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IMPROVEMENT OF THE EXISTING EXAMINATION AND EVALUATION SYSTEM FOR COMPETENCY FOR GRADUATES OF THE IAMU MEMBER MARITIME UNIVERSITIES/FACULTIES

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ABSTRACT

Assessment and evaluation are basic elements which determine the performance and competency of a given system. The fact that maritime education is an international activity that cannot be validated within national boundaries, initiated the International Maritime Organization (IMO) to engineer and outline an international maritime education system. This is reflected in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW95); and the IMO model courses which are internationally implemented by maritime schools, institutes and colleges worldwide; thus setting the solid minimum grounds for global maritime education.

The International Association of Maritime Universities (IAMU), has clear objectives in setting the International excellence ground for the maritime education system and to design the optimum uniform examination systems for evaluating the level of competency.

This paper highlights and analyses a number of examination procedures followed by some countries, particularly written examinations, in an attempt to set standard parameters for question setting and selection. The paper focuses, as well, on computerizing the whole procedure of question selection from a databank of questions according to proposed rules and constrains.

The implementation of this proposed approach complements the IMO and IAMU global concept in reaching a global assessment tool based on databank. A computer programme determines questions and examinations according to pre-analyzed standard set of procedures, which ensures reliability and validity as well as security.

NOMENCLATURE

IAMU	International Association for Maritime Universities
STCW	Standards of Training, Certification and Watchkeeping for Seafarers
MSC	Maritime Safety Committee
CP	Competent persons
CPP	Competent Persons Panel
CBA	Computer Based Assessment
WE	Written Exams
OE	Oral Exams
AASTMT	Arab Academy for Science, Technology and Maritime Transport

1. INTRODUCTION

In fact the safe operation and handling of ships relies mainly on the standard of knowledge of shipboard crew and their skills rather than the sophistication of the ship's equipment and condition in general. Statistics, derived from marine casualties analysis, indicate that 80% of these casualties are due to human errors resulting from inadequate education and training. More than one hundred vessels of which the deadweight amounts to approximately million tons are lost annually worldwide. The importance and the significance of marine education and training in decreasing marine causalities due to human errors are not questionable.

Since technological developments go hand in hand with efficient training, there is a necessity right now to enhance training that can keep pace with the accelerated high-tech advances. The rising cost of education as a result of using modern equipment as training aids (like simulators, labs and workshops) has led to considerable discrepancies and variations in the levels of performance and career proficiency standards among sea personnel coming from developed and developing countries

So far, examinations are the crucial factor for the assessment of seafarers. However, on the global level, performance and knowledge assessment of seafarers necessitate standardized levels of education and training. In the absence of such parameter any setting of achievement and performance assessment exams would be invalid.

The International Maritime Organization who engineered and outlined an international maritime education system, as was reflected in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW78) and its amendments in 1995, is highly appreciated. STCW Convention considered as the backbone of the system of education and training in the maritime field worldwide.

The problem is to what extent the STCW convention is actually implemented? Are the measures included in the convention adequate to insure that after 1st Feb. 2002 – the final dead line date of the full implementation of the convention – the standards stated in the convention will be implemented globally. To investigate this problem the STCW 95 Convention would be reviewed in the following discussion in regard of the main areas of change in the 1995 Amendments to the STCW Convention.

1.1 Considering the change of Maritime Education & Training Goals from academic objectives to Competency objectives and setting up and clarifying its requirements to enhance the shipboard tasks in a safe and efficient manner.

1.1.1 IMO Model Courses:

According to the new competency objective set by the convention for the maritime education and training system, it was important to modify IMO model courses. Unfortunately, such revision did not coincide –in time- with the issue of the Convention in 1995. The 1st revised edition of IMO model course was published late 1999, which was after the dead line date stipulated in the convention for maritime administrations to communicate information to the SG of IMO – before the 1st of August 1998 – in regard of their implementation and compliance with the convention. These reports-mostly- did not take into consideration the revised IMO model courses, as this was left to each Administration and to their capabilities and resources.

Thus, STCW 1995 may lost its most important Goal which is the standardization of education and training, in which, the IMO model courses are considered its core and base element.

1.1.2 Assessment /Evaluation:

It is well known that education and training, on one hand, and examinations and assessment, on the other hand, are two integrated inseparable aspects in which they could be considered as both sides of the same coin. Since the assessment/evaluation mechanism stated in the Convention is left to the convenience of each individual state, then even with the assumption that IMO model courses were revised in due time, there will be lack of standardization in

assessment and evaluation methods and procedures.
Within this context, assessment method(s) will vary from one administration to another pending on the available facilities and resources in each administration. It is important to set up the minimum requirements and system of evaluation and assessment to be implemented within the STCW 95 convention by all administrations.

1.2 Setting up procedures for making parties to the convention accountable to each other - via IMO- for their proper implementation of the convention and the quality of their training and certification, (known as the White List procedures).

This aspect represents one of the most important points in the revised Convention. However, the mechanism of procedures needed is invalid and lacks credibility, since the Convention called States to modify their national legislation, regulations, syllabi and assessment methods; as well as companies' regulations to be compatible with the Convention requirements; and to communicate reports- in this direction- to the SG of IMO before August 1st, 1998. In fact 82 administrations met the deadline date and forwarded their reports.
In this context, the Convention encouraged administrations to nominate a number of experts – to be approved by the IMO, Maritime Safety Committee (MSC) - as competent persons (CP) assigned to deal with and to assess the administrations communicated information in a panel formulated from 3 to 5 CP's and to report to the SG whether these administrations are 100% complying with the requirements of STCW 95 or not.
In view of the qualified Competent Persons' reports, the SG of IMO has to report the MSC with the list of administrations, which are fully complying with the requirements of the Convention. This list known as: "The White List"

1.2.1 Full and Complete Effect:
Revising the process and work of Competent Persons Panels (CPP's) and in view of the forms issued by the MSC to help the CP's in their work of evaluation and assessment, will yield either full and complete effect to the convention (100% complying), or non-complying at all (0%). In real life the full and complete effect and implementation of the Convention for most countries –if not all- are almost impossible.
The logical question-in this context- is: if the Convention has set broad outlines for education - training and assessment; and if IMO-itself- did not completely revise the IMO model course until late 1999, how-on earth- can any administration be complying fully with the Convention (100%) in August 1998?
In fact, measures and basis of assessment used to evaluate information communicated to the SG have been left to the individual personal discretion and views of the CP's leaving a sizable margin of space for the CPP's tolerance and/or strictness! Surely, the whole assessment will- eventually- lack the required credibility in this respect.

1.2.2 Lack of Remuneration Budget for CP's:
IMO did not consider the allocation of any remuneration budget for CP's. In the absence of any compensation to the work requested by the MSC from the CP's, most CP's treated the assessment process lightly, putting it on a lower scale of their priorities.
In most panels, the process ended up by one individual (out of five) – usually the Head of the Panel- doing the whole job of assessment, while the other members endorse his opinion without going into the actual process of assessment! This scenario has been observed in the work of many panels.
In view of the above, it has been pointed out clearly that although the recognition of certificates through IMO as stipulated in the Convention is extremely important, yet its actual implementation process will lead to its non-credibility.

The previous discussion emphasizes that the revised STCW 95 has introduced a number of positive aspects and could be considered as the most active and effective convention in standardizing the Maritime Education and Training Worldwide. On the other hand the actual implementation process will lead to the Convention non-credibility. In this regard, the problem can be solved partially by harmonizing the Assessment methods used Globally, specially through the International Association of Maritime Universities (IAMU) and its Education and Training Working Group by assigning the task of setting a

Universal mechanism of assessment for the required degree of competence.
As for the issue of recognition of certificates, the expansion of membership and development of the IAMU will enhance the processing of recognition of certification among members and will eventually lead to the implementation of the STCW 95 regarding this matter, which represents one of the most important issues introduced in the revised Convention.

2. REVIEW OF CURRENT ASSESSMENT APPROACHES

The importance of maritime education and training need to be overemphasized. The various forms and types of examinations, i.e., written, oral, computer-self test evaluation, etc., should reflect the validity, reliability and extreme quality-control concepts which entail issuing sea-going personnel certificates worldwide.
Such examinations have to comply with the international standards and measures as stipulated in the STCW and IMO model courses as well as the prescribed requirements stated by individual sovereign States.
Within this overview, the role of examinations in the sea-going profession -by necessity- should aspire towards a global system of harmonization which while accommodating international regulations, should also cater for special requirements of each country. Consequently if the assessment is valid and reliable, then the assessment of educational and training standards is also valid, reliable and true. Assessment can be classified into written, oral and Computer Based Assessment (CBA).

2.1 Written Exams (WE)

The traditional method for knowledge assessment included in the written exam paper can be affected by several factors which can be concluded in the following:

2.1.1 Types of questions

2.1.1.1 Essay

Used to determine the candidate's ability to absorb theoretical components of the course. Questions starting with: **D**escribe, **S**tate, **D**efine...etc. belong to this type of questions. Drawbacks of such questions are the length of time needed to answer them as well as the subjective element in grading.

2.1.1.2 Problem Solving

These are questions which reveal the candidate's capability to undertake the practical and applied components of the course. This -in itself- presupposes that the candidate has already mastered the theoretical part of the course. This type of question begins with phrases like: **F**ind, **S**olve, **C**alculate...etc. These questions are distinguished by their power to measure the candidate's achievement and absorption of both theoretical and applied portions of the course indirectly and directly.
The same drawback is here, i.e., the length of time needed to respond to these questions.

2.1.1.3 Situational

These are characterized by emphasizing the applied aspects. Responding to such questions requires ample understanding of the course components, where case studies or situations are the focus of questioning. Candidate's answers represent a true-life measure of their capability to absorb the course material and its applications not memorizing it. This question type is an excellent tool for distinguishing candidates who are capable of efficient proficiency applications.

2.1.1.4 Multiple Choice

Where the question format offers to the candidate choices as answers. This type lends itself to any of the other types of questions previously stated.
This type is characterized by ease of correction and grading particularly when the computer is utilized in the grading process for large numbers of applicants. In a country like Philippine, for example, the number of applicants for sea-going certificates of competency is in the range of 20.000 per year.
However, the inherent weaknesses of the multiple-choice format of questions is the fact that it does not accurately measure in-depth

the candidate's absorption of the course. On the other hand, some courses like engineering drawing, chartwork ...etc., cannot be fully covered by using the multiple-choice question format. In addition to that the haphazard correct choice on the part of the candidate is also another weakness which affects the examination reliability and validity.
Any exam paper may contain any or all of the previously mentioned question types.

2.1.2 The Balance of question paper in length, difficulty and importancy

It is pertinent -however- before determining the type of questions used- to point out the necessity of setting a balanced question paper as regards the level of difficulty and the period of time allocated to answers.
This is of crucial importance so that we do not end up by having an extremely difficult exam paper that is unanswerable or a very long exam and cannot be attempted in the time allocated for the set questions. Thus, the factor of the weight of time and difficulty is very important.

2.1.2.1 Weight of time:

This factor can be calculated by applying the following:

$$\text{The question/exam weight of time} = \frac{\text{Actual time for answering question/ exam}}{\text{Allowed time set to the papers' question/ exam}} \times 100$$

Where:

Allowed time:
It is the time allocated to solve a specified question/exam. For example, if the time allocated for the subject exam paper -(allowed exam time)- is two hours, and the exam paper consists of four questions, each of them is assigned an equal allowed time, then 30 minutes will be the allocated time for each question in the examination paper.

Actual time:
In reality each question will not be solved in the same period of time, allocated for it. Of course this depends on the type of question, the question itself, ...etc., So the actual time is the time actually taken to solve a specific question.

Weight of time:
From the previously mentioned simple formula, the weight of time can be calculated. This is very useful because this calculated value can be considered as a measurement of the time taken to solve the exam paper in relation to the time allocated for the exam. In the same previous example if we have a large number of questions - bank of questions- and we are going to choose four questions randomly to be included in the subject exam paper, then we have to look into the average weight of time of the four questions. If it is near to 100%, then the actual time to solve the exam questions will be close to the time allowed/allocated for the exam. This means that the exam will be quite lengthy in time. On the other hand if the average weight of time of the exam questions is near to or less than 50% then most of the students will finish answering the exam paper before half of the exam allowed time elapses. This case also means that the exam is not correctly measured/weighted in time. We can reselect questions randomly until we reach the average time of the four selected questions within adequate range of 60%-80%.

2.1.2.2 Weight of difficulty:

Once we categorize the levels of difficulty into (easy, moderate and difficult or 50%, 70% and 90%), we can assign the difficulty level for each question in the bank of questions. When choosing the exam questions randomly, then the average difficulty of all chosen questions must be within the-agreed upon- range of difficulty (60%-80% as an example). This can be considered as the second constraint used when selecting the exam questions randomly.

2.1.2.3 The level of questions' significance

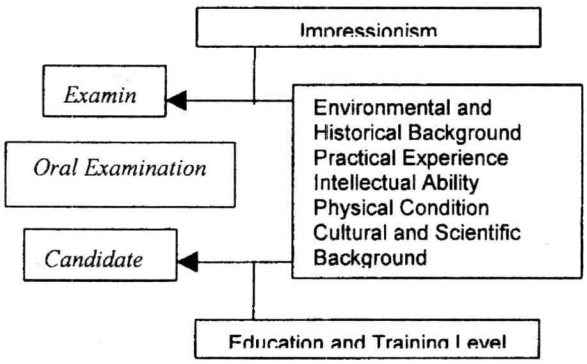
This factor is very important in determining the efficiency and relevance of the test and its reliability in measuring accurately the candidate's mastery of the course. Any test or exam cannot be considered significant for a given course if the whole bulk of questions

were to test marginal or peripheral or irrelevant issues such as definitions for instance. Definitions are not that important -in some exams- as other issues which are extremely relevant to the ship safety such as questions directly related to collision avoidance if this is the main objective of the subject exam.

In determining the level of questions' significance, the key issue is to measure the understanding of the main objectives of teaching the course; and consequently, the significance or relevance of each course component to the course objectives in general. Definitions are important in a course of Law, but may not be that important in another course. Thus, there should be a high correlation between the level of significance or relevance of the course topics and the objectives of the course; and consequently the questions set for assessing candidates.

2.2 Oral Exams (OE)

Oral examinations, being an important part of the evaluation process, can be affected by many factors that arise due to the dynamic interaction between the examiner and the merchant navy candidates. These factors can be summarized as shown in **figure (1).**



Factors affecting oral exams (Fig. 1)

Therefore, the results of the existing oral examination procedures are -adversely- affected as follows:

- degradation of the comprehensive level;
- impact of impressionism;
- degradation of the education process level;
- randomness of the evaluation process;
- consistency of examination contents;
- degradation of confidential level;
- losing confidence between merchant navy candidates and the examination procedures;
- contradictory levels of merchant navy candidates performance;
- overlapping of written and oral examinations;

2.3 Computer Based Assessment (CBA)

This type has developed tremendously in the last decade and has been implemented in some countries. The experience of Norway in this respect is ***worth mentioning:***

More than 50% of the seafarers working on board Norwegian fleet are Philippines seafarers. For this reason Norwegian ship owners were being aware of the Philippines' seafarers level and standards of knowledge and skills. The Norwegian ship owners developed a Computer Based Assessment program for assessing skills of Philippines seafarers prior to their recruitment process. This type of assessment expected to be used in most areas of Education and Training in maritime field in the near future.

3. PROPOSED METHODOLOGY TO ENHANCE THE DEVELOPMENT OF EXISTING METHODS OF ASSESSMENT

Enhancing the methodology of existing methods of assessments needs first to set up a clear idea regarding the excellence system of education and training stipulated in the STCW Convention and implemented in maritime institutes globally to the level depending on the resources available. Second step is dealing with enhancing the effectiveness of the current methods of assessment.

3.1 Enhanced system of education and training for Watchkeeping Certificate

STCW 95 stipulated in Regulation II/1 the mandatory minimum requirements for Certification of officers in charge of navigational watch on ships of 500 gross tonnage or more as the following:

1 Every officer in charge of a navigational watch serving on a seagoing ship of 500 gross tonnage or more shall hold an appropriate certificate.

2 Every candidate for certification shall:
- Be not less than 18 years of age.
- Have approved seagoing service of not less than one year as part of an approved training programme which includes on-board training which meets the requirements of section A-II/1 of the STCW Code and is documented in an approved training record book, or otherwise have approved seagoing service of not less than three years;
- Have performed, during the required seagoing service, bridge watch-keeping duties under the supervision of the master or a qualified officer for a period of not less than six months.
- Meet the applicable requirements of the regulations in chapter IV, as appropriate, for performing designated radio duties in accordance with the Radio Regulations; and
- Have completed approved education and training and meet the standard of competence specified in section A-II/1 of the STCW Code.

The features of system of Education and Training conducted could be concluded as in Fig. (2), provided that the above mentioned mandatory minimum requirements are taken into consideration.

From the proposed competency educational & training concept, the quality assurance factors can be analyzed and concluded in the following:

A PROPOSAL COMPETENCY EDUCATIONAL &TRAINING CONCEPT

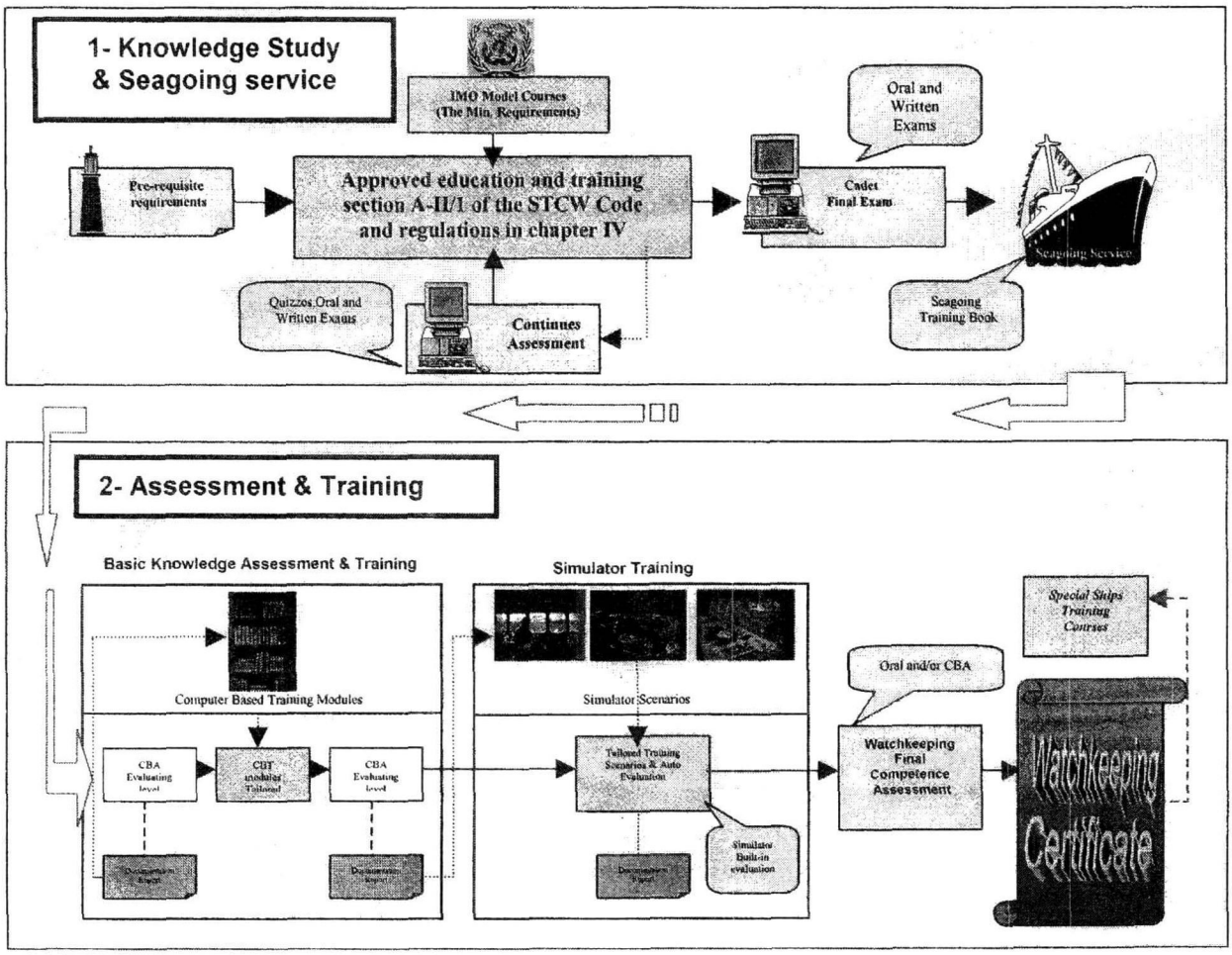


Fig. (2)

1- **Knowledge Study & Seagoing service (Dealing with groups of Students):**
   - Pre-requisite requirements (STCW stated only the age as pre-requisite requirements)
   - Continues Assessment (Quizzes, Oral and Written Exams)
   - Final Exam (Oral and Written Exams)
   - Seagoing Training Book

2- **Assessment & Training (Dealing with Competency for each individual Student):**
   - ***Computer Based Assessment for Evaluating the level of Competence (tailored Computer Based Training modules)***
   - Simulator tailored training scenarios & auto evaluation
   - Watchkeeping Final Competence Evaluation (Oral and/or CBA)

3.2 Enhancing the effectiveness of current assessment

Using computer-based systems in evaluation and assessment can extremely help in enhancing and harmonizing methods of examinations worldwide.

Procedures to be followed in order to enhance the effectiveness of current written exams can be as follows:

3.2.1 Studying factors affecting the balance of the subject exam

- Determining the course objectives and pinpointing the orientation objective of the course, then classifying and sorting out the type of questions used relevant to the subject objectives.
- Categorizing the subject-areas of the course content in groups/sections according to their degree of importance and on the basis of the course objectives.
- Determining the number of questions in each group in case of using multiple choice format, while in conventional format types the number of questions will be equivalent to the number of groups.
- Assigning allowed suitable time and marks for each question.

3.2.2 analyzing some of the current examination papers

In order to assess the consistency of current examination papers with the factors as mentioned in item (3.2.1) above; the study and analysis of current examination systems for examination paper in some countries dealt with in an attempt to find out their compatibility and adeptness to meet the requirements of the IMO. This paper focused on three countries:

The Philippines: being the largest supplier of marine employment force in the world.
UK: being, -historically- the oldest country engaged in the maritime field.
USA: being the most high-tech country worldwide.

The subject "Celestial/Ocean Navigation" was considered as the sample of analyzes and evaluation for some of the examinations given during the period 1991-1996. By studying the three samples of examinations in Philippines, UK and USA we could get the following results:

The Philippines: (Multiple Choice Exams)

- The number of questions that consistent with the subject-areas items determined in *IMO model course* represents 21.2% of the exam questions.
- Redundancy and repetition of questions were existing in the exam papers.
- There is no any stress on the degree of importance for some questions; a point that consequently reflected on the examination paper as a whole.
- The actual time to solve the examination paper exceeds by far the time allocated for candidates to attempt all questions. There are some questions that need more than 20 minutes each to solve, like G.C. sailing questions.

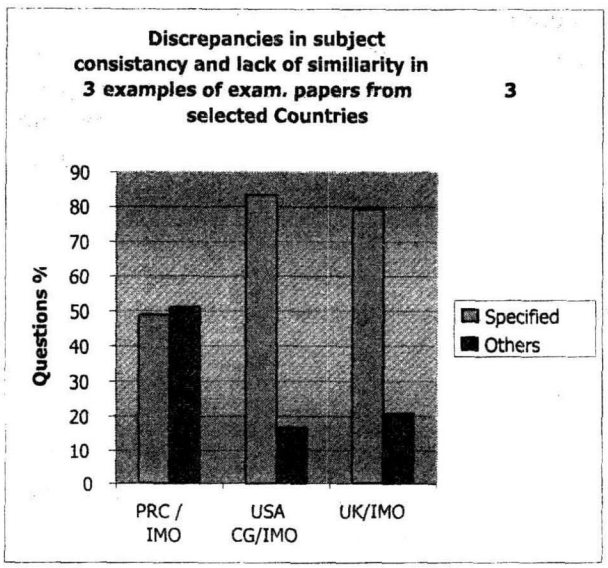
U.K.: (Conventional Exam)

- The number of questions which are consistent, with the subject-areas of 'Principles of Navigation' course for Second Mate Certificate represents 83.4%
- The test is mainly theoretical, however there are some applied questions,
- As the total number of questions is 6 questions only, the exam paper does not properly cover the subject's items.

USA: (Multiple Choice Exams)

- The number of questions consistent with the subject-areas of 'Celestial Navigation' - as stated in the IMO Model Courses- represents 83.4 % of the total exam questions.
- In general, the whole orientation of the set exam paper is towards the applied aspects of the course; consequently the paper does not contain any questions which test the theoretical principles or concepts of the course material.

By studying the three exam papers in Philippines, USA and UK, we generally observe lack of similarity as well as obvious discrepancies in the level of difficulty.



The maritime system of examination needs - more than ever- an international commitment to offer a unified syllabus; and consequently examinations can become -more or less- of the same level.

3.2.3 Revising current available question data banks

In view of the above analysis of the examination systems, there is an urgent need to revise all available questions in the present available data banks for the sake of harmonization, reclassification and updating questions.

Important factors to be considered during the process of revision are the weight of time, difficulty and importance.

4. A PROPOSED GLOBAL EXAMINATION COMPUTER BASED PROGRAM

The global data bank system of examinations will be processed by a package of computer software that will enable concerned authorities to:

4.1 Written Exam

Procuring a well-balanced examination paper in terms of time, consistency and level of difficulty.

The methodology of compiling the global written examination data bank should be based on the following steps:

- Review and investigate the written examination data banks available either on the national and/or regional level.
- Rearranging IMO model courses in such a way that takes into consideration the system of examination implemented in each country.
- Compiling all written examination questions and model answers from different systems in various countries worldwide.
- Reclassifying these questions and model answers according to relevant IMO model courses or rearranged ones.
- Weighting each one of the compiled questions as regards time, level of difficulty, validity, reliability and consistency.

4.2 Oral Examination

As shown in figure (3), improvement of the oral examination procedures can utilize the following tools:

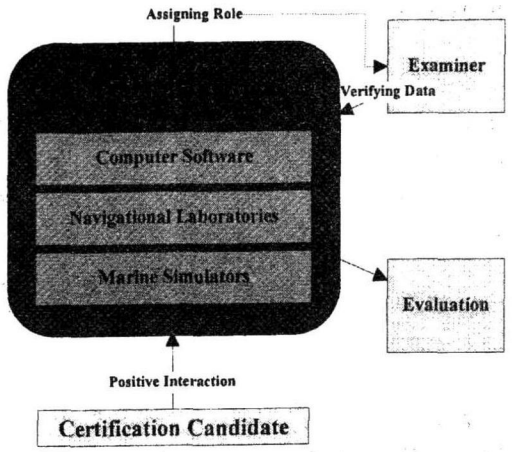


Figure (4) - Improvement of oral examinations' procedures

- **Computers:** Can be utilized either by using ready-made software or preparing special software by professional programmers.
- **Laboratories:** Using different types of laboratories will be effective in evaluating merchant navy candidates, especially in the subjects related to chart work, use of modern equipment, extracting and analyzing navigational data, making navigational calculations, position fixing and cargo handling.
- **Simulators:** Different types of simulators can be utilized in various areas of oral examinations, such as: ship handling, using of radar, interpretation of radar display, using ARPA equipment, extracting and analyzing data from both radar and ARPA equipment and the use of navigational instruments in navigation.

4.3 Computer Based Assessment

This system of assessment and/or evaluation is extremely beneficial and determinant in marginal and critical cases of candidates; particularly in cases where the candidate's performance in either/or WE/OE is not indicative enough; and in cases where the examiner is not positively sure of the candidate's level of performance as regards responses to examination papers or situations.

Within this framework, a computer software package (Computer Based Assessment) is mainly used to evaluate the skills of students, as the first step, as indicated in fig. (2), after finalizing the basic knowledge study and seagoing service. This method of assessment could be used to evaluate tailored knowledge and skills needed for students before attending simulator training and which watchkeeping certificate is utilized now in the Norwegian Embassy in the Philippines to assess seagoing personnel applying permit for work on board Norwegian ships in order to ensure and assess the applicants. The package relies on the multiple-choice format, where a number of questions are randomly processed on the screen for each applicant to choose the correct answer. At the end of the programme, the applicant will get his final assessment on the spot. The package is characterized by keeping a permanent record of all applicants with their score on the test.

The same system -i.e. practical and computer-self tests- is valid for assessment and evaluation for employment and for job promotion for assessing the performance of job or vacancies' applicants in companies, organizations, ports, etc., at any stage of pre-employment and/or employment or promotion.

Depending on the experience of the examination center of AASTMT, Egypt and the experience of others in this field, a global examination system has been developed and can be applied globally after finalizing the needed Questions and the model answer databank.

5. CONCLUSION

This paper is mainly concerned in setting proposed standardized rules, and norms can be internationally applied when selecting examination questions for seafaring candidates worldwide.

The rationales is to narrow gaps and remove obvious discrepancies existing among certified

seafaring personnel having the same marine competency certificate from various marine training institutes worldwide.
The main emphasis -in this study- is focused on written examinations. Different formats, question types, norms for setting questions are thoroughly discussed. Based on the analysis, certain norms and criterion for setting written examination papers are justifiably proposed according to major elements that need to be satisfied.

Three representative samples of examinations are studied and critically analyzed in order to find out their compatibility with the basic elements and norms established for setting a well-balanced examination paper.

The analysis indicated -as well as- the existing discrepancies and pitfalls in the systems of certifying examinations as implemented in various countries of the world. The end result was an urgent need to set standardized norms and criterion for setting, selecting and balancing examination questions.

A proposed set of norms and regulations for processing examinations is suggested, as well as a proto-type model for a computer-aided implementation process for such norms and regulations.

Endorsing the proposed steps of establishing an international unified marine question data bank together with a computer software package for selecting questions/examination paper according to proposed norms and techniques, will form a major step towards a global unification system for setting, conducting and processing marine certification examinations worldwide.

6. RECOMMENDATION

Endorsing the proposed steps of establishing an international unified marine question data bank together with a computer software package for selecting questions/examination paper according to proposed norms will form a major step towards a global unification system for setting, conducting and processing marine certification examinations worldwide.
Such a move will eventually help in narrowing existing discrepancies among marine certificate issuing levels from various marine training institutes. The role of IAMU should be highlighted in this regard. Under the IAMU umbrella, implementation steps are recommended hopefully through IAMU members and Nippon foundation funding facilities. The proposed IAMU/Nippon foundation project is seen to be based on two major components:

-An international marine data bank for questions; and
-A computer software package for question selection and processing.

Along this line, the forming of two work groups is recommended. The first will focus on establishing the question data bank (collecting, organizing, rephrasing and setting questions) through contacts with major question data banks worldwide. The second working group will work on programming and improving a computer software package according to the proposed norms, techniques and criterion discussed in the paper with the objective of implementing an integrated unified marine examination system worldwide.

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