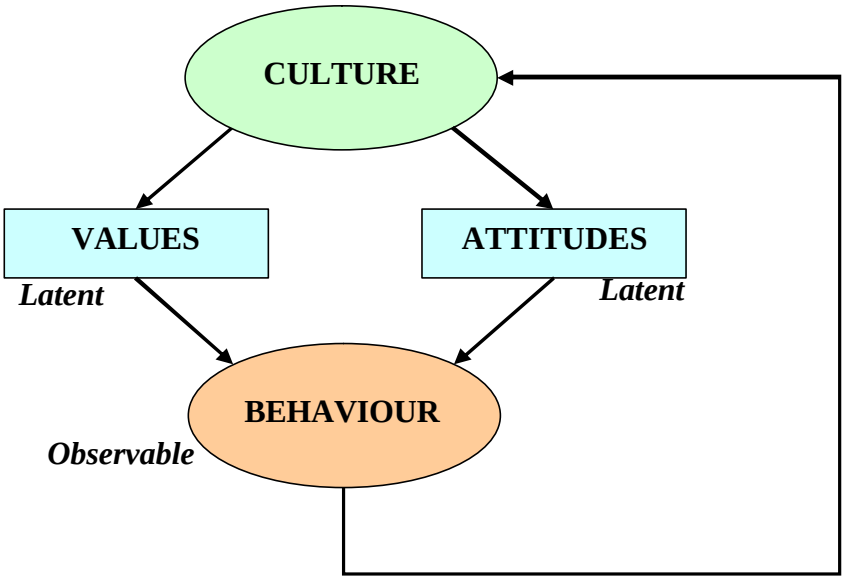

Figure 3-3: Relationship between the elements of culture

Seeking to modify behaviour is therefore significantly tied to trying to modify attitudes. The degree to which the observable behaviours are characteristic of internalised attitudes is what indicates an individual's propensity to continue with a particular behaviour when the reinforcers for that behaviour are removed. The ABC pattern (Antecedents, Behaviour and Consequences) of behaviour modification supported by the H.S.E. and Krause et al with its emphasis on consequences is

appropriate and well suited to the workplace. However this should not be the only consideration for safety especially in the context of education. To reach the optimum level of responsible behaviour and commitment to safety processes, requires some affective objectives in education. By its very nature, the ABC pattern focuses on consequences. If the consequences change, behaviour that is not sufficiently internalised also changes. This is a less than perfect situation, because the optimum would be consistent behaviour even when the consequences (positive or negative) change, such that when, for example, punishment for intentional oil discharge into the sea, is either removed, non-existent or impossible, there is still the behaviour of no such discharge. Therefore while the ABC approach is extremely helpful– and indeed all measurable affective objectives must be in terms of behaviour - it should be complemented with education in the affective domain for inherent attitudes and values. The two approaches to behaviour/attitude change need not be contradictory but complementary. In the seat belt example therefore, while in "industry", attempts could be made to control behaviour through consequences, in "education" drivers could be made to understand/appreciate/value/own the principle that seat belts are inherently safe. This would be an antecedent to behaviour (together with the antecedents of laws and recommendations) that is complemented by the consequences present in "industry". In the maritime industry therefore, antecedents may be provided primarily by educational institutions and by companies which provide conditions/triggers in which certain behaviours will thrive. Consequences will ever be present in the form of repercussions from the breach of legislation as well as rewards by industry in general and shipping companies in particular.

This will help to ensure that when the conditions are not right (e.g. working on a ship belonging to an owner who is bent on cutting corners – a reality in the maritime world) or when the repercussions of unacceptable behaviour are either remote or avoidable, appropriate behaviour is still resorted to.

Although the behaviour of individuals may be influenced by a set of rules, it is their attitude to the rules that determines the culture. Do they comply because they want to, or because they have to? To be truly effective in achieving the goal of safer shipping, it is important that the shipping community as a whole should develop a want-to attitude.

O'Neil (2002, p.1)

CHAPTER 4 – ATTITUDES AND ACCIDENT CAUSATION

This chapter briefly examines a number of cases to determine the potential place of attitudes in accident causation. It is strongly emphasised that in most accidents there are many causal factors – a chain of events of action and non-action in suitable conditions and a small window of opportunity. The discussion here just focuses on attitudes as one of many other causal factors.

4.1. Chernobyl

The following is an excerpt from a description of the disaster (IMO, 2004).

> On 25 April 1986, prior to a routine shut-down, the reactor crew at Chernobyl-4 began preparing for a test to determine how long turbines would spin and supply power following a loss of main electrical power supply. Similar tests had already been carried out at Chernobyl and other plants, despite the fact that these reactors were known to be very unstable at low power-settings.
>
> A series of operator actions, including the disabling of automatic shutdown mechanisms, preceded the attempted test early on 26 April. As flow of coolant water diminished, power output increased. When the operator moved to shut down the reactor from its unstable condition arising from previous errors, a peculiarity of the design caused a dramatic power surge.

> The fuel elements ruptured and the resultant explosive force of steam lifted off the cover plate of the reactor, releasing fission products to the atmosphere. A second explosion threw out fragments of burning fuel and graphite from the core and allowed air to rush in, causing the graphite moderator to burst into flames.

After a critical analysis of the incident, Reason concluded that the attitudes of the operators and their managers influenced to a very large extent the events of that day. Writing about this elite group of operators, he says:

> …they approached the task with a "can do" attitude and with some confidence in their ability to "fly" the reactor, even in these unusual configurations…more importantly they had forgotten to be afraid of the dangerous beast they were driving. As the Russian report put it: 'they had lost any feeling for the hazards involved'. In short, they began their task with a not uncommon mixture of ignorance and complacency: something that is by no means a Russian monopoly in those who control complex hazardous systems.
>
> Reason (1987, p. 203)

The possibility that these attitudes had been engendered over a period of time is recognised. It was felt that the groups had most likely committed other violations with impunity in the past. Basic attitudes that had permitted behavioural symptoms of "small" violations, had been reinforced by the absence of negative consequences till that one accident that affected (and still does) almost all of Europe.

4.2. Exxon Valdez

On 24th March 1989, the tanker Exxon Valdez ran aground and spilt 11 million gallons of crude oil in Prince William Sound. The US National Transportation Safety Board (NTSB) investigation determined that the ship had left the officially marked channel to avoid ice, under the control of an inexperienced officer. The master, required to be on the bridge for this particular transit by company policy, was not. Even though the belief that he was under the influence of alcohol was found to be inadmissible in court, the NTSB report concluded that he had been under such influence. Forensic phonetics testimony from Malcolm Brenner, NTSB Senior Human Performance Investigator showed a speech pattern characteristic of alcohol influence (Smith, 2003). The accident investigation report (NTSB, 2004) acknowledged this and further stated that:

> the "actions attributed to him (*the master*) on the night of the grounding were incompatible with his qualifications as a master mariner and experienced career tankship officer … and reflected a lack of concern for ensuring high standards of crew response. He also showed a disregard for Exxon regulations that clearly required his presence on the bridge.

This is a situation where a "trained" officer, despite clear laid-down policy, chose to exhibit a behavioural pattern that caused a major pollution incident and much legislation.

4.3. Destructive obedience

This collision between the chemical tanker, Bow Eagle and fishing vessel Le Cistude on the 25th of August 2002 off the coast of Britanny, led to the sinking of the latter with the loss of 4 lives. The Bow Eagle did not stop. The French maritime accident investigation bureau is said to have concluded that the failure of the ship to stop "considerably aggravated" the consequences of the accident (Sampson, 2002, p. 4).

In subsequent investigations it emerged that the second officer on the tanker, who was the officer of the watch at the time of the accident, had instructed a rating on watch with him not to say anything to anyone about the incident. In describing this, Sampson uses the aviation term "destructive obedience" and cites another example of the Green Lily, which sailed under the command of a master whose judgement was "silently questioned" by the crew (at least one officer) and yet where no action was taken. The ship later foundered resulting in the death of a rescuer.

To these two incidents Sampson (2003b) adds the case of the allision of Dole America with the Nab Tower (east of the Solent). Here too the master's "inappropriate and unquestioned helm order to port" (p. 5) was the immediate cause of the accident. The second officer was reluctant to offer information to the master, an attitude that is often based on cultural perceptions of power and one's place in relation to that "power". Sampson (2002, 2003b) cites the NTSB, which concluded that in 25% of 37 aviation cases investigated (23 of which involved fatalities), the accident could have been prevented by the non-flying officer 'challenging' the behaviour of the flying officer (senior in 81% of cases).

"Destructive obedience" was also evident in the USCG Cutter Cahuyoga and MV Santa Cruz collision. Here too the decision of the master was not "questioned" although his mistake was obvious to the crew (Rothblum et al, 2002, p. 7). A truly avoidable accident occurred.

In a very real sense, the inability of masters to challenge management when put under undue commercial pressure which compromises or jeopardises the safety of the ship and crew is an extension of this ship-based "destructive obedience" into management. A case in point is the failure of one master of the "Herald of Free Enterprise" to challenge the shore-based organisation when confronted with a value system opposed to the desirable. The operations manager (D. Shipley) is quoted by the UK Department of Transport Report (1987, p. 11) to have said:

> I expect to read from now onwards … that the ship left 15 minutes early … Put pressure on the first officer if you don't think he's moving fast enough….Let's put the record straight, sailing late out of Zeebrugge isn't on. It's 15 minutes early for us.

Almost two decades on, this kind of commercial pressure is still very much a part of the industry. The dilemma of a master caught in this position is real and no attempt is being made here to imply that there is no difficulty in withstanding these pressures – especially in the full knowledge that a replacement could and would be readily found in a short time. That does not however detract from the force of the argument that ideally masters and their officers should be able to stand firm against such pressures especially in the face of direct compromises in safety. If inherent beliefs/values and attitudes are strong (internalised sufficiently) there is a basis for arguing that there will be a greater potential to resist behavioural patterns and suggestions that go against these values, irrespective of their source and potential consequences. To "fear" possible repercussions and proceed with inappropriate behaviour could lead to close or remote consequences far beyond what is being avoided on a personal level; in this particular case the loss of 193 lives.

Destructive obedience is an attitudinal problem, based on cultural perceptions (concepts of power distance). It is not enough to state in a theoretical lecture lesson that officers should tactfully question the decisions of masters where appropriate. The kind of curriculum that achieves this will certainly not be just cognitive and psychomotor based.

4.4. The Attilio Ievoli grounding

The following are excerpts from the MAIB report. The full report can be found at http://www.maib.dft.gov.uk/cms_resources/Attilio%20Ievoli.pdf.

On 3rd of June of 2004, the Italian registered chemical tanker, Attilio Ievoli, ran aground on Lymington Banks in the west Solent (south coast of the UK). The master,

second officer and cadet were involved in one way or the other just prior to the accident.

The master (Italian) had been on board for 4 months and had worked as master for 14 years. The second officer (Ukrainian) held a chief mate certificate of competency and had previously sailed as chief mate with other companies. He had been on board the ship for a week.

The MAIB contracted QinetiQ's Centre for Human Sciences to research the human factors aspects of this accident, specifically with regard to bridge teamwork. As a result of the investigations and analysis and among other conclusions drawn, the MAIB determined that:

- Fatigue was not an issue in this accident.
- The master decided to use the west Solent even though he knew this to be contrary to company instruction
- Language was not an issue. All were competent in the use of English.
- There was a possible issue of "power distance" – the situation where one culture expects a greater deference to be shown to superiors as compared to another culture. This is what results in the "destructive obedience" syndrome described in the Cahuyoga/Santa Cruz collision. In this case, the second officer was unwilling to question the master's authority or competence, although he was convinced the vessel was not where it had to be and on the wrong track. This is obvious from the fact that he chose to address his concerns about the vessel's position to the cadet and not the Master.
- An alarm function on the echo sounder, which was functioning properly, had been set to zero in direct contravention of the company's instructions which stated that the alarm must be set to the draught plus the required under keel clearance.
- The master was on a mobile phone for 25 minutes and 40 seconds out of the 36 minutes directly preceding the accident. He was distracted from his navigational duties, not hearing information the second officer had passed on to him.

- The Attilio Ievoli was certified under the ISM code and had passed a full audit some time earlier. The investigators considered the safety management system to be comprehensive and satisfactory.
- The vessel did not report the grounding to the coastguard.

The report notes that "the routine transit of large vessels, some carrying hazardous cargoes and some carrying large numbers of passengers … is a cause for concern." If the causal factors in this accident had occurred in another accident the consequences may have been entirely different and certainly more attention grabbing.

A similar event was narrated by Stephen Meyer, UK's chief inspector of marine accidents, as reported by Osler in the 25th May 2005 issue of Lloyd's List. Meyer is said to have played back a tape from the bridge of an unnamed vessel.

> The watch officer (*named nationality*), was listening to a news broadcast reporting on the recent pro-democracy protests in his home country. Apparently engrossed, he did not take any notice of anguished radio appeals from a vessel he was about to hit. The tape ended with the cacophony of a collision. The second ship had been clearly painted on radar and visible for at least 10 minutes.

The report cites Meyer as noting that complacency (an attitude) was real and led to such poor practices (behaviours) as too small passing distances, lateness in altering course, failure to post dedicated lookout or use available technical support despite all the rules and training in these matters

4.5. Thrill seeking: An aviation example

Miller (2005) writing for the Associated Press reported the release by the US NTSB of cockpit recordings (from preliminary investigation) of events leading to the crash

of Northwest AirLink CJR-2 near Jefferson City, Missouri[16]. The two pilots were said to have cracked jokes and decided to "have a little fun" and fly to 41000 feet – the maximum allowed for the plane. Their idea of fun was pushing this commercial plane to the extreme limits as set by the manufacturer for apparently no reason than to "have fun". Two minutes later the plane was at that altitude and the report indicates one of the pilots popped a can of Pepsi and joked about drinking beer. A few minutes later, both of the plane's engines had failed, the plane had crashed and both men had lost their lives.

The UK P & I Club emphasises the existence of this kind of behaviour (thrill seeking) in their "summarised sources of human error"[17].

4.6. Accident causation dynamics

Although in all cases there were other causal factors, the case studies show a list of attitudes and behaviours that were present in people who knew what was right, had some safety systems in place, but for one reason or the other, chose to ignore them. Among these were:

- Destructive obedience
- Apathy,
- Wilful and deliberate actions against well-laid down and known procedures
- Thrill-seeking
- The human tendency to take the path of least resistance

In almost all the scenarios, any audit of the management systems would have or indeed had yielded positive results. Systems were in place and all the certificates were valid and on board. The situation is not much different with personal injury/accidents. The statistics for deaths and injuries associated with enclosed space entry remains troubling and high despite this being a key factor in MET curricula (McAleenan & McAleenan, 1999).

[16] Flight details on http://www.ntsb.gov/ntsb/brief.asp?ev_id=20041015X01633&key=1
[17] A chart based on Reason's Generic Error Modelling System is shown in Appendix 5

What mattered in all these accidents was that the people involved chose to behave, by an act of their own will the way they did. Such tendencies certainly give reason for the public to see ship crew as culprits and guilty of negligence at best and at the extreme, criminals. Though they may not be, the image of the industry gets no better, leading to decreased motivation in the human resource already in the industry and a barrier for potential resource - and the malicious cycle is perpetuated.

To end at this level of causation will not be enough. It is not enough just to identify that the crew in an accident did not have healthy attitudes. The underlying factors could be lack of effective training – a challenge then for the METI which train mariners and the companies which employ them.

In keeping with models of accident causation that emphasise the latent causal factors, education to influence latent attitudes - psychological factors - will help to further limit the "tendency to prescribe measures which will reduce the consequences of an accident rather than concentrating on ideas which will reduce the risk of the accident happening in the first place" (Grey, 1993, p. 30). This way of thinking proactively, extends responsibility for attaining a safety culture to education and training institutions.

In all the accident causation models there is always an element of the human factor.

Figure 4-1 shows Reason's understanding of some of the human elements contributing to accident causation.

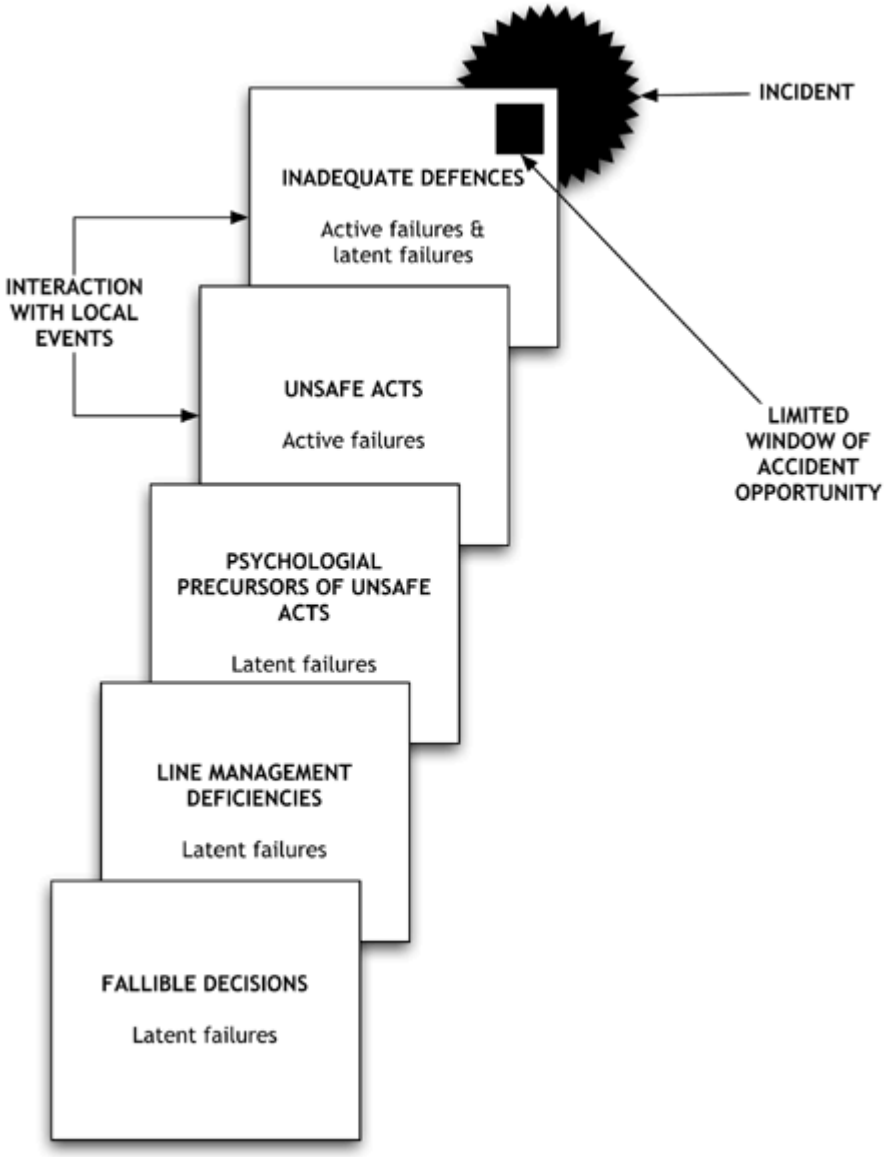

Figure 4-1: Human contributions to the breakdown of complex systems

Source: Reason, J. (1990). Human Error.

The figure shows the psychological precursors of unsafe acts as one of the possible latent failures. This obviously includes the mindset and attitudes of the human resource, be they operators or management. These inherent values and attitudes can either facilitate or prevent the occurrence of an accident or alleviate/mitigate the consequences of accidents. Safety consciousness is a psychological factor that can

be influenced by education and training institutions. Figure 4-2 also shows some of these mental states.

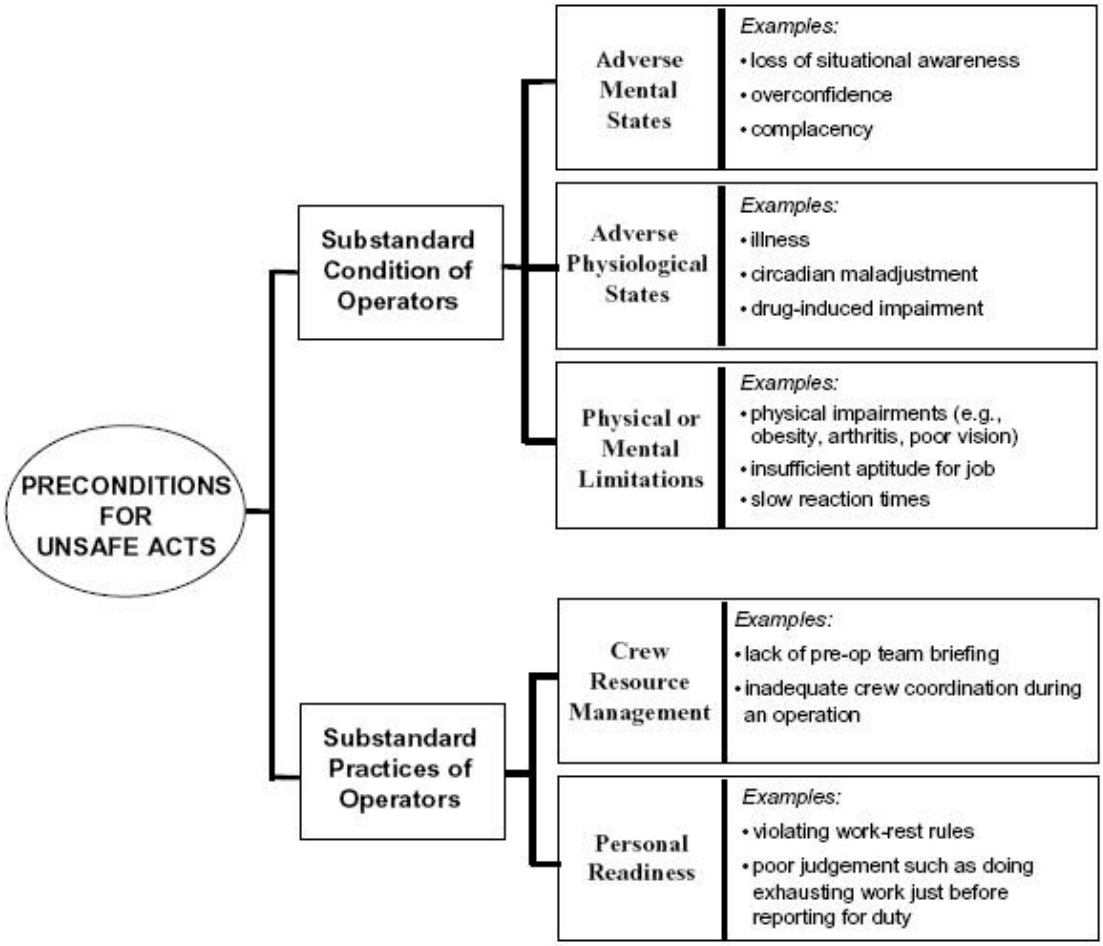

Figure 4-2: Classification of Preconditions for Unsafe Acts

Source: Rothblum et al (2002) Human factors in incident investigation and analysis.

Although in considering the human factor/errors, a lot of focus has been put on the basic error types as shown in figure 4-3 (slips, lapses and mistakes) there is reason to believe that there consistently are violations that also cause accidents. These violations – small as they may seem to the operators – are dangerous and are based

on unquestioned attitudes such as complacency, overconfidence and thrill seeking.

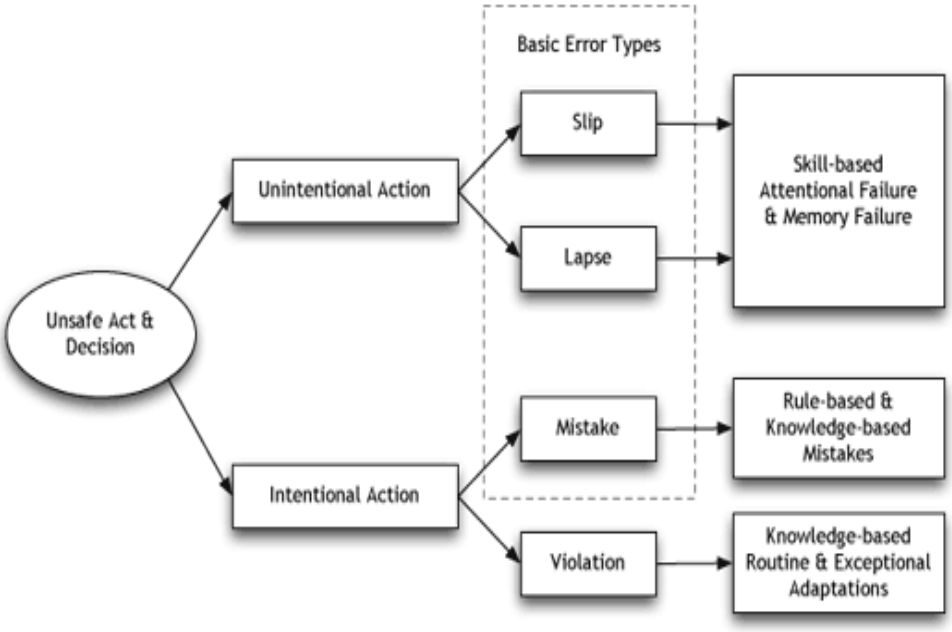

Figure 4-3: Error or violation types – the Generic Error Modelling System.

Source IMO (2002). A course for marine accident and incident investigation.

(Adapted from Reason, 1990)

An elaboration of the above diagram is given by the UK P & I Club[18] (undated). Figure 4-4 gives a detailed expansion of the "violations" section of this chart.

At the extreme end of the violation possibilities, Reason (1990) adds "acts of sabotage" which is especially relevant with respect to crew attitudes concerning security matters.

Hernqvist of the Swedish Club is cited by Lloyd's List ("Familiarity that can breed contempt", 2005) as saying that it was clear from a study by the club of collision cases between January 2001 and February 2004 that human factors - poor situational awareness, lack of communication and non-adherence to standard operation procedures are present as root causes of most of the collisions.

[18] See Appendix 5 for the club's full elaboration of the sources of human error

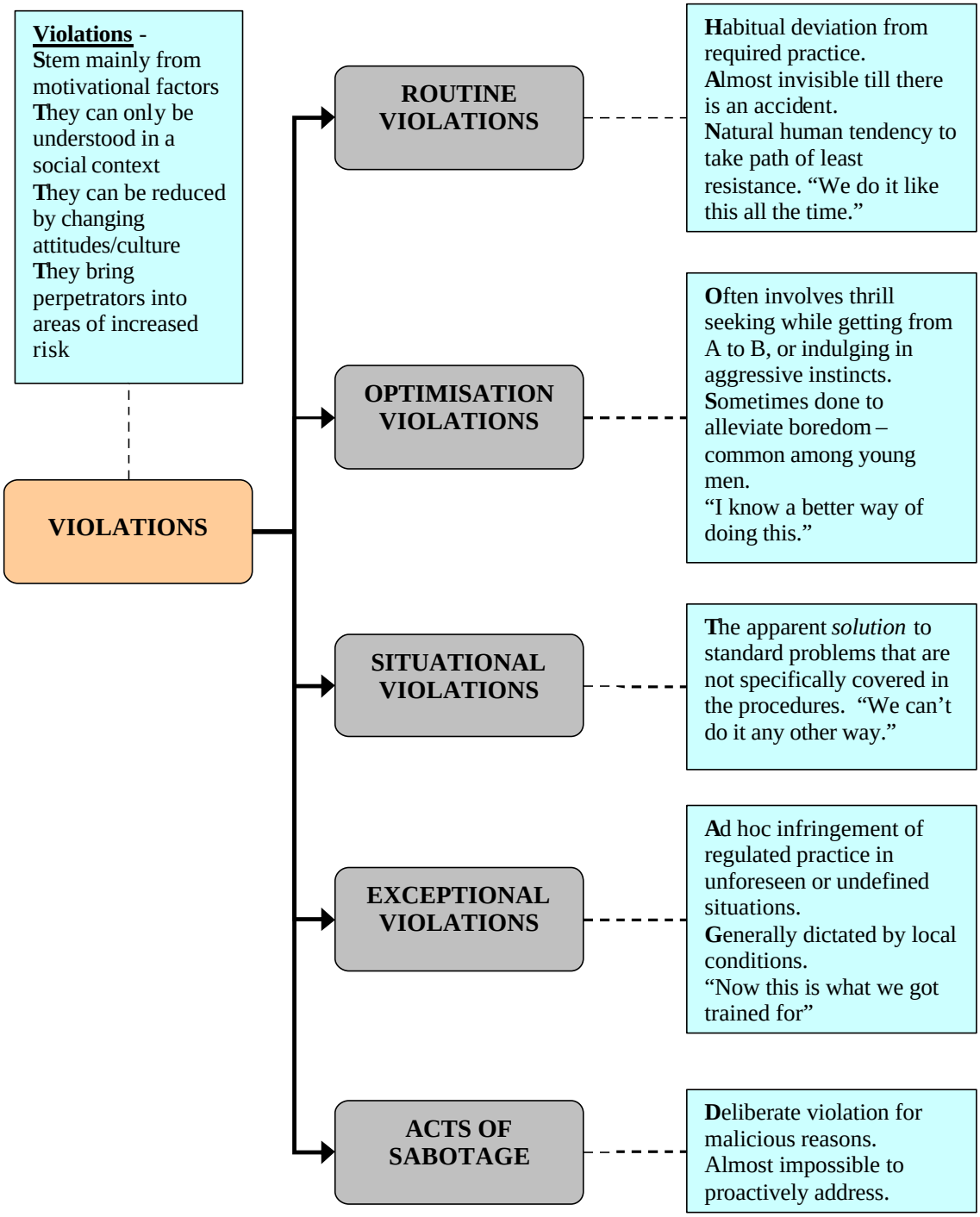

Figure 4-4: Elaboration of violation as a source of human error

Source: UK P & I Club

In summary, the attitudes of the human resource at all levels is worthy of consideration as a causal factor in accidents. These attitudes may be evidenced as behavioural patterns of wilful violations, complacency, destructive obedience and many others that cause or aggravate the contexts within which accidents thrive. Lessons learnt from these accidents give MET the opportunity to develop systems that contribute to the development of right attitudes and values (the affective domain).

We need balance. We should be defining what teachers (and the products of are school) need to know, be able to do and be

Olson and Wyett (2000).

The expression “be, know, do” is a neat summation of how effective leaders operate, but it also points to the central challenge of leadership development. The capacity for “knowing” and “doing” is relatively easy to build up in a student…But knowledge and skills are perishable – both because they are not applied all the time and because they become outdated. It is the “be” piece – your self concept, your values, your ethical makeup, who you are – that lasts.

K. H. Hammonds (2001)

CHAPTER 5 - THE IMPORTANCE AND CHALLENGE OF AFFECTIVE EDUCATION

5.1. Importance of affective education

The literature, survey and cases analysed show that affective education is important. It is the opinion of this dissertation that in good education, the student is developed beyond the point of repetition of what is considered "good" or what the majority of people around him/her do, to the point where he/she is equipped to consider alternatives and his/her own decisions based on a value system inherent in him/herself. Training ensures one's ability to do the right thing. Education should ensure one's willingness to do the right thing. Education should therefore emphasise more of the affective domain as against the obvious need and importance of cognitive and psychomotor abilities in training.

5.1.1. Industry wide applications.

Statistically the average time being spent at sea by officers is about 8 years (Rodger, 1999). After their time at sea, individuals go on to shore jobs where innate values learnt are essential. Often the theory and practice which form the bulk of a competency examination and a life at sea are not necessarily relevant and essential regarding a shore job. Innate values must drive such individuals to different knowledge goals based on their own attitudes. In a paper which is almost prophetic in nature, Short (2004) predicts that technological advances on board ship as well as strong demand for people with seafaring experience for shore jobs will increasingly mean less and less people will see a life at sea as a long-term career. He strongly advises that MET be designed to equip students for the broader career range of the maritime industry – at sea and ashore. One way to do this would be to treat as

essential the development of attitudes, values and ethics that will serve students well when they are in key positions ashore. The attitudes, for example, that the ISM code requires in the management of a shipping company should be inherently developed in officers who, in all probability will proceed to some of these managerial roles.

The experience of WMU is a case in point. For the period from 2001 to 2005, about 35% of the students who entered the institution could be described as having a seafaring background.[19] Figure 5-1 illustrates the trend for the period.

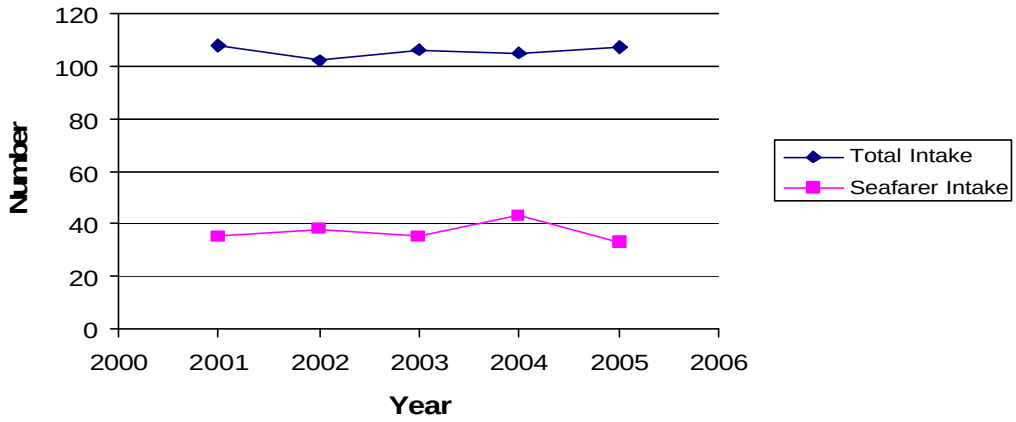

Figure 5-1: Student/Seafarer intake into WMU

Source: WMU Registry (2005)

Like others who go on to study in other institutions for shore-based jobs and the many more who just move to positions ashore without any intervening period of study, they will certainly have benefited from any previous education in the affective domain while in METI.

5.1.2. Global recruitment of officers

The growing shortage of officers is accepted as fact by many (Baltic International Maritime Council/International Shipping Federation, 2000; European Commission

[19] The definitions given for people with "seafaring background" vary – ranging from naval and coastguard to purely merchant marine experience of various durations. The point here is the exposure to some form of maritime education and training for an active on board/sea-associated life.

[METNET], 2003; Rodger, 1999). Some dispute the reality of this shortage, preferring to see it as an imbalance in quality of labour supply rather than quantity (Li & Wonham, 1999). The argument is that the shortage is mainly in the OECD countries and that an abundance of labour is available in other countries although sentiments exist that question the quality of labour from these other sources. What is agreed by most is that most of these "other" countries may have no relevant seafaring traditions and what is compromised is quality. But what is quality and when one says a "quality officer" what does one mean? Fan Cun & Wei (2002) suggest that quality is related to trends in the industry as a whole. In their opinion - to meet the trends of faster and larger ships, increased automation, increased emphasis on management and professionalism – quality operators of ships have to:

- ✓ Be equipped with skills in operating new ship-based technology, safety management systems and computers
- ✓ Master such things as communication/language, leadership, management, human relationships
- ✓ Possess qualities derived from professionalism – with experience, career commitment and professional ethics.

To these may be added

- ✓ The possession of an inherent desire for self improvement to keep pace with the dynamism of the economical, technological and regulatory aspects of the industry.

The industry seems to inherently lean towards an agreement that having an STCW certificate is not all that it takes to optimise seafarer performance. The reality of decreasing numbers of officers from the developed world as well as the economic dynamics of shipping, imply that the need to recruit from all cultures (global recruitment) will only become more pronounced in the future. If the STCW 95 truly globalises officer characteristics, there would have been less concern with the situation. Though all institutions will argue that their training produces suitable officers for the industry once they comply with international standards, what seems to be missing is the global ability to define and produce what constitutes a complete

officer, knowledgeable, skilled and with the right attitudes, values and ethics – in one word, professionalism. This is where the concern lies. Without this the industry will necessarily have to employ people who though "qualified" by all existing regulatory standards are considered by many to be incompetent and unprofessional leading to a culture of criminalisation. This in turn leads to less people wanting to go to sea and the whole vicious cycle is perpetuated.

In a bid to improve the quality of officers, the European Commission's Thematic Network on Maritime Education, Training and Mobility of Seafarers [METNET] (2003) introduced the 4-E concept. Even though the project was primarily (and unfortunately restrictively) directed toward specific goals for the European Union, the concept is applicable on a global level. Figure 5-2 illustrates this concept.

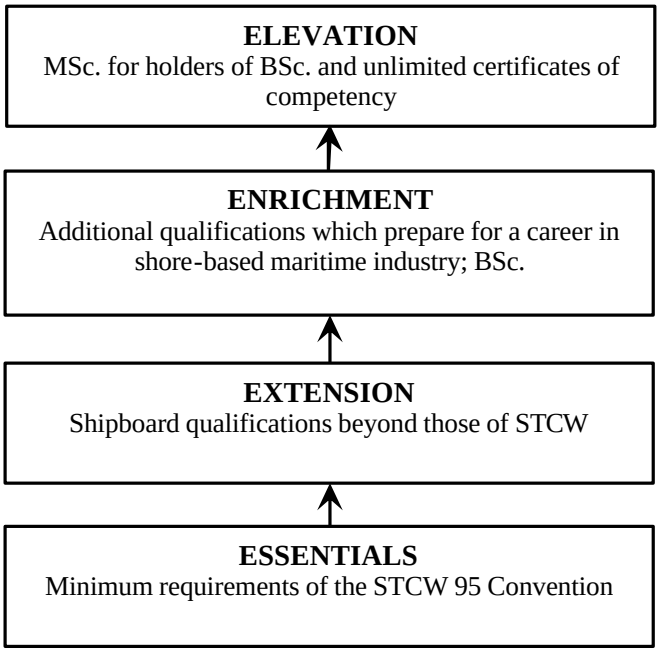

Figure 5-2: The 4-E concept

Source: METNET final report[20] (2003)

[20] Each level is built on the preceding levels and include their requirements

The METNET final report (p. 19) makes a noteworthy comment:

> It is the gap between knowledge/competence (cognitive domain) in, and attitude/position (affective domain) to, the profession that is not well balanced … This loss in the affective domain in affiliation and identification cannot be substituted by a gain in the cognitive domain.

It is the argument of this dissertation that the difference between the STCW 95, or any such cognitive/psychomotor based standard, and the "high quality" requirements of the industry, is mainly in the realm of the affective domain.
In the words of Andrew Winbow (2005, p. 13), the answer to the shift of maritime matters away from the traditional maritime nations is perhaps

> to develop training programmes that not only provide the technical skills needed to operate ships and their equipment safely and efficiently, but also instil the attitudes – the safety culture – that is likely to have the most direct effect on safety standards. If these programmes can be tailored to meet the needs of all of the nationalities in today's global maritime workforce, so much the better.

5.1.3. Disciplines for lifelong learning/self development.

More and more institutions are offering components of their curriculum online. There is constant drive to optimise the resources of an METI by taking advantage of technology with online learning. In addition to this, the highly dynamic nature of the industry in relation to school curricula, places a responsibility on officers to foster attitudes and be motivated to pursue study programmes on their own. To succeed one must be high on motivation and have values that drive one to seek knowledge.

This shows that any such training and education that will help create this kind of intrinsic motivation and value system is not misplaced. It equips prospective officers to have the affective characteristics that empower them to stay appropriately abreast with industry trends even when out of school.

5.2. Challenges: Measurement and assessment

From the time of Socrates, the question has been asked whether attitudes and values can be taught. The challenge of effectively teaching and reaching the objectives of the affective domain is recognised by the literature. An even greater challenge is assessing these very subjective attributes of individuals (Haspeslagh and Wittenauer, 1989, p. 8; Ringness, 1975). As a result most educational and training systems have either conveniently "forgotten" about affective objectives where they are specifically stated in the curricula - allowing them to erode - or they neglect to include such objectives (Leonard, 1989; Bloom et al, 1964; Adkins, 2004). Exacerbating the problems associated with affective education is the frequently slow rate of attainment of affective objectives (Ringness, 1975).

There are also philosophical, political and legal difficulties in evaluating attitudes and values. Some consider attitude change to achieve behaviour modification as immoral and an infringement of an individual's freedoms. The reality is that the dynamics of behaviour modification are always present in any human interaction especially in the educational setting. What is being advocated is the explicit statement of how these are going to be done. The necessary ultimate aim of all education is therefore desired behaviour modification.

In an industry such as the maritime industry it should be possible to identify appropriate behaviour and seek to influence the attitudes that create these in ethical ways. What should be researched and specifically stated are the values and attitudes, the teaching of which should be attempted. In addition to this is the need to be able to measure and assess the success of reaching the desired learning objectives.

5.2.1. Attitude scaling

Attempts to measure attitudes have historically being dependent on attitude statements, which are then put together as an item pool and then put against an appropriate scale. A number of methods for measuring attitudes (attitude scaling) have been developed. It is beyond the scope of this dissertation to critically analyse these. The following are only brief summaries of three of them and the general principles underlying their use as discussed by Oppenheim (1992)[21] among others.

1. Social-distance scales

This scaling method was designed by Borgadus in 1925 and has undergone some revision. It was primarily to measure attitudes towards various ethnic groups. Social distance is the amount of space individuals want to keep between themselves and others based on social factors. This has very significant implications for the multicultural environment of shipping today. It was a simple scale that put a number to the desired closeness of a relationship and asked respondents to circle those numbers representative of their immediate response to the group in question (not to the best or the worst in that group). An example of the scale, adapted to the maritime industry, is shown in table 5-1 with possible responses to the question of whether the respondent would admit certain groups to different levels of closeness and work relations.

Table 5-1: Example of social-distance scale adapted to the maritime industry

	To work in the same ship as your superior	To work on same ship at same rank	To work on the same ship	To work in the same company
Group A	1	2	3	4
Group B	1	2	3	4
Group C	1	2	3	4
Group D	1	2	3	4

[21] Oppenheim's treatment of the subject is quite detailed and relevant and is highly recommended

The numbers marked by individuals would seem to reflect (in a cumulative way) the degree to which they held attitudes of maintaining a social distance between themselves and various groups, reflecting a willingness to tolerate, work together etc. These groups may be nationalities, cultures, gender etc. An individual marking 4 for each of the five groups would for example be seen as having a high social-distance attitude and show an unwillingness to maintain a close working relationship with the groups concerned.

2. Thurstone scales

The main focus of the Thurstone scales was to introduce linearity and equal intervals. To produce this scale, a number of statements, expressing various positions with regard to an issue or subject, are collected. These are then edited for clarity and relevance. The resulting statements – ranging from favourable through neutral to unfavourable – are submitted to a number of judges who position them individually at subjectively equal intervals (a continuum normally made up of eleven categories) to try to imply that the difference between any two adjacent statements is the same as for any other two. Items retained are those with the most agreement among the judges and with the equal interval required. Subsequently using statistical methods, the spread of judgements can be considered. Ambiguity is indicated by a wide spread. The statistically determined average judge position of a statement is the scaled value for that statement. A completed Thurstone scale (with about 20 statements, each with a numerical value) requires the respondent to check those items he/she agrees with. The individual's attitude score is the mean value of the items checked (Arul, n.d.). Success in the design and use of this scaling method is dependent on the clarity of the statements, the degree to which the judges are unbiased and similarity between judges and questionnaire targets/subjects.

3. Likert scales

Likert scales are easier to set up than Thurstone and are more common. They are made up of various opinion statements reflective of positions on a subject or an issue.

These statements are collected and after editing, are given to respondents who indicate their attitudes toward the issue by rating the statement on a continuum. The continuum is normally a five point one and the most common is:
1- Strongly agree, 2 – Agree, 3 – Unsure/Undecided, 4 – Disagree, 5 – Strongly disagree. The Likert scale is also known as the Summated Ratings scale, because the final attitude score of the respondent is the sum or his/her ratings for all statements.

Other scaling methods include factorial scales and scalogram analysis (Guttman scales). The basic principles underlying the use of all of these scales are:

- The collection of a pool of relevant attitude statements
- Ensuring that the statements are representative of what it is desired to measure.
- Making assessment as uni-dimensional (measuring one thing at a time), reliable, valid and linear (to make quantitative scoring easier) as possible

These classical methods of attitude measurement have been augmented by the mathematical abilities of computers (Oppenheim, 1992) and remain relevant. Other more subjective forms of measurement are by

- direct observation
- direct questioning.

5.2.2. Validity/reliability of assessment

Validity of an assessment method is defined as the ability of the test to measure what it is supposed to measure. Reliability is the consistency with which the test measures whatever it does measure (Wiersma & Jurs, 1990, p. 183; Fisher & Muirhead, 2001, p. 89). Validity increases when test items are as closely related to curriculum objectives and content as possible – curriculum alignment. Reliability ensures that evaluation and test items reflect consistently the outcomes of learning irrespective of learner or situation. Both of these requirements are relatively difficult to achieve

with affective objectives. The major challenge lies in the determination of the objectives. If this is done with clarity, it will be much easier to determine measurable behaviours and statements that go to determine the degree to which the objectives have been reached. This being the case, the validity and reliability of these kinds of assessments will be no lower than the current levels for oral exams and essay type questions.

The use of questionnaires has been suggested in much of the literature for this purpose. These do not lend themselves easily to grading, but are very useful where the assessment is diagnostic or formative. In other words, when students don't see the exam as a "pass" and "fail" form of assessment, their honesty in answering questionnaires will help to implement curriculum strategies to correct wrong attitudes, values and beliefs.

Summative assessment is a challenge in this domain. It implies an assessment mode that leads to qualifications and may result in certification and this seems ethically wrong. The dilemma is how to classify a student who demonstrates ability and knowledge, but who does not have right attitudes. At best, recommendations may be given as part of completion certification to indicate the position. This is open to debate and a lot of work needs to be done in this area if summative assessment is to be used in affective education. However, diagnostic and formative forms of assessment remain helpful for the purposes of achieving the objectives of the domain.

The use of computer software in assessing affective objectives is gaining prominence. Between the extreme of psychometric testing – used in such "industries" as the military and police – and no assessment, there are a range of products that claim to give reliable, valid and objective ways of assessment in this domain.

5.2.3. Use of diaries as an assessment form

The use of diaries is an accepted form of assessment in suitable contexts (Habershaw, Gibbs & Habeshaw, 1993). They can be a support for mentoring processes (described later). Diaries have the advantage over more rigid forms of assessment in that they allow the student to discuss more personal things from his/her perspective. A diary can be filled out daily or weekly and is a personal account of what one has

learned with associated feelings/views. Properly framed rubrics will allow for expressions from students that give insight into affective learning outcomes. A hypothetical rubric example is shown below with table 5-2 showing possible criteria for grading.

Rubric – Write a diary of what you have learnt in the module on a weekly basis, indicating any personal views and reactions and what has been learnt about yourself and others.

Table 5-2: Example of assessment and grading criteria for student diaries

Marks	**Criteria**
0-29	Does not constitute an answer to the question.
30-39	The student writes about professional knowledge and skills but avoids personal reflection or evaluation. Language is full of clichés.
40-49	Student gives specific accounts of parts of session, but lacks self-knowledge and is dependant on ideas from other sources. Language remains impersonal.
50-59	Student gives accounts of the sessions and adds personal accounts regarding those sessions. Honest and showing some self-knowledge, supported by relevant examples. Uses personal language.
60-69	Student shows self-knowledge and self awareness. Clear insights about him/herself and the sessions and ability to evaluate both. Good illustrations. Willing to take responsibility for him/herself and to learn. Expressions honest and personal.
70+	Exhibits qualities as above but in greater depth and with additional flair and originality in language.

Source: Adapted from Habeshaw, Gibbs and Habeshaw (1993)

All the processes of evaluation such as standardising scores can then be applied for an indication of overall student performance.

5.2.4. New trends

In a comprehensive article on new advances in technology for assessing and teaching objectives in the affective domain, Adkins (2004) writes of products known as Affective Computing and Affective Learning Technology that are designed for the affective learning domain. An example is the work of a research group in the Massachusetts Institute of Technology (described on the website http://affect.media.mit.edu/index.php). Adkins states that most of these are well beyond the research phase and are being used in many industries. He gives examples of companies such as "SimuLearn", "WILL Interactive" and "Insight Experience" which are marketing products relating to the teaching and assessment of affective domain objectives.

5.3. Steps to good affective education in METI

1. MET management commitment

Similar to the ISM requirements for commitment from shipping companies, the management of METI should be committed to the development of the "safety culture" mentality in the students they educate. The extra resources required to emphasise and achieve objectives in the affective domain, can only be made available with the commitment of top management. Clear mission and goal statements help in the development of affective objectives in the drive for the appropriate industry culture (European Commission [METNET], 2003, p. 19).

2. Clear affective educational objectives

In the same way that a lot of thought and work have gone into the development and setting out of cognitive and psychomotor objectives, serious effort must be put into the development of specific desired affective objectives and the observable behaviours that accompany them. The more specific the objective, the easier it will be to design "suitable" assessment and measurement forms. Instead of such vague statements as "students will develop appreciation and tolerance for other cultures" a

more specific statement would be "when presented with a written or filmed portrait of an alien culture, the majority of students will show acceptance and tolerance rather than condemnation" (Thompson, 1974).

3. Teacher recruitment and training

It has been said that as far as teachers are concerned, selection is much more important than training. Teachers, without question, are the most import resource in an educational institution. "Everyone who remembers his own educational experiences, remembers teachers and not just methods and techniques" (Hook as cited by Olson and Wyett, 2000). Teachers teach as much by what they are as by what they teach. Olson and Wyett (2000, p. 741) express a conviction that "the personality and attitudes of teachers are just as important as their knowledge of subject matter and pedagogical skills".

In an industry suffering from a perceived lack of operators who "graduate" to become the teachers of future operators, further sifting through potentially qualified candidates for those with good affective dispositions is a problem. Even with the current emphasis on cognition and skills alone, one major problem for global implementation of standards remains the availability of suitably qualified manpower/expertise (Muirhead, 2000). Additional explicit affective characteristics will invariably make it more difficult to recruit suitable employees.

Teacher development by MET is the answer.

Most applicants to MET are not trained teachers and even trained teachers struggle with the affective domain. What can be suggested is that if in the recruitment process, an otherwise qualified person, is found to lack the desired affective dispositions and abilities to inculcate the necessary values in students, that individual be exposed to some form of affective education, post-hiring, as part of existing "staff appraisal" schemes. Identification of such needs should therefore be part of the selection process. The management in essence seeks to have the situation where the teaching staff has a clear understanding of and commitment to affective objectives.

4. Teaching

- ✓ Use key people/role models in industry to have workshops and seminars with students. Kelman's study [22] showed that "attitudes adopted from a communicator whose power is based on credibility will tend to be expressed under conditions of relevance, regardless of surveillance or salience" (1958, p. 57). In other words, credibility of instructor increases internalisation. The World Maritime University has been very successful in this kind of education, by using as a lecturer resource, recognised authorities in the particular field of endeavour. The affective effect on students is very positive (informal interviews by sitting in with students in assessments of the university by external auditors 2004-2005).
- ✓ The use of controlled group discussions achieves better affective objectives than the traditional "lecture addressing student" way. Constructivism seems to have a place in contemporary education along with elements of McGregor's theory Y assumptions [23] with respect to motivation. In achieving affective education, the teacher is better positioned as a "guide on the side" rather than "a sage on the stage" (Muirhead, 2005). The dynamics of small group interaction leads to the learning of attitudes and values from others in the group as well as tolerance and insight into very varied views. A note of caution is that individual differences must always be recognised in keeping with the belief in the dignity and worth of all people.

  Foy (2000) finds that discussions -

  - Help students explore many perspectives, increasing awareness of and tolerance for ambiguity or complexity
  - Help students recognize and investigate assumptions
  - Encourage respectful and attentive listening and shows respect for others' voices and experience
  - Increase intellectual ability to work with thoughts and ideas.

[22] See Chapter 3 on compliance and safety cultures
[23] See Chapter 2 on motivation.

- Help students become connected to a topic
- Help students learn process and habits of group discourse, dynamics and relationships
- Develop collaborative learning
- Lead to transformation

Her views, though addressed to primary and middle school students, is just as valid for higher education (Brown and Atkins, 2002, p. 52; Print, 1993, p.171, Winston, Bonney, Miller & Dagley, 1988).

- ✓ Extra-curricula activity that involve lecturers with students often help to transfer values
- ✓ Role play has been recognised as an effective way of teaching affective domain subjects (Adkins, 2004). Simulators are helpful in this context.
- ✓ Use of workshops, seminars out of the context of the classroom.
- ✓ Educators must have good technical expertise and be competent teachers with right values (Wilson, 2005).

5. Paramilitary training

This mode of training to instil discipline and other affective objectives is still required by most METI. The merits of paramilitary training is best summarised by De Simone (1997, p. 168). Writing about this kind of training on training vessels, he states:

> The character and leadership development of the cadet is the obvious by-product of the structured (regimented) lifestyle which is essential for the safe and effective operation of a ship crewed with cadets. Additionally, the self discipline required on large, modern ships, crewed with as few as six under certain registries, takes on greater importance by the day. In this context, these discipline parameters are just as valid today as they were in the 1890s.

> We can only hope they are somewhat better packaged but, none-the-less, they remain integral to ship operations even in a world where the ship master is increasingly referred to as the ship manager.

The last sentence emphasises a growing challenge to this kind of training. Paramilitary training entrenches the hierarchical and power-distance systems on board ship and gives room for such behaviours as "destructive obedience". The challenge is to optimise the virtues of this kind of training in a shipboard environment that is shifting from a strictly hierarchical command structure to the less rigid concept of teamwork.

Previously affective objectives were forced into people (military style) with debatable or dubious results. Those desirable objectives are still relevant. However new ways must be found to increase the positive results of affective education in a more liberal setting. The goal must be to allow for the top-down and down-top communication and interaction necessary for good team work, while retaining the necessary respect and authority of officers in their respective ranks.

Behaviour must now be seen as compliance with required rules and codes of conduct in the recognition that people need to live and work together as good stewards in a civilised global society. This indicates a desire to have people obey willingly because "they understand that it is necessary for the common good" (Sadler, 1983, p. 1). Sadler adds that self discipline is far better than imposed discipline.

6. Mentoring and coaching

Mentoring connotes trust (Merriam Webster, 1996). It is the leading by a counsellor or guide, of a less experienced individual. It requires time, patience, positive interaction and empathy. Barve (2004, p. 23) puts it this way:

> A mentor, in the historical sense, is seen as someone who is a loyal friend, confidant and advisor; a teacher, guide, coach and role model; is entrusted with the care and education of another; has knowledge and advanced or

expert status; who is willing to give away what he or she knows in a non-competitive way; and represents skill, knowledge, virtue and accomplishment.

There are many benefits to mentoring. The principles of good mentorship can be applied and are beneficial for a whole range of social levels including teacher training. Some benefits include (The Connecticut Mentoring Partnership, 2005):

- Increased communication abilities
- More enthusiasm
- Decreased hostile/antagonistic/adversarial attitudes
- Improved peer interaction
- Stronger self-esteem and self-control
- Increased sense of responsibility

In mentoring, not only knowledge and skills are passed on, but also values and attitudes. The mentor must thus be selected with some caution and often some training is required. Among possible areas of consideration (US National Education Association, 1999) are:

- Attitude and character
- Professional competence and experience
- Communication skills and
- Interpersonal skills

Role models are the basis on which mentoring rests. Role models have to be acknowledged and developed in all sectors of the maritime industry. Those who come to the attention of students should not be the "guilty" ones, but those striving for excellence and they should be known to them by name and not just as a statistic. This way of "teaching" is so significant because of the fact that humans are influenced greatly by their societies, role models and identifying figures (Vygotsky, 1978; Ringness, 1975). Where models are highly competent and exhibit integrity,

the mentored will have very high standards themselves and will feel rewarded only for high levels of competent behaviour with integrity.

7. Practice what we preach – institutional atmosphere

It is important that the atmosphere and behaviour of management/staff in a training institution positively reflect a culture of safety and responsibility. Without this, students tend to see the focus of their education as the acquisition of certification and not the development of a core belief system and work ethic. Observation and learning by students, especially at the younger ages, go far beyond the classroom.

8. Affective objectives through cognitive objectives

While there is a need to clarify affective objectives and seek to achieve them independently, cognitive objects should remain a way to achieve affective objectives. Discussions in class – in the "constructivist" style should give avenues for this. Thorough discussions of maritime cases (case studies) are particularly helpful in this context.

9. Lifelong learning

> Education …. includes the acquisition of knowledge and experience and the personal development of each individual … and must never be thought of as something that ceases the moment a person leaves school or college; it is a lifelong continuing process (Davies, 1968, p. 131).

Modern technology allows for guided learning concepts, such as mentoring, to be continued in a "lifelong" way through online facilities. Distance learning has an important role to play in this. The myth that mentoring should be face to face is disappearing as ways are found to optimise the use of satellites, data transfer and storage facilities relating to size and speed, helping to maintain a "notion of dialogue" (Pourzanjani, 2005b; Muirhead, 2005). To optimise the use of resources and reach a wider student constituency, an increasing number of institutions are

resorting to some curriculum delivery by distance learning. One major disadvantage with distance learning is that the level of social interaction that contributes to the development of certain attitudes and behaviours is missing. Some effort must be put into bridging this gap in social interaction. Web chatting, video and teleconferencing and other such high technology solutions (though still limited) can help in this direction. However cost and infrastructure remain issues – not only for the institution but also for the student. The view of this dissertation is that where an institution considers distance learning important enough to put in place all the necessary infrastructure and resources for it, that institution should consider with all seriousness how the affective domain and its objectives should be included in curriculum delivery.

5.4. STCW, quality assurance and affective education – a global standard?

At the very essence of quality is the idea of sameness and consistency and meeting of specific standards. The word ISO, so ubiquitously associated with the International Organisation of Standardisation, is actually a derivative of the Greek word "ISOS" which means "equal"[24]. Not only does global quality imply an ability to and willingness to be consistently competent, it also implies that products from a global MET resource base can be relied on to reflect the essential sameness with respect to quality. The Quality Standard System required by regulation I/8 of the STCW Convention as amended in 1995 (IMO, 2001) is sufficient to assure quality in the affective domain, provided the relevant objectives are clear and defined and can be suitably covered. The quality system in essence does not have to differ. It is supposed to ensure that defined objectives are continuously monitored. The challenge is to specifically define objectives in the affective domain at a global level. This must be researched, with benchmarking of current best practices and then standardized in much the same way as has been done for cognitive and psychomotor domains. This will create a global recognition of the need of affective education and

[24] See http://www.iso.org/iso/en/aboutiso/introduction/index.html#three and http://www2.cs.uh.edu/~joseph/ISO9000.htm

create a platform on which METI can build programmes (which unlike the objectives may differ in approach depending on culture etc) with the verification incorporated into STCW – add flesh to the skeleton, so to speak.

5.5. Standards in ethics

Education and training for the achieving of affective objectives is gaining prominence in many industries. After such cases as Enron[25] and the Exxon Valdez spill, ethics has become an area of growing concern in business as a whole.

The Business Ethics Research Project (1999) in Japan, designed a standard[26] known as the Ethics Compliance Standard (ECS) 2000. The evolution and description of this standard is given in a letter from the designers to the International Organisation of Standardisation on the site:

http://www.iso.org/iso/en/comms-markets/sr/background/messageboard/2001-10-07.html .

The ECS 2000 is specifically directed at economic entities/businesses and as it presently stands is not easily applied to life on board ship. However, it shows the possibility of having such standards. They can be adapted to become a part of the maritime landscape (applicable globally), made known to and valued by prospective seafarers, through the instrumentation of education and training and not necessarily as another set of regulations to comply with. In the final analysis, in much the same way that society (individuals) trusted Enron – one of the most admired companies in America – with their money, society trusts that shipping companies and the seafarers they employ will carry the world's goods safely from one place to another, without causing accidents or polluting the environment in the process and to be transparent and accountable in their efforts to do so.

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[25] A series of unethical and corrupt practices led to the bankruptcy of the energy firm Enron and the loss of millions of dollars of investors' money.
http://news.bbc.co.uk/1/hi/in_depth/business/2002/enron/default.stm

[26] The standard is to be found on the site http://www.ie.reitaku-u.ac.jp/~davis/assets/applets/ecs2k-e.pdf

The key to improvement is in the close involvement of all stakeholders to ensure that a ship is “fit for purpose” and that the master and crew are provided with the proper tools and are adequately trained to be able to conduct their business in a safe and efficient manner.

Middleton, R. (2003)

CHAPTER 6 - ROLE OF KEY PLAYERS IN THE MARITIME INDUSTRY

6.1. METI

The inculcation of professional values has historically been heavily reliant on the sea training phase of maritime education. Unfortunately the phenomena of crew reduction, faster turn around, increased frequency of crew changes and an increased crew workload on a more multinational crew has limited the effectiveness of training on board ship regarding values pertaining to a safety culture (Winbow, 2003). With this trend has come a tendency in METI to transition from purely vocational schools to universities (variations of METNET's 4-E concept) and thus significantly increase continuous student-lecturer contact time. This places the onus on METI to increase their influence in inculcating the values of safety, social responsibility and professionalism in prospective and continuing seafarers.

In the absence of a specific global standard, METI should take action in this direction for industry good, for their own recognition and to have a competitive advantage with their programmes of study and quality of graduates.

Writing about intentionally structured groups, Winston, Bonney, Miller, and Dagley (1988, p. xiii) suggest that "it is the responsibility of colleges and universities to be concerned about and to purposefully address the psychological, social, career, aesthetic, intellectual, ethical and physical development of their students and not just their academic development"

If the officers who become part of a global maritime culture lack the appropriate essential values and ethics, what is to be expected is an industry that is perceived globally to be driven by profit with no respect or desire for social responsibility. The

already much maligned “image of the shipping industry” will certainly not be bettered.

METI should also make further inroads into being industry training providers in the continuous professional development style – on the job training and addressing training for specific industry objectives that emerge faster than the generation of laws (Bramley, 2003, pp. 2-3).

6.2. IMO

Legislation at an international level is often obstructed by the concept of national sovereignty. IMO’s ability to make and enforce legislation, suggest guidelines and set standards is dependant on the member nations’ commitment to these. This is not always easily achieved with many nations having different interests, and even where interests converge, decisions are often hindered by various governmental and bureaucratic barriers. Ultimately however any such standard for the clear incorporation of the affective domain in educational objectives in an STCW–like fashion will have to be achieved at the level of the IMO to achieve the global effect desired. The relevant committees of the IMO should therefore seek to clarify these issues in any considered revision of the STCW.

It is also noteworthy that attention has to be paid to fundamental reasons why global MET remains unequal despite the IMO’s best intentions. An SIRC study (Sampson 2003a) identifies three issues that are critical to the success of MET:

1. The economic context of colleges
2. The available physical resources
3. The available human resources

Any improvements in the quality of MET will have these three factors as the foundation. At an international level, the IMO is uniquely positioned to positively influence these factors and indeed seeks to do so with laudable attempts at technical cooperation and human resource development[27]. Ultimate responsibility must lie

[27] Resolution 11 (attachment 3) of the final act of the STCW 95 conference

however with the institutions and the administrations/states that control them. The member states of the IMO remain its "teeth" - the bedrock of its authority and abilities.

6.3. WMU

The WMU is strategically positioned to deliver the impetus needed for the importance of this domain to be appreciated. Every year, a number of students from many countries pass through its corridors, acquiring knowledge and attitudes about the maritime industry. These individuals study in courses that position them to influence policy and trends in many sectors of the industry (O'Neil, 2003).

One of the specialisations offered since the university's inception in 1983 – Maritime Education and Training - is particularly relevant. Incorporating a degree of educational and social psychology in the curriculum of this specialisation, will lead to a better appreciation of the affective domain in education and make these prospective lecturers/managers of MET, place the necessary emphasis on these objectives when they are back in their own countries.

Additionally, the university is suitably positioned to explore and research further into the merits and challenges of the affective educational domain and inform the IMO accordingly. The extensive and cordial relationships with industry and other universities will be of help here. The STCW 95 convention encourages the WMU "to assume a leading role for the promotion and implementation of a network of advanced maritime training establishments" [28]. Such networks are extremely important media for enhancing the attainment of affective goals without necessarily having regulations in place.

[28] Resolution 12 (attachment 3) of the final act of the STCW 95 conference

6.4. Institutional associations

Various association and groupings of educational institutions such the International Association of Maritime Universities (IAMU) and the Association of Maritime Education & Training Institutions in Asia Pacific (AMETIAP) are often not as limited in their decision making by governmental pressure as the IMO probably is. STCW relies to a very large extent on "self-regulation" (Sampson, 2003a) and realistically, the IMO is limited in its ability to review exactly and completely what happens in all MET systems round the world. These associations therefore remain ideal fora within which these issues can be discussed, clear conclusions reached, practices benchmarked and standards set on a voluntary/self-regulatory basis. It is often the case, that when practices become the norm in such associations, such practices are more easily transferred as standards to the global industry. . They can also be a platform for research work into the domain and sharing of experiences. There is certainly no denying the strength and influence of associations such as IAMU.

6.5. Shipping companies

While shore based industries often recruit from a limited area (geographically and often culturally), the modern shipping company seldom has that luxury. The recruiting grounds are the multicultural expanse of potentially the whole globe and social compatibility in forming a team is difficult. If global definitions and standards are developed, the companies can build on the foundational work of educational institutions in the affective domain, by seeing themselves as an extension of the educational setting for their officers. In other words, education for the mariner should not end with the acquisition of a certificate for passing an exam. In the absence of global standards, this educational task is made simpler, if recruiting is carefully structured to employ individuals with desired and similar values and attitudes (Amanhyia, 2005). Additionally companies can develop systems that promote competencies encompassing all three domains of educational objectives.

An example is the shipping company Teekay's work with Det Norske Veritas (DNV) in the context of the DNV Seaskill Standard for Certification of Competence Management Systems. This new DNV standard, while acknowledging the usefulness of the STCW Convention, recognises that the "best companies are already looking beyond satisfying minimum requirements" (Brewer, 2004, p. 24). Brewer, in an article in the corporate magazine of DNV, describes the Teekay programme as going "well beyond legislative requirements for certificates of competency and including Teekay competencies; management/leadership behaviour competencies, overall knowledge and understanding, aptitude, experience, attitude and motivation" (p. 25).

The trend towards such action by shipping companies in conjunction with bodies such as DNV is increasing. While this may be said to be an indictment on the education that seafarers are currently receiving, there need not be a conflict between METI and the industry. The task of education of the seafarer should be a shared responsibility but arguably with greater responsibilities lying with METI. Companies must always have a role to play in complementing this and fostering ongoing learning/education beyond the school.

Shipping companies are also the most strategically positioned to give the motivation that is so critical to development of the affective domain in the workplace. Managers and controllers, who themselves must be equipped with appropriate attitudes, must see to the creation and maintenance of an environment where the affective domain is considered important and thrives. This is of value economically, because such crew are loyal in a positive way, competent and dedicated.

In today's competitive maritime world "high quality" officers have a high mobility (METNET, 2003). Any shipping company seeking to counter this must foster a sense of ownership and commitment in its officers.

6.6. Mariners and students

Through out this dissertation, mariners and students have been looked at as the objects of the affective education and training under discussion. While this is true,

they need not be passive, disinterested observers to the process. They should challenge themselves to understand the core issues at stake in their education and to excellence and right affective dispositions in their chosen field of endeavour. While the image of the industry does not rest only on them, they form a key part of the public's perception of who a "good seafarer" is and any bettering of the image is to their advantage. So too is any excellence they display, both in enhancing their own career prospects and more critically, saving their own lives at sea.

6.7. Professional bodies

Parker (2003) discusses the role of professional associations in a particularly relevant and insightful way. He clearly shows how these bodies are well positioned to help enhance the safety culture, support continuous professional development and re-establish trust in professional values. He states:

> The professional associations have particular strengths which include effective channels of communication through their journals, meetings and conference programmes … standard setting capabilities through validation and accreditation and proactive continuous professional development, all supported by an ethos of trust and transparency and an underlying belief in contributing to the common good. Optimism for the future cannot be built on compliance with prescriptive rules alone. True motivation comes from people who share a spirit of trust, a sense of commitment and who feel personally responsible (p. 113).

These bodies require members to abide by codes of conduct based on ethical principles. One such code, designed by the Nautical Institute for the wider industry, is shown in Appendix 6. It must be mentioned that simply having such a code is

only a step. The professional bodies offer a paradigm within which the codes are adhered to because their members are disposed to (whether by suitable education, or experience or core values) seek the professionalism the codes imply.

With regard to the affective domain in education, professional bodies can influence the sensitisation that is needed to create a global awareness of the need for such objectives. Because of the high regard they have with regulatory bodies (may have consultative status at the IMO), they can also positively influence the standards that are set in the form of legislation. Additionally they can continue to bring their core affective principles (for professionalism, excellence, commitment etc.) to young students by reinforcing extensions of the associations in the educational campuses and exposing students to the role models who voluntarily submit to the ethics of such associations.

I believe that education is the fundamental method of social progress and reform.

I believe that all reforms which rest simply upon the enactment of law, or the threatening of certain penalties, or upon changes in mechanical or outward arrangements, are transitory and futile.

I believe that education is a regulation of the process of coming to share in the social consciousness; and that the adjustment of individual activity on the basis of this social consciousness is the only sure method of social reconstruction.

I believe that this conception has due regard for both the individualistic and socialistic ideals. It is duly individual because it recognizes the formation of a certain character as the only genuine basis of right living. It is socialistic because it recognizes that this right character is not to be formed by merely individual precept, example, or exhortation, but rather by the influence of a certain form of institutional or community life upon the individual, and that the social organism through the school, as its organ, may determine ethical results.

John Dewey (1897)

CHAPTER 7 - CONCLUSIONS AND RECOMMENDATIONS

7.1. Conclusions

In answer to the three research questions the study and analyses indicate that:

1. The affective domain is considered relevant and important
2. There is recognition of the need for this and various institutions approach this in very varied ways with different levels of specificity and commitment.
3. There are many existing methodologies for teaching and assessing the affective domain but they invariably suffer from questions of objectivity, reliability and validity. Certification specifically for the affective domain remains elusive.

Education and training must keep in focus what is desired in the personnel who man ships. It should not be just a process to gain certification so that employment opportunities will be available or to satisfy administrations and port state controllers that certain examinations have been passed, but the developing of a human resource base which feels accountable for a conscientious protection of human life, the seas, and the cargo entrusted to their care. The findings of this study[29] and analyses shows that wrong attitudes create undesirable conditions despite appreciable knowledge and skill levels. The affective domain has to be specifically addressed and clear ways found to achieve these objectives consistently and in a verifiable way. Education for suitable attitudes and necessary behavioural change has a place in ensuring that the seafarer of tomorrow is as competent and responsible as his certificate deems him to be.

[29] See Appendix 1

Knowledge and skills are critical to the maritime industry and the operation of ships. This dissertation by no means attempts to criticise or change the approach taking by the STCW in emphasising cognitive and psychomotor skills. However the human resource must have right attitudes to optimise the knowledge and skills that modern shipping requires. What is recommended is that the emphasis on cognitive and psychomotor skills, easily assessed by specific criteria, be augmented by affective objectives.

In the maritime field there is limited research and literature emphasising the place of this in MET systems. It seems to be implicitly acknowledged yet the main way of acquiring these objectives remains as by-products of cognitive and psychomotor training. In other words, the assumption is made that as students are taught and assessed with cognitive and psychomotor objectives, they will "pick up" the values or affective characteristics desired in the industry. The record of shipping does not show this to be true. The very need for a code such as the ISM code shows that the attitude problem should be addressed (although in the case of the case of the ISM code, the emphasis on the company/shore management).

Undoubtedly the future will bring greater demands on ship operators. Possibly in a decade, a lot of knowledge which is the bulk of today's curricula will be obsolete. It is the attitudes, the ethics and the values of people who understand and identify with the global issues of the maritime industry, which will result in the acquisition of relevant new knowledge. Those same attitudes will bring the principles of attaining and maintaining safe, clean and secure oceans, to bear on all new situations.

METI – whether required by regulation or not - should strive to be instrumental in the achieving of a maritime society and industry which is not evasive or exhibiting unmotivated compliance, but innately inclined to the desirability of specified goals. The role of a training institution should not only be to tell its students about the regulations and teach them the skills to comply with them, but also to develop in them an understanding of underlying issues and a commitment to the values inherent in these regulations. In the final analysis this will lead to the "production" of true officers. Among other things, this gives the economic competitiveness associated

with a good institutional reputation and helps to enhance the image of the industry. Officers who realise their indispensability to the global economy and hold that trust judiciously and worthily will certainly over time demand or even command the respect due them from the politicians and the world at large.

While emphasising the idealness of education and training that covers all of the domains of educational objectives, the study recognises that MET may be severely limited in their ability to improve anything, by their economic contexts and access to physical and human resources. The study has focused on the need for accentuated education in the affective domain. A detailed examination of the economic and human resource limitations of METI is beyond the research scope.

7.2. Recommendations

Almost all who write on the affective domain admit that there is a very large scope for more research (Lang, 1998; Sonnier, 1989; Ringness, 1975; Bloom et al, 1964). This dissertation would recommend that the place of the affective domain be recognised to be important to the full realisation of a safety culture and that resources (human and capital) be made available at all levels for increased research into this field.

Potential research questions could include:

- What are the specific values and attitudes to be instilled?
- Which methods deliver the best results in teaching objectives of the affective domain?
- How can the validity and reliability of assessment of affective objectives be improved?

In this context it would be appropriate to seek a clear definition of the kind of mariner the industry needs, not only in terms of knowledge and skill, but also in affective terms.

A further recommendation would be for the industry, both METI and shipping companies to explore the merits of new technology for affective education and incorporate their use into their systems if appropriate.

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Appendix 1 - Presentation of data

The questionnaires were sent to institutions in 26 countries using the criteria as specified in the research methodology.

Responses were received from 18 METI and 3 other institutions/associations[1].

1. Type of institution:

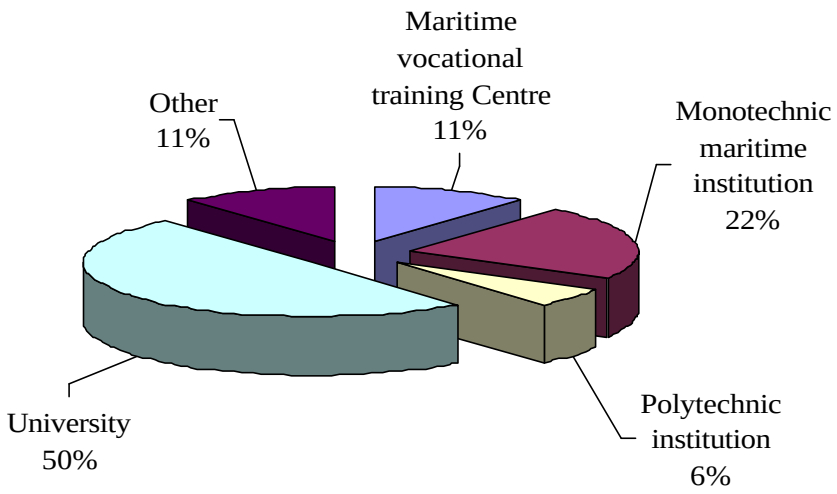


Figure A-1: Institution type

The category "other" included a training centre for ratings and a simulator centre

2. Year institution started:

The earliest date given was 1786 and the latest 2004. All but 3 of the responses came from schools that were in existence in one form or other prior to STCW 95.

3. Marine certificate of competency and other courses offered

The majority of respondent institutions run courses covering the spectrum of maritime education for competence: from cadetship to upgrading courses.

[1] My sincere thanks to all respondents.

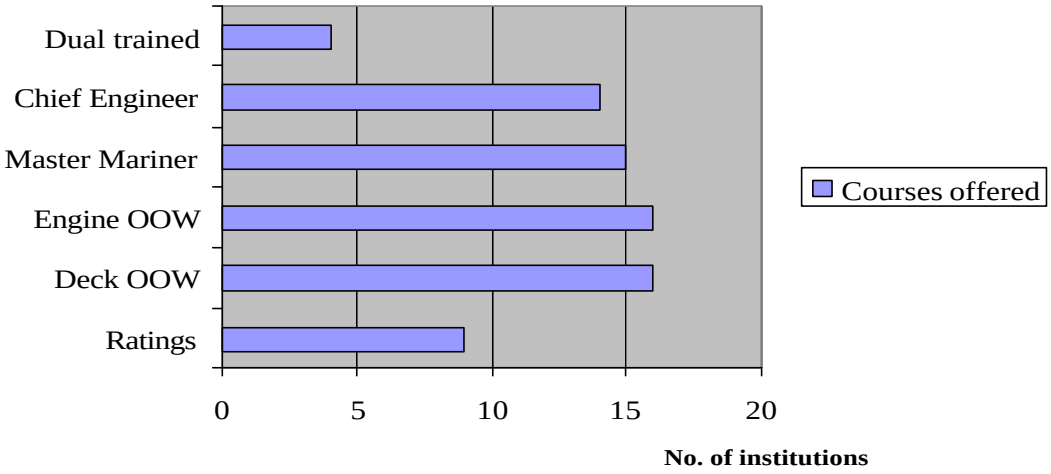


Figure A-2: Competency courses offered

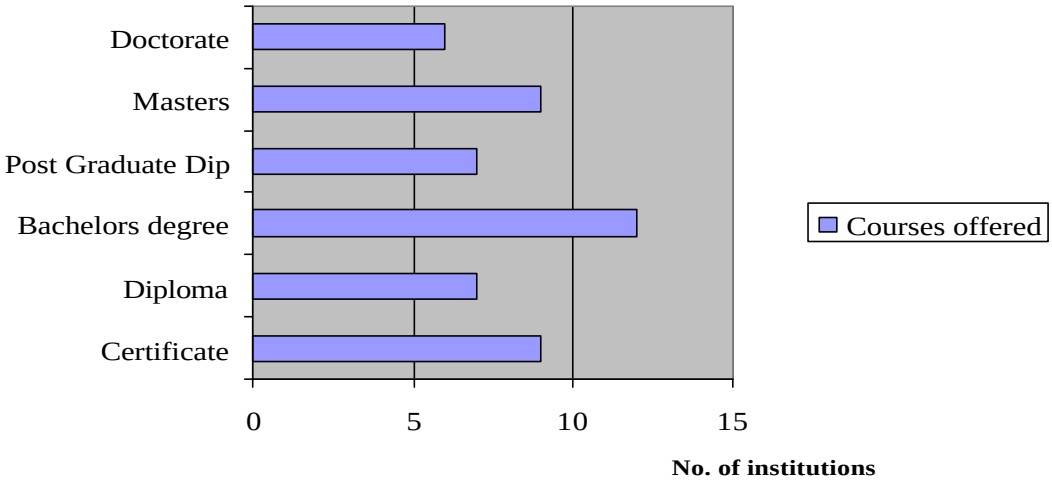


Figure A-3: Academic courses offered

This question sought to give an idea as to the trends in maritime institutions to shift from a purely vocational education type to a more broad university education.

4. Average sea experience of lecturers

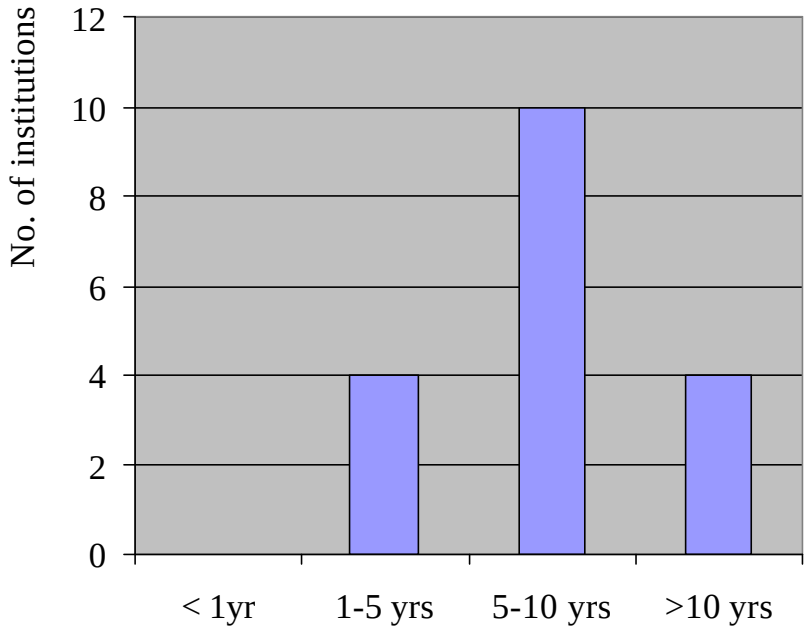


Figure A-4: Average sea experience for lecturers

5. Academic qualification of maritime lecturers

There was a wide range of responses to this question. While not intending to specifically analyse these statistics, the question was intended to give a picture of how "academic" METI are becoming as compared to a purely competence or vocational approach.

50% had PhD holders on the staff.

89% had Masters Degree holders

72% use staff with Bachelor degrees

6. Average age of students

The average age found for the whole survey was 22.6 years.

7. Do curricula incorporate training in the affective domain?

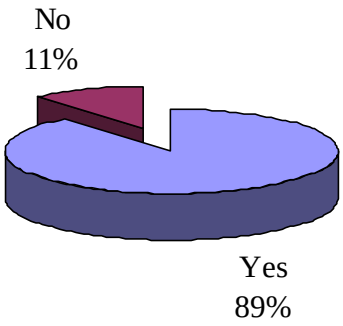


Figure A-5: Training in affective domain

8. How is this training delivered and assessed by those who incorporate it into curricula?

There was a wide variety of methods stated to be used for delivery and assessment of objectives in the affective domain. They included:

Delivery –

- Computer based training and workshops
- Audio visuals (e.g. videos)
- Case and consequence studies with analyses/discussions
- "Living in a very colourful maritime atmosphere"
- Paramilitary training
- Shipboard training
- Classroom lectures as part of academic programmes or short courses in various subjects/topics such as
    - Personnel management
    - Hierarchies, coaching and mentoring
    - Industrial relations and psychology
    - Pedagogics and philosophy
    - Culture and politics

Assessment –

- Use of questionnaires
- Permanent evaluation
- Observation by lecturer/expert monitoring – school or onboard.
- Part of simulator assessment
- Graded written or oral exam based on faculty discretion

9. Are there standards (international or national) used specifically for affective objectives in the institution? If yes, what is this standard?

50% of respondents answered "NO"

50% answered "YES"

22% of all respondents mentioned STCW as the relevant standard

17% of all respondents mentioned ISO (some together with STCW)

39% mentioned national standards. Of these almost 71% (28% of total) mentioned national standards as been the only relevant standard.

10. Is a quality assurance system in place?

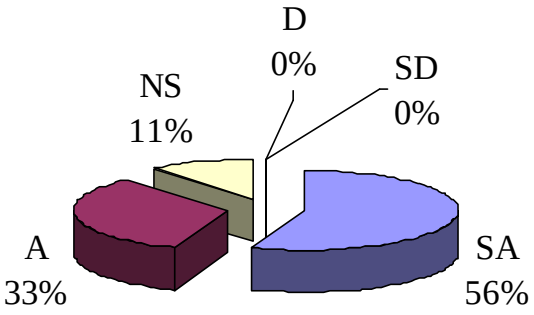
All respondents use a quality assurance system.

11. Is a code of conduct used?

89% of all respondents use a written code of conduct either for staff or students.

11% do not have any such codes.

12. A lack of attitudinal and ethics training is detrimental to the maritime industry



SA – Strongly agree; A – Agree; NS – Not sure; D – Disagree; SD – Strongly disagree.

Figure A-6: Value of training in attitudes

13. Specify in what way this kind of training is beneficial to the maritime industry.

The reasons given for this kind of training being beneficial included:

- Helps the decision making process for officers
- Enhances understanding and behaviour in the context of multi-ethnic crewing for the promotion of peace and order
- Enhances the prevalence of a common approach to issues, teamwork, open mindedness, cultural awareness and communication
- Inculcates a strong sense of principles and values to enable seafarers to withstand the challenges and pressures that arise when they are confronted with compromising situations
- Ensures fair and ethical approach to work
- Improves the prestige of the industry
- Creates leadership qualities, tolerance and loyalty
- Promotes the creation of a broadly accepted code of ethical decision-making and conduct in a diverse cross-cultural environment

- Promotes a sense of responsibility and "team play" which is the main cornerstone of safety, security and environmental awareness at sea

14. Examples of suggested values[2]

Table A-1: Suggested values

Value	Managers	Educators	Seafarers	Legislators
Respect for rights/dignity of others	**6**	2	3	1
Social responsibility	**4**	**7**	2	5
Integrity	3	**6**	2	**7**
Fairness	3	4	1	**6**
Leadership	3	0	0	0
Discipline	2	3	**8**	1
Safety consciousness	2	3	**7**	1
Flexibility	2	2	2	3
Rule-keeping	1	0	4	5
Desire to increase knowledge	1	2	1	2

15. Institution's mission statement

The stated mission statements (78% of respondents) all reflect the global ideals of MET. Most have a regional connotation, but in general the mission is to train and educate maritime personnel to national and international standards. One such statement is especially relevant to this study and reflects the general feel of the others: "The *institution* (name given) provides quality education and training to midshipmen/trainees for the development of competent seafarers who shall possess the character, knowledge and skills necessary for the successful pursuit of a maritime career" (Baylon, 2005, personal communication).

[2] The numbers indicate, in each category, the most recurring answers out of 36 possibilities. It was noted that there are many more values that are important, even fundamental.

16. Future plans

61% of all respondents indicate having future plans to incorporate or improve the attainment of affective objectives as part of curricula

17. Comments from respondents

- "The central focus of an ethics programme should be at the maritime colleges in order to internalize the ethical values required for future seafarers… It would be interesting to come up with a Global Code of Ethics for seafarers."
- "Due to exposure to a lot of inconsistent and challenging cultures and behaviours, *seafarers* (specific nationality named) have the tendency to adapt to the environment in which they are and may compromise own values and principles in order to belong to the group. This is not necessarily correct; a seafarer may find him/herself in a lot of compromising situations. With a strong sense of principles and values, the one would be able to withstand the pressures and challenges that will come along the way."
- "It is the view of this *institution* (institution named) that training in ethics, values and attitudes is not our responsibility. We are generally dealing with adult students (*average age given as 28*) who should have these attributes already. Our courses are focused on the skills and knowledge required to be an effective and safe member of the maritime industry."
- "The industry operates in numerous cross-cultural environments and an important basis of understanding is a broadly accepted code of ethical decision making and conduct."

Conclusions

The aim of the questionnaire was to help address the first two research questions namely:

1. Of what relevance is training in the affective domain in the maritime industry?
2. Do current training and educational systems address training in this domain?

The statistical base of the survey is recognisably small, but the quality of responses is considered good and shows a general acceptance among respondents of the value and high relevance of the affective domain to the maritime industry. The conclusions, while not unexpected, are significant and important. While it was felt by at least one respondent, that METI are not the place to develop these, many others feel differently and indeed there are many institution-based initiatives in this direction[3]. The average age of students from the survey was **22.6** and it would appear that this is not an age where values are so entrenched that individuals cannot benefit from affective education. This same age band (18-24) is the base of recruiting into most military institutions. To a large extent, and generally speaking, the success of developing affective characteristics suited to the military, indicate the possibility for this to occur in people in this age band. The responses therefore show that institutions are aware of and seek to achieve these objectives.

There seems to be however considerable differences in opinions as to how to achieve and assess these. It is also obvious that there are no global standards considered by all to be relevant for the domain despite its accepted importance. In the absence of such standards, the methods for demonstrating the achievement of affective education objectives are highly subjective and certainly not uniform.

[3] One such initiative is the WE CARE programme run by the Magsaysay Training Centre in the Philippines. WE CARE stands for Work is wealth, Education/Enthusiasm, Commitment/Communication, Adaptability/Accountability, Respect/Responsibility.

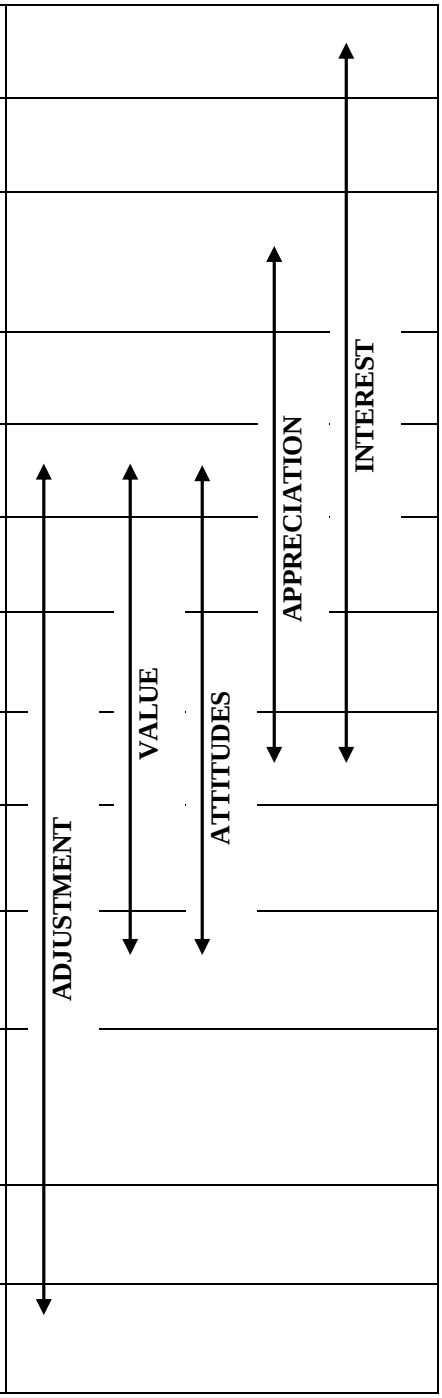
Appendix 2 - Details of Bloom's taxonomy in the cognitive domain

Source: Bloom et al (1964)

1.0 KNOWLEDGE	1.1 Knowledge of Specifics
	1.2 Knowledge of ways and means of dealing with specifics
	1.3 Knowledge of the universals and abstractions in the field
2.0 COMPREHENSION	2.1 Translation
	2.2 Interpretation
	2.3 Extrapolation
3.0 APPLICATION	
4.0 ANALYSIS	4.1 Analysis of elements
	4.2 Analysis of relationships
	4.3 Analysis of organisational principles
5.0 SYNTHESIS	5.1 Production of a unique communication
	5.2 Production of a plan, or proposed set of operations
	5.3 Derivation of a set of abstract relations
6.0 EVALUATION	6.1 Judgements in terms of internal evidence
	6.2 Judgements in terms of external criteria

Appendix 3 - Details of Bloom's taxonomy of the affective domain

Source: Bloom et al (1964)

1.0 RESPONDING	1.1 Awareness	
	1.2 Willingness to receive	
	1.3 Controlled or selected attention	
2.0 RESPONDING	2.1 Acquiescence in responding	
	2.2 Willingness to respond	
	2.3 Satisfaction in response	
3.0 VALUING	3.1 Acceptance of a value	
	3.2 Preference of a value	
	3.3 Commitment	
4.0 ORGANISATION	4.1 Conceptualisation of a value	
	4.2 Organisation of a value system	
5.0 CHARACTERISATION BY A VALUE COMPLEX	5.1 Generalised set	
	5.2 Characterisation	

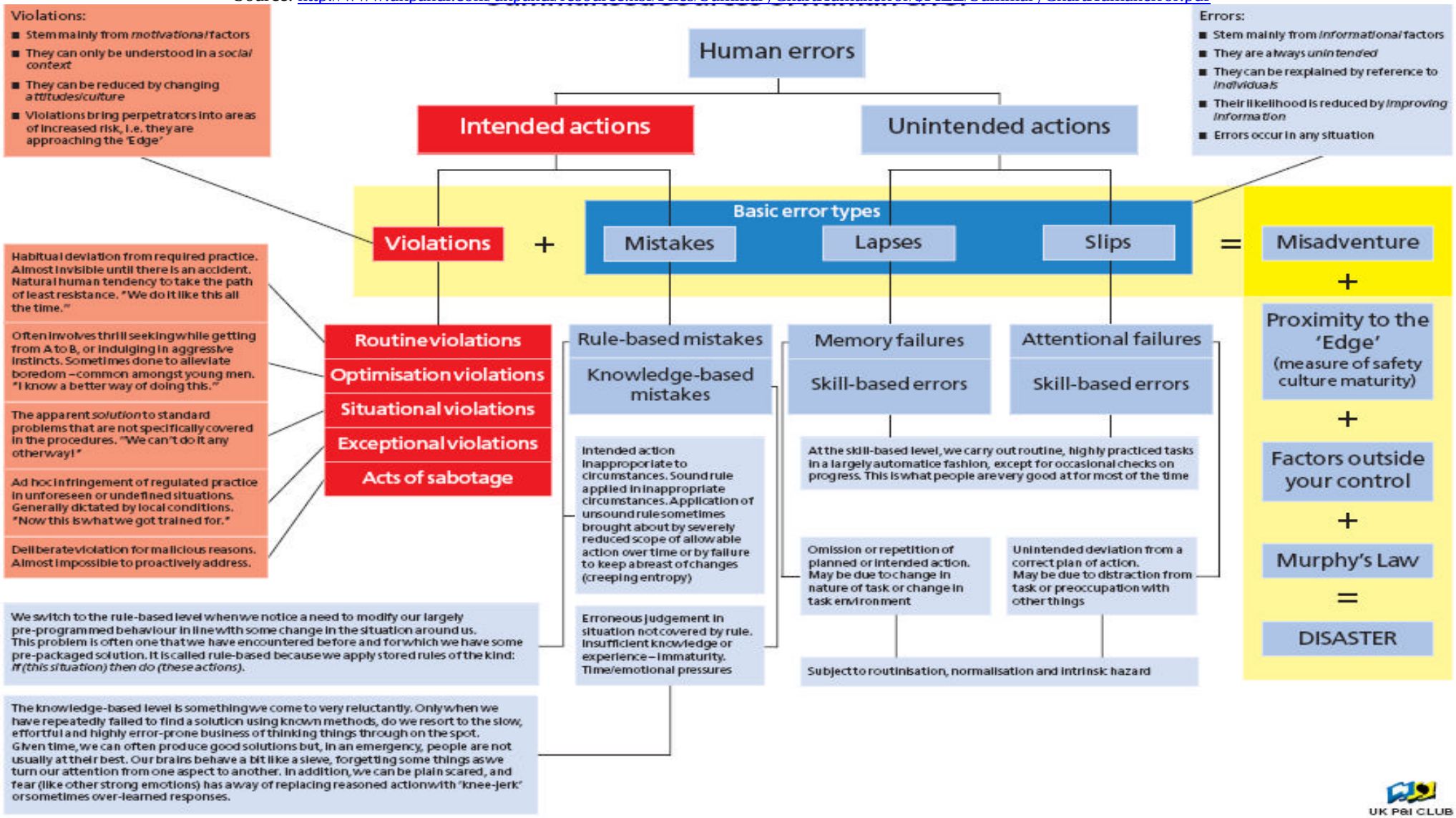
Appendix 4 – A Comparison of three learning perspectives

Source: http://home.earthlink.net/~dougary/ITEC_800/final_project/comparison.htm

	Behaviourism	**Information Processing**	**Constructivism**
How is Learning Described?	A change in the probability of a particular behaviour occurring in a particular situation	A change in knowledge is stored in memory.	A change in meaning constructed from experience.
How is Learning Process Viewed?	An Antecedent prompts a Behaviour that is followed by a Consequence	Memory involves three processes: Attention, Encoding and Retrieval	Interplay among students' existing knowledge, the social context, and the problem to be solved.
What is teacher's role in process?	To arrange the contingencies and present them to the students.	To guide and support cognitive processes that support memory	To provide students with a collaborative situation.
How does teacher carry out that role?	**S**tate objectives of the instruction as learner behaviours **U**se cues to guide students to desired behaviour **U**se consequences to reinforce desired behaviour	**O**rganize new information **L**ink new information to existing knowledge **U**se techniques to guide and support students' attention, encoding, and retrieval	**P**rovide students with "good problems" that stimulate exploration. **C**reate group learning activities. **M**odel and guide the knowledge construction process.

Appendix 5 – UK P & I Club summarised sources of human error

Source: http://www.ukpandi.com/ukpandi/resource.nsf/Files/SummaryChartHumanerror/$FILE/SummaryChartHumanerror.pdf



Appendix 6 - Nautical Institute Code of Ethics

(Permission for use granted by the Nautical Institute – 15th August 2005)

The nautical professions, which include merchant and naval officers, pilots, harbourmasters, surveyors, ship managers, trainers and those associated with other marine services, have evolved over centuries. These professions are worldwide, but despite differences in language, national and commercial interests, nautical professions share the same purpose, which is the safe and efficient operation of seagoing craft.

Shipowners and their sea staff are becoming increasingly subject to the same basic and internationally recognised conventions and guidelines. These in turn are reflected into national legislation and are subject to Port State, as well as Flag State, control. However, in reality there are three influences affecting commercial shipping. They are, first the market, with its emphasis on rates, supply and demand; secondly, the availability of resources involving people, finance and ships; and thirdly, the legal framework, both statutory and commercial.

Because legislation has played such a dominant role in maritime affairs in recent years it has often been assumed that the law must be used to control shipping operations. Such an assumption is misguided, for it is essential in any form of healthy endeavour that practitioners be able to exploit opportunities, take risks and innovate. Similarly, the law can never replace command and management because it is unable to provide rewards, only penalties.

All professionals are faced with a dilemma when they are tempted by a reward to engage in activities which might be dishonest, against the public interest or likely to put lives or other people's property at risk. There are also many situations, which arise where a number of choices can be made and where guidance is needed. Ultimately the viability of an industry and service to society must provide the orientation for good conduct because that is the only way of preserving the future.

The code is voluntary and sets standards, which should be followed, in normal circumstances. It identifies those areas of shipping activity where safety takes precedence over commercial considerations.

It is with these introductory remarks in mind that the following Code of Conduct for Nautical Processionals has been developed. The code is divided into seven sections. The Council of The Nautical Institute asks that this Code of Conduct be promulgated to employers, employees and new entrants to the shipping industry.

1. Service and conflict of interest.
2. General - navigation, safety, protection of the marine environment and emergency response.
3. Distress and lifesaving.
4. Seaworthiness.
5. Cargo care and security.
6. Competence.
7. Professional development.

SECTION 1

Service and conflict of interest

Nautical professionals should:

1.1 Carry out their responsibilities with integrity in a conscientious and diligent manner.

1.2 Carry out their duties safely and efficiently in support of the marine venture and the public's interest.

1.3 Operate and maintain their ship(s) efficiently and in good order.

1.4 Not take personal benefit contrary to the interests of their professional duties.

1.5 Safeguard the security of confidential information.

1.6 Comply with regulations and in particular the provisions of international legislation and codes.

NOTES

i. All individuals in positions of responsibility who make decisions which affect the safety and performance of other people must be expected to act in good faith and at least to a level of competence appropriate to the required industry standards.

ii. Shipowners, managers and those responsible for the employment of seafarers have a duty to provide reasonable conditions of employment as laid down in ILO Convention 147

iii. Seafarers have a duty to serve their employers and ensure that the ship is operated efficiently and to high standards in accordance with the good practice of seamen.

iv. Because the activities on board any ship cannot be monitored directly from the shore those on board have a duty to prevent loss, avoid waste and manage resources efficiently.

v. Defects or requirements for repair must be reported to the owner, charterer or ship manager and appropriate steps taken at the first available opportunity to make such good and, where such affects the safely of the ship, prior to proceeding on a further voyage or passage.

vi. The nautical professional owes duties of service, competence and integrity to his/her employer(s), fellow professionals including those serving under him, and to the public. The public includes those he is serving - e.g. cargo owners, and the public who may be affected or injured or suffer loss through his professional conduct.

vii. It is a fundamental breach of employment law to take an undisclosed benefit from a third party in the course of one's employment. If in the course of one's duties, one may gain a benefit from someone else without breaching one's professional responsibilities, there is an

obligation to disclose such benefits to the employer first and, if in any doubt, reject it.

SECTION 2

General - Navigation, safety protection of the marine environment and emergency response.

Nautical professionals should:

2.1 Navigate safely.

2.2 Take all reasonable care to ensure that working areas and living quarters are safe and healthy.

2.3 Ensure that safe working practices and safety of personnel are followed.

2.4 Take all reasonable care to protect the marine environment from discharges of polluting substances and to dispose of waste materials in an environmentally friendly way.

2.5 Prepare emergency response plans and carry on appropriate practices to ensure that the safeguards will work when needed.

2.6 Ensure that in an emergency the saving of life takes precedence.

NOTES

i. Safety navigation implies that voyages are properly planned, that nautical publications are up to date and equipment is operational. The bridge organisation is such that an error or omission by one person will not lead to a collision or stranding and the ship will not be put into a situation of uncontrollable risk.

ii. Safe working practices must be encouraged at all times to avoid accidents and injury. They need to be supported by management and implemented by example. Incidents or near accidents should be discussed with the purpose of preventing a recurrence.

iii. There is a general and increasing awareness that the sea and the life it supports can be irreversibly damaged by pollution. All reasonable precautions

should be taken to avoid discharges of pollutants. It is essential to have an effective system on board for monitoring compliance with the provisions of the MARPOL Convention and a properly prepared contingency plan to mitigate the effects of a polluting accident.

iv. Preparing for the unexpected is an effective response to potential danger. Time has to be set aside at regular intervals so that everybody on board knows what is expected of them in an emergency.

v. Where choices have to be made about protecting the ship, cargo, property and the marine environment, the preservation of human life must take precedence.

SECTION 3

Distress and lifesaving

Nautical professionals should:

3.1 Keep a proper watch for distress and emergency situations and take appropriate action to render assistance.

3.2 Regularly exercise equipment and procedures for lifesaving, be it man overboard, personal injury, or assistance to others.

NOTES

i. In spite of new technology and of aircraft for search and rescue, assistance to those in distress at sea can usually only be provided by other vessels. Although helicopters, of course, can be used in coastal areas they do have a limited range and payload. It is, therefore, essential that a proper response be given to any distress call. This is a requirement in international law and no private agreement can release a nautical professional from this public duty.

ii. Because of this requirement it is essential that all reasonable steps be taken to keep distress alerting equipment in good condition. Every care should be taken to prevent false alarms. If a false alarm is made, the Master of the ship concerned

must inform the appropriate rescue co-ordination centre for the area without delay.

SECTION 4

Seaworthiness

Nautical professionals should:

4.1 Ensure the ship is seaworthy and cargoworthy for each stage of the voyage.

NOTES

Seaworthiness, although dependent upon circumstances, is an absolute requirement in law as a condition of carriage. It means that the ship should be fit for the intended voyage, properly manned, with appropriate equipment in working order, and able to withstand the sea conditions that may be encountered.

Seaworthiness applies to the ship's equipment as it does to the ship itself, and the nautical professional should ensure the ship is fitted with the appropriate equipment including, but without limitation, the navigational, safety, firefighting, lifesaving and emergency equipment, and that it is in operational order. Coincidentally, the nautical professional should ensure that the hull, tackle and machinery are in good repair, that the ship is manned by an efficient crew and supplied with adequate fuel, stores, and as necessary, ballast.

The ship should be cargo-worthy, sufficiently strong and with the necessary equipment and securing measures to ensure the safe carriage of the cargo in such a way that it does not deteriorate during the voyage. Vessels carrying liquid cargoes should be able to segregate pump and preserve the cargo in a fit condition during the voyage.

SECTION 5

Cargo care and security

Nautical professionals should:

5.1 Take all reasonable steps to ensure the cargo is loaded, transported and delivered in good condition.

5.2 Take all reasonable precautions to preserve and safeguard the ship, its equipment and fittings.

5.3 Take all reasonable precautions to prevent unlawful acts from taking place on board.

NOTES

i. The cargo owner has a right to expect that those on board will care for the cargo during loading, transport and discharge. Those on board have a right to expect that the ship can load at a safe port and that the loading sequence will not adversely affect the stability or inherent strength of the vessel. Similarly, the cargo must be properly stowed and secured prior to sailing.

ii. For vessels carrying liquid and hazardous cargoes the master and officers should take all reasonable steps to minimise accidental spills and discharges, to ensure that all tanks are in a fit condition for the cargo, that contamination is avoided, that proper safety precautions are followed and that the tank atmospheres are safe. Plans, equipment and procedures should be ready to contain accidental spills or discharges

iii. The shipowner or manager has a right to expect that the crew will safeguard the ship against theft and unlawful acts, by keeping a deck watch in port and maintaining reasonable security at all times.

iv. It is the duty of the master, supported by the officers, to preserve good order on board and to take all reasonable precautions to inhibit and prevent acts of violence breaches of the law, both relating to the flag and Port State.

v. In particular, masters and officers should aim to prevent drug trafficking, breach of immigration laws, smuggling and contraband. A diligent search for stowaways should be carried out prior to sailing.

vi. Adequate records of the ship's or shipowner's property should be maintained, including all equipment and stores, to ensure a proper accounting for the property and its use of expenditure. Adequate records of cargo, including particularly special or valuable cargo, and of its loading and discharge should also be kept.

SECTION 6

Competence

Nautical professionals should:

6.1 Take all reasonable measures to become competent by qualification and experience to perform the services to which they are appointed to undertake.

6.2 Take all reasonable measures to maintain, up-grade and up-date qualifications and competence.

6.3 Encourage and support the training of sub-ordinates and ensure their competence for the duties and responsibilities assigned or delegated to them.

6.4 Seek to keep up to date with new developments.

6.5 Co-operate with other professionals and individuals to ensure the best outcome of the marine venture or commission.

NOTES

i. Ships are not inherently safe places of work. Consideration of stability, strength, safe stowage, hazardous substances, power applications, sea conditions and other risks means that professional mariners of all denominations owe a duty of care to fellow members to be competent.

ii. Unlike factories, which do not move, ships - when under way- are at risk from other ships, the weather conditions and their proximity to land. Nautical

professionals should be competent to ensure that no ship is put at risk through ignorance or inadequate training.

iii. Those in responsible positions on board have a duty to ensure that subordinates have the opportunity to become properly qualified, competent and trained.

iv. Industry and naval practices continually evolve in response to competitive influences. Similarly, work patterns change and new methods of operation have to be introduced. It is therefore essential for those in responsible positions to keep up to date with new development, including changes in the law and technological innovation.

v. Shipping enterprise involves the work of many different professionals such as naval architects, marine engineers, shipbrokers, accountants, computer specialists and personnel managers. On board there may also be a variety of disciplines. Increasingly, for effective management, professionals should co-operate to ensure that the specialist skills are applied appropriately in pursuit of the aim of the marine venture.

vi. Competence involves not only the understanding of theory and principles but also the adequate knowledge of up-to-date practice and procedures. It also involves such nautical knowledge and procedures as may have to be relied upon in the event of technological or equipment failure, breakdown, accident or emergency.

SECTION 7

Professional development

Nautical professionals should:

7.1 At all times so order their conduct so as to uphold the dignity, reputation and standards of the profession and to safeguard the public interest in matters of safety, health and environmental protection.

7.2 Contribute actively to the development of professional standards and to the development and training of subordinates.
7.3 Uphold the reputation of The Nautical Institute by observing the provisions of the constitution, bylaws and code of conduct.

NOTES

i. It is the responsibility of masters and commanding officers to exercise command and set the highest personal and professional standards.

ii. It is the responsibility of shipowners, managers, charters and naval commanders to ensure that proper professional standards are upheld within the shore administrations in support of sea staff, and to issue instructions for safe and seamanlike operation of their ships to masters and commanding officers.

iii. The opinion held by the public of the nautical profession is influenced by the media, personal contact, performance and reliability, trustworthiness and a variety of subjective assessments. These attach both on duty and off duty and require individuals to conduct themselves with integrity at all times.

iv. Professional standards need to be developed in response to new working practices and professionals should also take a lead in promoting sound working practices. This can best be achieved through discussion and involvement. Society benefits from professional standards and professional organisations should contribute to the development of both national and international regulations.

v. Shipowners, charterers, managers, masters and commanding officers should also ensure that the necessary plans, equipment and procedures for emergency duties in the event of equipment breakdown or accidental spill or pollutants or other harmful substances are in place and regularly exercised.

vi. Duties or responsibilities delegated by authority or assumed by personnel under the master or command officer, remain the responsibility of the master or commanding officer who should ensure that those to whom duties and responsibilities are delegated are qualified and competent to carry them out.

vii. The aim and objectives of The Nautical Institute have been designed to meet the requirements for the nautical profession. By joining, supporting and complying with the provisions of the constitution, individuals can contribute effectively to the development of their profession.