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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**AN EMPIRICAL ANALYSIS FOR DISTANCE
ASSESSMENT IN THE CHILEAN MET
ADMINISTRATION**

By

**DANIEL ANTONIO SARZOSA VERGARA
CHILE**

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

MASTER OF SCIENCE

in

**MARITIME AFFAIRS
(MARITIME EDUCATION & TRAINING)**

2020

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.

Signature: Daniel Sarzosa Vergara

Date: Malmö, October 31th, 2020

Supervised by: Dr. Johan Bolmsten

Professor World Maritime University

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Abstract

Title of Dissertation: **An empirical Analysis for Distance Assessment in the Chilean MET Administration**

Degree: **Master of Science**

This dissertation is a study of the current situation of distance assessment for the Chilean MET administration, concerning compliance with the requirements for seafarers' career progression.

A brief look is taken at present methods of evaluating competence in the marine field, by the use of e-learning assessment tools, currently in use and the ones that when Head-Mounted Displays (HMD), become massive, would bring new opportunities to the Maritime industry. The international framework for seafarer's evaluation process definition concerning career progression is also examined. Particular reference is made to main issues that are related to the assessment process.

For achieving this on the above mentioned national jurisdiction, administrative and organisational elements were studied, to obtain meaningful information on how this state is proceeding for minimising the gap of not having the possibility of face to face assessments. Furthermore, three essential stakeholders, related to distance assessment tools, were interviewed to get insights on what are the fundamental elements to consider before the implementation of this training and assessment elements, for addressing knowledge and skill-based requirements achievement.

Furthermore, practical examples in IMO model courses, on how could distance assessment would minimise the face to face interaction. Additionally, the data collected after its codification was analysed by the use of internal and external management tools to understand different factors that could be predicted and might affect the implementation of the mentioned tool. The concluding chapters examine the results of the analysis and provide further considerations before the development of a national policy on distance assessment.

KEYWORDS: MET, Assessment, Evaluation, Competencies, Knowledge-based, Skill-based.

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List of Abbreviations

BOK	Book of Knowledge
CBT	Competency-Based Training
CIMAR	Chilean Maritime Instruction Centre
COC	Certificate of Competency
COLREG	Convention on the International Regulations for Preventing Collisions at Sea
DIRECTEMAR	Directorate General of the Maritime Territory and Merchant Marine
DIRINMAR	Directorate of Maritime Interests and Aquatic Environment
ECDIS	Electronic Chart Display and Information System
E-LEARNING	Electronic Learning
HEI	Higher Education Institutions
HTW	Subcommittee on Human Element, Training and Watch-keeping
IMO	International Maritime Organisation
ISO	International Organisation of Standardisation
LMS	Learning Management System
LO	Learning Outcomes
MET	Maritime Education and Training
METI	Maritime Education and Training Institutions
M-LEARNING	Mobile Electronic Learning
MUVE	Multi-User learning environment

OL	Organisational Learning
PESTLE	Political, Economic, Social, Technological, Legal and Environmental analysis
QSS	Quality Standard System
STCW	International Convention on Standards of Training, Certification, and Watch-keeping for Seafarers, 1978 as amended
SWOT	Strengths, Weaknesses, Opportunities and Threats analysis
TVET	Technical Vocational Education and Training
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Educational, Scientific, and Cultural Organisation

Chapter 1 Introduction

1.1 Background

One of the biggest challenges for the International Maritime Organization (IMO) and its Member States has always been the human factor. Its importance relates to the foundation of this specialised agency of the United Nations concerning safety measures. For this crucial reason, to establish uniform standards for training, certification, and watch-keeping rather than delegating this function to each state, the International Convention on Standards of Training Certification and Watch-keeping was established in 1978 (STCW) and is considered one of the pillars of IMO.

Moreover, in 1995, due to disparity in the application of the Convention among different parties, the international community had to analyse and review the STCW for standardisation (Mukherjee & Brownrigg, 2013). On this basis, it was amended with the aim of encouraging seafarers to demonstrate their competences, not just their knowledge. Finally, the Convention was updated again, resulting in the 2010 Manila amendments to provide training and assessment guidelines to MET providers and different stakeholders for applying the necessary competences to seafarers.

Therefore, and according to STCW Regulation I/6 concerning training and assessment issues, each Member State should manage its Maritime Education and Training System in compliance with the mentioned instrument, having the accountability for their instructors and the type and level of training and assessment involved.

These specified standards act as guidelines for regulatory bodies and MET providers worldwide to develop consistent and uniform training outcomes. However, STCW may lead to particular interpretations in adopting learning and assessment processes towards competency development, which creates the risk of seafarers graduating with Certificates of Competence, but lacking the required competence for workplace operations (Ghosh, Bowles, Ranmuthugala & Brooks, 2014).

Chile, which is a Member State of IMO and recently elected for 9th consecutive time as one of the 20 Category "C" members of the Council, is essentially a maritime nation. Its geography, location, and natural resources along with its long coast have made it a maritime state and, according to UNCTAD, it is the 5th most maritime connected country in Latin America with a 42,9 index (Brooks, 2018). Due to this, Chile, throughout the years, has implemented several policies to regulate activities that relate to the sea and is currently working very hard on the implementation of its National Maritime Transport Policy, with all state agencies involved in this crucial issue.

In this sense, control and compliance of all maritime activities, according to the national framework, is the responsibility of the Chilean Navy under its Directorate General of the Maritime Territory and Merchant Marine (DIRECTEMAR), the Maritime Authority of the State. Consequently, DIRECTEMAR is the organ by which the government oversees the compliance of current international instruments, ensuring the safety of navigation, and protecting life at sea, the marine environment, and natural marine resources. It also controls activities carried out under its jurisdiction, contributing to the maritime development of the nation.

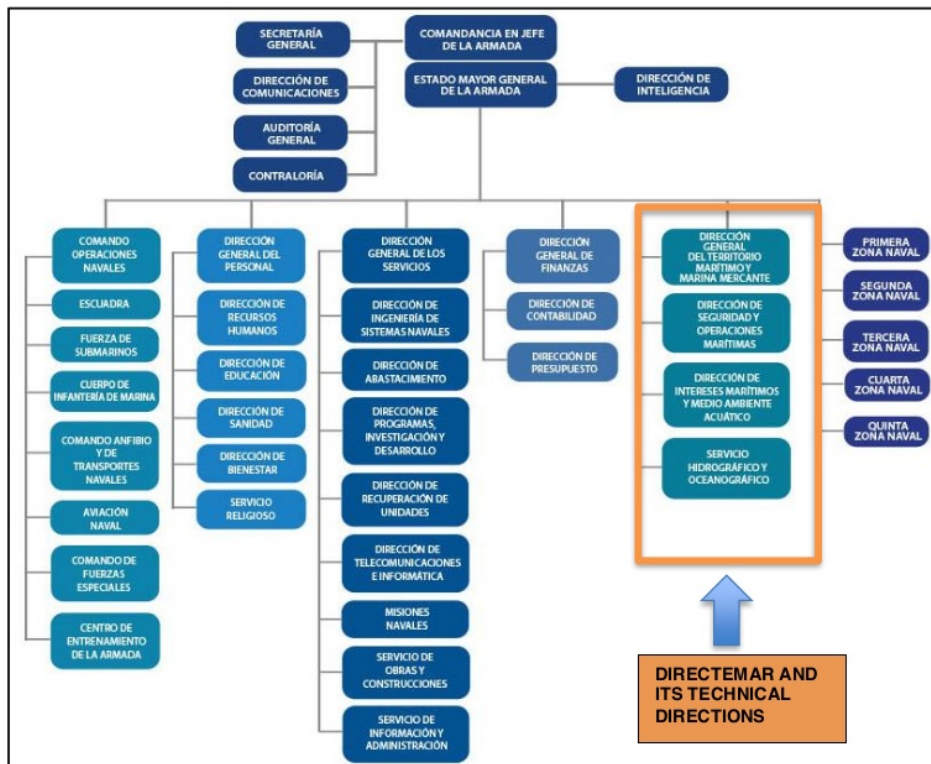


Figure 1. Scheme of the General Directions by which the Chilean Navy is Organised.

Additionally, and related to the human factor in the maritime industry, which is crucial for all the activities onboard vessels, it is important to note that in 1987 by Supreme Decree number 662, the Chilean government ratified the STCW 78 Convention. This international instrument forced the National Maritime Authority to develop in the Chilean Maritime Education System, the Maritime Instruction Centre, CIMAR, which introduced all-new requirements contained in the Convention (Gracia, 2000). CIMAR was developed to establish a structure for the education and training for seafarers and other personnel who perform fishing activities, according to international conventions related to maritime issues.

Therefore, the Maritime Personnel Department and the above mentioned CIMAR, as components of the Chilean MET system, have functioned as competence assessors as well as training institutions. Additionally, after reviewing this brief description of how the Maritime

Education and Training system is organised, it can be observed that the Chilean framework gives sole responsibility to the Maritime Authority for these duties.

1.2 Problem Statement

The Chilean Maritime Authority complies with the STCW convention and is confirmed as one of the parties belonging to the "White List", which means that it has been assessed by the Maritime Safety Committee (MSC) as giving full effect to the relevant provisions of the Convention. The above mentioned international framework, in general terms, gives guidance to each party on how to proceed with seafarers' assessment processes. Consequently, the STCW Convention provides individual freedom for every member state to handle and manage its MET system.

Furthermore, this state, has on active duty 8330 seafarers (deck and engine) that have studied in the eight educational institutions authorised to impart careers by the national organisation. However, is the Chilean MET prepared for a contingency measure that could allow them to evaluate competencies and to assess seafarers in a non-physical classroom? What can be done in the case of a 'scarcity' such as the non-possibility of realising physical assessment appears?

Moreover, according to the Chilean Maritime Personnel Department (personal communication, November 2019), the MET administration has faced significant inconveniences on its annual schedule for the seafarer's examination process, which is affecting the annual schedule.

For instance, this year's COVID-19 pandemic was a real threat to academic institutions, and blended learning and tools such as e-learning were crucial for replacing the typical classrooms to follow up on the regular schedule. Moreover, it was an essential driving force (Sellamna, 2007) that affected all areas and gave rise to changes in the regular practical assessments for seafarers' career progression. However, it is unlikely that all METI's or course providers are prepared to confront this issue in a standardised manner.

On the other hand, the characteristics of the Chilean territory, which extends more than 4,200 kilometres from north to south, could lead to difficulties for the MET authority in terms of checking if assessment and evaluation are adequately realised. Furthermore, especially in isolated locations, accessibility to IT and proper broadband is not available to everyone.

This issue it also has another side and has generated difficulties especially for seafarers that aim to progress on their careers, when they cannot travel to Valparaiso to attend CIMAR's examination's period, or when are currently working onboard vessels.

Consequently, aside from the possibility of another pandemic, several issues could affect the accomplishment of METI's academic schedules, so it is necessary to establish a mechanism that would allow standardisation in terms of how to conduct assessments when such a situation happens. To that end, it will be required to evaluate which tool could be most suitable for these purposes and considered as the opportunity cost, or the second-best option for mitigating this issue (Buchanan, 1991).

In the situation described above, distance assessment conducted by e-learning tools is probably the correct answer. According to Willis, (cited by Fisher & Muirhead, 2001), e-Learning is defined as any education delivered by physical distance, when teacher-student interaction is not physical and is replaced by different tools. Different means tools such as voice, data and images that are used to bridge the instructional gap.

Nevertheless, it is essential before developing any policy or seafarer's career modification on assessments means that the evaluation process should be measured objectively not influenced by personal opinion or judgement of the examiner. Additionally, the assessments must be aligned with the expected learning outcomes, which are defined in the curriculum development process.

In this sense, and in relation with seafarers' careers, the STCW convention was amended in 1995 to address abilities to perform functions and task-related functions on a ship. Additionally, these issues were emphasised by additional requirements in the 2010 Manila amendments.

Therefore, the answer to this problem is related to the need for standardisation of the assessment method for distance learning. Still, it is necessary to establish which assessment method would be used, for what purposes, and examinations should be realised with a proper QSS according to STCW Regulation I/8, and based on the characteristics of the Chilean MET system.

1.2 Aims and Objectives Background

1.2.1 Aims

The overall objective of this study is to evaluate how the Chilean MET system could standardise distance assessment by using e-learning tools to fill the gap for possible inconveniences that might appear in regard to carrying out assessments. Moreover, due to the mentioned characteristics of the Chilean territory,

The aims of this research are also focused on identifying the role of the Maritime Authority in standardisation of non-classroom assessment, and achieving the expected outcomes for MET institutions.

Moreover, having a proper standardisation for this new challenge could imply a significant advantage for the organisation. It would help to have an appropriate contingency plan that would minimise the possible impacts involved in non-classroom assessment.

1.2.2 Objectives

The objectives of this study are as follows:

1. Describe the current National MET assessment process for the seafarers career certification.
2. Describe the measures taken by the Chilean MET administration to minimise the existing gaps for assessment.
3. Analyse the potential for using distance assessment for seafarer certification in the Chilean MET system.
4. Propose to the Chilean MET a standardisation for distance assessment tools for its National Framework, that would be suitable for its Administration.

1.3 Research Questions

To achieve the mentioned objectives, the following questions guide the research:

1. How is the Chilean MET administration process for seafarer's career certification organised?
2. What are the current gaps in the current Chilean MET assessment system?
3. Can distance Assessment for Chilean seafarers be an effective tool for MET progression activities?
4. How can distance MET assessment be standardised in a national organisation?

1.4 Methodology

The study is a combination of descriptive and quantitative methods for a better understanding of the internal factors of the MET organisation in Chile.

Firstly, a descriptive analysis is undertaken to reach a deeper understanding of how the administration is organised, and its relationship with seafarers' career progression.

After this analysis, an empirical study is going to be realised with two essential Chilean MET stakeholders related to seafarers career evaluation and assessment. With a qualitative study, the results will identify existing elements that could be improved by using distance assessment tools and how has been their experience would help the author to understand how this issue could be standardised.

On the other hand, to obtain solutions for the presented inconveniences, a third stakeholder is interviewed to identify new elements and opportunities currently available and others in a development phase, which may be useful and would help to achieve seafarers progression on their careers without problems.

This quantitative approach was conducted through semi-structured interviews, which will provide empirical data to further the understanding of how the Chilean Administration should address this essential issue.

Finally, the gathered data will be used to understand how could distance assessment minimise existing impacts to seafarer's career progression. And different management tools will be analysed before understanding main issues to be considered before a standardisation for the national MET administration.

1.5 Expected Results

What the author expects from this research is to find qualitative data that could lead to a proposal for the Chilean MET system to establish a Distance Learning policy to solve potential assessment and evaluation issues. Moreover, the findings that will be proposed to the national administration could be submitted to the HTW Subcommittee for further studies.

1.6 Limitations

Due to the inability to obtain all the necessary information from other governmental organisations due to the Covid-19 pandemic, this study is limited to the duties of the Chilean MET Department of the Maritime Authority as a competence evaluator, with recognised national and international online training providers.

Furthermore, the Covid-19 crisis had an impact on researcher's ability to access a large number of respondents. Therefore, this study will use examples from the respondents that provided feedback to the author.

1.7 Chapter Sequence

This study comprises seven chapters with each chapter based on an element of the research. Below is a brief description of sections according to their sequence.

Chapter one contains the outline to the study, with an introduction and basis for the task. The chapter further gives the research problem and research questions, and explains the significance of the research.

Chapter two explains the framework for the study by providing a literature review for the international structure and concepts that bound the assessment process with the seafarer's career certification and progression.

Chapter three describes the research methodology process and design used in the study for data collection.

Chapter four explains how the Chilean MET administration is organized and the COC process for seafarers' career progression. Moreover, it analyses the gaps in the national provisions.

Chapter five analyses the possible distance assessments that minimize the existing gap using practical examples. Additionally, a SWOT and PESTLE analysis will evaluate the main issues. Furthermore, it also presents findings following the research approach described in chapter three.

Chapter six aims to discuss the main findings concerning the literature review and other elements introduced in the study.

Chapter seven provides conclusions, recommendations and further research directions for Chilean MET organization, which are presented in a proposal for the mentioned Organization.

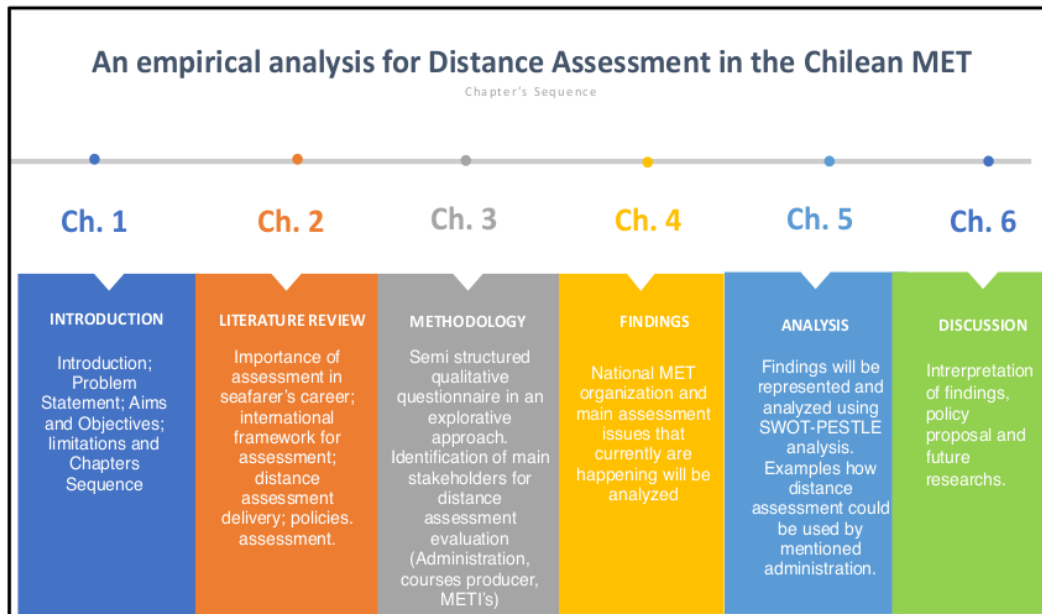


Figure 2. Scheme of Dissertation's Organisation.

Chapter 2 Literature Review

2.1 Introduction

To gain a better understanding for the need for distance assessment of seafarers, this chapter will be divided as follows.

Firstly, an analysis of the importance of assessment and evaluation and its relationship with the seafarer certification process is described to reach an understanding of why these elements are involved in the curriculum design process.

Moreover, the international framework that gives responsibilities to a member state for seafarer assessment is reviewed, together with advantages, disadvantages and recommendations and guidance for distance and e-learning training and assessment.

Additionally, the chapter discusses how training and assessment could be delivered with the use of existing methods to achieve the expected objective.

Finally, it is described how a state needs to consider a National Policy for Maritime Education and Training Distance Assessment.

2.2 Measure, assessment and evaluation

During the curriculum design process, there are several tools for determining the level of achievement of the expected learning outcomes. These components are vital to measure and show the learning process, provide feedback for improvement, and differentiate among the following three components of evaluation, that are measure, evaluation and assessment.

The evaluation process, starts as a hierarchical subsystem with measuring, which relates to the data collection from a quantitative perspective from results that were obtained, from the evaluation process. This includes how many points a student earned in a specific exam or their score in a practical simulator training exercise (Print, 1993).

There are several ways of collecting the data, such as standardised tests, oral tests, interviews, questionnaires, systematic observation, and others, which have advantages and disadvantages in their approaches.

After the data is collected, it is analysed and interpreted; this process is the assessment, where data obtained is represented in a mark or a grade for a quantitative approach and distinction or credit in a qualitative one. Moreover, according to Mertler ([2009], cited by Khadijeh & Amir, 2015) assessment of students performance is one crucial responsibility of instructors because it is a demonstration of the knowledge that they are taught.

Even though a rubric with assessment criteria can be used in normative assessment, it may be influenced by the difference of opinion that is inherent to all human being. With this, the assessment of the same topic between two different lecturers may vary. For instance, in simulator training for demonstrating competences as Officer of the Watch, during a high traffic zone, the instructor will probably assess with a standardised rubric. However, how well did the learner achieved the goal will depend on the criteria of the assessor (Muirhead, 2002).

After determination and interpretation by the teacher, the assessment process ends with the evaluation itself, which is a judgment of the analysis realised in the review, and the necessary recommendations and conclusions will be obtained.

Consequently, in simple words, measurement involves data collection; assessment is an interpretation of the obtained data with a measure; and finally, evaluation is about how well the learning outcome was achieved.

According to Print (1993), when an evaluation is made, it is because someone is making a judgment about a specific issue. Therefore, and to establish a particular relationship with seafarers' career progression, it is essential to ensure that evaluation can be considered as the final element in the curriculum process because it is the measurable part for probing the acquisition of the KUP's required by the norm.

An example showing the importance of evaluation for the curriculum development process in optimal seafarer education and training was presented by the Global Maritime Professional (IAMU, 2019) Book of Knowledge (BoK). It is stated that to have highly professional seafarers, competent to accomplish their role in the industry, and in compliance with international requirements leading towards the vocational approach, should have several competencies that has evolved throughout the time.

Therefore, key drivers such as the technology, legislative and administrative requirements, and other topics needs to be addressed by these new maritime professionals.

On the other hand, logical and critical thinking and addressing the high level of professionalism and ethical behaviour, human relations skills, emotional intelligence, and multicultural/diversity awareness and sensitivity, for demonstrating the academic approach. Furthermore, the student will be judged based on how his or her proficiency was achieved.

Additionally, in this part of the curriculum process, it is when the student shows that they have the capabilities required for the qualification and have proved to a competent instructor that they comply with the requirements that the international framework demands for the expected position or certification. Moreover, the evaluation purpose at the end of the curriculum process aims to identify what happened and what did not; to improve the future development processes, communicate the results to the stakeholders; and finally, to analyse current policy (El Sawi, 1996).

Due to this, the results will not only measure the impact of the educational activities, but the evaluation also helps to achieve effectiveness, with two primary purposes: learning and development (Iseni, 2011).

Consequently, organisational decisions in Academic Institutions and the Administration, such as modifications to a specific programme's methodology, the replacement of a teacher, or a change in policy in the Educational system could be analysed after obtained results of the evaluation for a specific course and so. Finally, for this study, assessment is the element that will be analysed.

2.3 International Framework related to distance training and assessment

This subchapter will review the international framework that establishes responsibilities of states in assessment matters in general; as well as the STCW regulations that are directly related with assessment and finally some guidance regarding distance and e-learning, which were introduced in the Manila amendments.

In 1936, the International Labour Organization convention number 53 first discussed the qualification of Officers, indicating in its third article that nobody will perform duties onboard unless they possess Certificates of Competence for completing specified activities. Additionally, report four says that nobody will obtain their certification without the minimum age established, and without the minimum experience and approved examinations organised and granted by the competent authority.

Additionally, UNCLOS (The United Nations Convention of the Law of the Sea), known as the "Constitution of the Sea" in its Part VII, Article 94 establishes the Flag State duties. Moreover, its 4th paragraph states that each state must ensure that crews which sail under its flag will have the required competencies for it. Furthermore, SOLAS Regulation V/14, states that the government must ensure from the safety point of view, that its ships are sufficiently and efficiently manned.

Furthermore, the ILO's Maritime Labour Convention (MLC, 2006), in regulation 1.3 Training and Qualification, has as a purpose to ensure that seafarers are trained and qualified to carry out their duties on board ship. Consequently, they will not work on a vessel unless they are trained or certified as competent or otherwise qualified to perform their functions, and are not be permitted to perform duties on a ship unless they have completed training for personal safety on board. The same regulation states that training and certification must follow the mandatory instruments adopted by the IMO.

Finally, the essential instrument related to seafarers' certification is the International Convention on Standards, Training, Certification, and Watchkeeping for Seafarers (STCW 78), established in 1978. This convention was created due to the need to standardise

Maritime Education and Training issues, which were initially the responsibility of each state, but when the global community realised that shipping was a globalised industry, and these aspects needed to be addressed.

This instrument, considered as one of the four pillars of IMO, is the International standardisation for the minimum set of requirements for competences on board. It was amended in 1995 to address the problems associated with skills and knowledge, and in 2010 to prevent fraudulent practices, regulate drugs and alcohol abuse, and revise rest and work hours, among other issues.

In this specific convention, it is Regulation I/6 "Training and Assessment" that addresses assessment, with the provisions of section A-I/6 of the Code. It establishes that personnel responsible for training and assessment of seafarers are appropriately qualified for the type and level of activity involved (STCW, 2011).

In this sense and to not interfere in the jurisdiction of any Party, it can be observed that the Convention gives freedom to establish regulation for these matters.

On the other hand, and after interpreting the differences among measure, assessment and evaluation, in the previous subchapter, it is essential that training and assessment should face a different emphasis from the instructor's point of view. For that reason, according to STCW part A-I/12 of the Code, the assessor has to be very clear that the objective measure and evaluation is always related to what competency that will be qualified, giving minimum space for subjective judgements (Fisher & Muirhead, 2001).

Having explained the assessment issues pertaining to seafarers' evaluation process, and the importance of evaluation in the international maritime framework, distance assessment and training will be reviewed.

This above mentioned part of the Code has a list of procedures, and rubrics to follow for assessment; nonetheless, what if this evaluation processes cannot be realised in a regular face to face interaction between the instructor and the candidate?

To mitigate the possibility of having the gap mentioned above, the use of distance learning and e-learning in MET is encouraged by the new amendment (B-I/6-11). The change provides two complete paragraphs "the Guidance for training by distance learning and e-learning" and "Guidance for assessing a trainee's progress and achievements by training by distance learning and e-learning".

Taking this into account, it is significant to review this part of the Code, which gives some guidance and recommendation to the parties for distance learning and e-learning, and which were included in the Manila amendments.

Parties may allow the training of seafarers by distance learning and e-learning following the standards of practice and assessment set out in section A-I/6 in accordance with the guidance below.

Each party should ensure that any distance learning and e-learning program:

1. is provided by an entity that is approved by the party;
2. is suitable for the selected objectives and training tasks to meet the competence level for the subject covered;
3. has clear and unambiguous instructions for the trainees to understand how the program operates;
4. provides learning outcomes that meet all the requirements to ensure the underpinning knowledge and proficiency of the subject;
5. is structured in a way that enables the trainee to systematically reflect on what has been learnt through both self-assessment and tutor-marked assignments; and provides professional tutorial support through telephone, facsimile or e-mail communications.
6. Companies should ensure that a safe learning environment is provided and that there has been sufficient time provided to enable the trainee to study.
7. Where e-learning is delivered, standard information formats such as XML (Extensible Mark-up Language), which is a flexible way to share both the form and the data on the World Wide Web, intranets, and elsewhere, should be used.

8. The e-learning system should be secured from tampering and attempts to hack into the system.

Moreover, the same section of the code B is called 'Guidance for Assessing a Trainee's Progress and Achievements by Training by Distance learning and e-learning, and includes:

1. Clear information to the trainees on the way that tests and examinations are conducted and how results are communicated;
2. Have test questions that are comprehensive and will adequately assess a trainee's competence and are appropriate to the level being examined;
3. Procedures in place to ensure questions are kept up to date;
4. The conditions where the examinations can take place and the procedures for invigilation to be conducted;
5. Secure procedures for the examination system so that it will prevent cheating; and
6. Secure validation procedures to record results for the benefit of the party.

Therefore, and after reviewing the guidance, an emphasis on the different elements of quality assurance (information to the students, conditions for examination, prevention of bad practices and records) can be observed. Nevertheless, it is necessary to indicate that the use of distance learning and e-learning is not mandatory and the specifications for its development concerning certification of seafarers will depend on each party.

This issue happens because several states present gaps for the full implementation of distance learning such as lack of approved training facilities, monitoring systems and facilities, control of MET quality, control of examination and assessment, and others, which may vary depending on the state.

In such a circumstance, the above provisions in the amendment constitute crucial technological help that should be taken into consideration due to the increase of distance learning and e-learning activities (Wei, 2013).

Consequently, after having analysed the international framework that sets the basis for seafarers assessment, it can be observed that boundaries are clear in general aspects, and distance training and assessment guidance does exist. The next subchapter will review different methods on how to proceed with these forms of evaluation.

2.4 Distance learning assessment characteristics

Having described the international framework, distance learning assessment for seafarer's candidates will be explained and critiqued.

Firstly, distance learning refers to every means of education that is not delivered in a classroom-based environment. Some examples are correspondence through regular mail; telecourses/broadcast produced by radio or television; stored on a mobile device or through a wireless server; CD held content; and internet courses conducted either synchronously or asynchronously (Saxena & Upadhyaya, 2017).

Secondly, it is critical to know that despite several methods of delivering distance learning, the most commonly used is e-learning due to the exponential increase in IT. Moreover, its use is mainly related to complementary or supplementary content.

This form of delivering education has also evolved as M-Learning, or 'Mobile E-Learning'. Its main difference to E-learning is related to when, how and where can be realised. While E-Learning was considered in a classroom or an internet laboratory, M-Learning does not have those limitations (Mehdipour & Zerehkafi 2013).

In this sense, and due to the nature of seafarer's profession, this modality of education and training delivery will help to simplify access to it, is more flexible, more individualised and has a richer communication.

Even though distance assessment would probably help to minimise gaps related to seafarers professional progression, it has several weaknesses such as lack of direct communication between instructors and students; unsuitability to all specialities; and lack of uniformity in its assessment methods and learning outcomes (Makashina, Fayvisovich, &

Truschenko, 2017).

2.4.1 Learning theories and distance assessment for seafarers

For the maritime field concerning the several levels of responsibility (Management, Operational or Support) that the candidate is applying for, in a competency-based approach, the students are going to have different examinations concerning the expected outcome that has to be demonstrated.

In this sense, and related to which learning outcome is expected to be attained, it is crucial to understand the relationship between learning theories and assessment, and why there are some differences among levels of responsibility to be addressed.

Furthermore, learning theories will help us to understand how people know, and provide guidelines to prepare learning activities depending on the acquisition of specific vocational skills and academic qualifications that are necessary to achieve, in relation to the new challenges, trends and opportunities to MET (Manuel, 2017).

On the other hand, an essential difference among learning theories is that some are teacher-centred (behaviourism, cognitivism), and others are student-centred (constructivism, connectivism) in terms of how to address the expected learning outcome. This second approach could be more suitable for seafarer education because it encourages active learning based on the previous experiences of the learner toward the achievement of the ILOs (Bartuseviciene, 2020).

At the support level, the most commonly expected learning theory would be behaviourism. The expectation is to perform assigned tasks, under directions given by operational or management levels, which are realised by repetition or other methods. This theory might apply to specific functions such as helmsman, when repetitive actions are part of the training, and undoubtedly that is the expected outcome that is going to be assessed for the qualification.

At operational and management levels, cadets will have to be evaluated case by case on how to proceed to navigate in the best way, avoiding incidents on board. For this point, the

constructive approach could probably be the most suitable for achieving the expected outcome.

Nonetheless, and in relation with Technical Vocational Education and Training (TVET), among knowledge obtained by the candidate at school, they must demonstrate the expected skills pertaining to a specific situation that will lead to determining which is the best approach for solving it and managing risk. (Moyseenko, & Meyler, 2017).

For example, during low visibility navigation, the officer of the watch, despite bridge equipment, knowledge of COLREG, and other requirements, must be competent to apply this knowledge in a realistic situation. The only method by which the seafarer can be assessed is by a CBT drill controlled by a qualified instructor, and the expected competence must be demonstrated to the instructor.

To conclude, there is no doubt that assessment must be aligned with the expected learning outcome; and, among different learning theories, the instructor must choose the one that will be most suitable for the competency being assessed, based on the relevant level of responsibility.

2.4.2 Distance assessment tools

This subchapter aims to highlight some elements that might be used as assessment tools. Additionally, it is essential to highlight that in some METI's and other academic institutions, the assessment itself is a component of a Learning Management System (LMS).

Learning Management Systems are currently used by traditional Academic institutions and software developers to deliver their courses using these platforms composed of different electronic tools such as files, lectures, mail, announcements, discussion forums and assessments.

Moreover, the benefits of LMS are related to improving teaching and learning processes and access to information while enhancing communication between professors and students.

Concerning online assessments with LMS, it is vital to say that it incorporates a variety of metacognitive strategies that include self-monitoring, personal management, focus and planning objectives (Gautreau, 2011).

The main LMS currently in use in different METI's, are the Blackboard software, which is well known due to the possibility of content creation in HEI, and the maintenance it provides to its users; and Moodle open-source software, which is more feasible to achieve because of its free access and easily configuration (Lambert, 2017).

For METI's, LMS is expected to have one space designed for training that should have a navigation or engineer simulator and a place that could help to enhance practical skills, and in that part could be located some assessments. However, what are the most suitable distance learning tools for a CBT assessment?

Firstly, for the knowledge-based approach and to fulfil the STCW requirements, several types of examinations could be held. According to a study conducted by Kearns (2012) in the nursing field, which could be comparable to the seafarers career because of the mixture between knowledge and skill-based training that needs to be addressed, the most commonly used distance assessments are the written assignments, online discussions, fieldwork, presentations and tests.

Furthermore, and despite the benefits that those kinds of assessments could bring to the maritime industry, in terms of minimizing the distance gap and effectiveness of an LMS platform, it may face the lack of the hidden curriculum that is expected to be obtained in vocational and academic approaches.

For practical skills, when the assessments are related to competency-based training, the issue is not fully developed. However, assessment could probably be done by

Computer-based simulators and Multi-User learning environments (MUVE's), which could be developed for personal computers or used by Head-mounted displays (HMD). Nonetheless, its use will require the approval by the state and it will be necessary to have a written policy that is very clear and without space for ambiguity.

The use of MUVE can lead to several benefits that are aligned with 21st-century skills, and it allows 'learning by doing', which is a method in which the candidates can demonstrate their competences (Kitada, Bolmsten, Zeya, Pham, & Aung, 2017).

On the other hand, for simulator-based assessment, part-task deck and engine simulators can be considered even in traditional METI's. They allow students to train specific skills that may not be assessed in detail in a full mission simulator.

Therefore, the experience in some computer-based simulators could be even better than one with all the functions for academic purposes. In this sense and according to Kluj (2001), some part task simulators for engineering officers are more convenient than those with all the functions. This is because of the educational purposes that will be attained with it; as an example when the competencies that are evaluated involve a fuel separator system, there is no doubt that a part task simulator will be better than a full mission simulator (Kluj, 2001).

Furthermore, for practical training and assessment with the use of HMD, new and opportunities for MET will be held to enhancing learning outcomes, increasing learning opportunities, and more access to training. This issue has led to a growing body of research on the latest HMD technologies as tools for education, focusing on their ability to provide motivation, a higher level of immersion and increased level of training, as well as their implementation for MET and operations (Mallam, Nazir, & Renganayagalu, 2019).

Additionally, and according to a study realised by Kherson State Maritime Academy (KSMA, Ukraine), training in classrooms and in some laboratories uses AR and VR which have a positive effect on the learners. Nevertheless, this tool was not effective when it started; it took approximately five years to translate the theoretical knowledge

to practical tasks, such as creation of cargo plan (Zavalniuk, Zavalniuk, & Nesterenko, 2019).

Taking this into account, emerging HMD implementation for seafarer training and assessment would open a new market because the development of hardware and software, if it is compared with traditional simulators, represents a much more economical and efficient alternative that could lead to rapid increase in users.

Moreover, advantages in flexibility, mobility, and accessibility will implement the "training anywhere and anytime concept," so it also is going to lead to more users. From an economic perspective, despite the operational costs of having, for instance, a full mission simulator (related with operation and maintenance), new mobile technologies may reduce direct and indirect costs associated to payment, salaries, and travel.

To conclude, for knowledge-based assessments, the different type of assignments it seems to be clear, and currently are in use. However, the competency-based ones, are in the development stage, and it will depend on each party to the STCW convention if it would authorize its MET administrations to use it.

2.5 National Policy for MET distance assessment

After analysing how assessment should be done by distance methods in the MET organisation, it is necessary to identify various factors that need to be established to standardise it, which at the end must be written in national policy for distance assessment.

To bring this topic to the attention of the Authority, it is crucial to influence the political will and raise the awareness of decision-makers to put it at the top level of their agenda..

Taking this into account, and considering COVID-19 as a key driver, it is predictable that a distance assessment policy for MET can contribute to minimising the gap that currently existing. The impossibility to carry out face to face assessment is undoubtedly affecting seafarers' career progression in some states that do not have a national framework for

distance assessment.

Moreover, due to the global pandemic, distance learning tools during this year have been a priority for governments worldwide. In terms of assessments, most schools have changed the modality of assessment: exams have been postponed or cancelled, and others have used online tests for final exams (UN, 2020).

Another point that could help to obtain the attention of policy-makers is to understand the fact that if the administration is not prepared for new challenges, distance assessment could be a differentiator among states . Therefore, if not implemented in a globalised industry, it might be forecasted that seafarers will go to other countries to obtain certifications (UNESCO & Bokova, 2015). This issue would impact national METI's if it is not well addressed by the different stakeholders involved.

One influential model that could be used to address this issue in terms of agenda-setting is Kingdon's multiple stream model, which introduces the notion of windows of opportunity. This issue occurs when a problem appears, this model put together three different factors to consider; policy stream (solutions), politics stream (public sentiments) and problem stream (problem perception) (Jann & Wegrich, 2007).

For this case study, the policy stream could be represented by the national MET distance assessment policy, the politics stream by the seafarers and METI's internal sense of losing jobs opportunities and demotivation and, finally, the problem stream by the need to be assessed to obtain their COC's and other requirements.

On the other hand, although a new distance assessment policy seems to be the best approach to standardise how METIs can perform assessments using different tools that will be authorised by the administration, it is essential that the authority has some internal processes that allow different stakeholders to understand the presented inconvenience.

Taking into account that the policy to be implemented will be suitable for a specific state, it is essential to understand that the members of this nation are individuals that compound one organisation that shares the same cultural background; therefore, the specific issues of culture and organisational learning should be considered by the policy-makers (Manuel,

2011).

This new provision, will determine some insights that must be considered in this policy because it is vital to analyse it in a specific state, taking into consideration the cultural awareness issues for the implementation of new changes.

2.5.1 QSS

To have a standardised distance assessment policy, and the fact that this evaluation process will culminate in a COC that allows seafarers to go onboard and perform some duties on a flag-state ship, it will be vital to consider a Quality Standard System (QSS) for monitoring the process.

The previously stated is related to the quality of the distance assessments that this new policy will authorise. But why it should a QSS be considered for this issue? The answer is related to the evaluation of the education delivered. A QSS will set some standards for indicating whether the content delivered was aligned with the learning outcomes or not, and if the content was the most appropriate; therefore, this mentioned system will standardise those aspects (Frydenberg, 2002).

Moreover, Regulation I/8 of the STCW Convention explicitly requires that all training, assessment, certification and other activities conducted by non-governmental agencies are continually monitored through a standard quality system.

On the other hand, the QSS ensures the achievement of defined objectives, including those concerning qualification of assessors and instructors' experience. Nevertheless, in parties that governmental agencies perform these duties, these organisations should be configured under QSS provisions.

Additionally, Code A Section I/8 indicates that for National purposes, objectives and related quality standards must be specified separately for different courses and training programmes and shall cover the administration of the certificate system.

On the other hand, an independent evaluation of the knowledge, understanding and skills is conducted at intervals of not more than five years to verify the following issues:

1. Internal management control and monitoring measures and follow-up actions with planned arrangements and documented procedures.
2. Results of each independent evaluation are listed.
3. Timely action is taken to correct deficiencies.
4. Report of the independent evaluation shall include the terms of reference for the review and qualifications and experience of the evaluators.

2.6 Summary

After analysing issues concerning the importance of assessment and why distance assessment should be considered a priority for the MET organisation, the following elements were covered in the literature review.

Firstly, and to understand why assessment is crucial in seafarers career progression, the evaluation process in curriculum design was explained and the terms measure, assessment and evaluation were differentiated, with the purpose of identifying why distance assessment process is the one that will be analysed.

Secondly, to analyse the boundaries between the MET administration and distance assessment, its international framework was deeply researched.

Additionally, distance assessment was defined; its usefulness for seafarers' career progression was identified, and some weaknesses were explained. Moreover, the learning theories that should be considered for different levels of responsibility were reviewed and related to some examples of assessment in a CBT element.

Furthermore, some suitable distance training tools for MET were analysed and explained in the LMS context, including ones currently in use by different METI's that could be useful for assessment as well.

Finally, some key elements were reviewed pertaining to the implementation of a framework in national policy, some of them related to OL and QSS, which will differentiate between states.

Consequently, the identified gap which this study aims to minimise is the lack of a national policy that would allow the Chilean National MET administration to standardise distance assessment for all METI's in its jurisdiction.

Chapter 3 Methodology

3.1 Introduction

This chapter aims to explain how the research was conducted to answer the research questions presented in chapter one.

Furthermore, as was described in chapter one, the methodology to be used will be by data gathered from semi-explorative questionnaires from a qualitative perspective.

Consequently, due to the nature of the research and data collected, the author believes that for “an empirical analysis for distance assessment in the Chilean MET Organization”, when distance assessment is a recommendation provided in Code B I/6, the qualitative analysis seems to be a suitable approach for this study.

Conducting more in-depth and narrowed interviews would provide better outcomes than quantitative data on a topic that is not fully developed due to its nature, when e-learning tools for assessment purposes are still in the pipeline but not fully developed for CBT and skill-based demonstration.

Additionally, the data collection and codification will be explained for understanding its interpretation and internal and external management tools will be used for analysing the possible issues that may appear before a standardisation on distance assessment for seafarers career progression.

The expected findings from different stakeholders are expected to provide inputs that, by using the internal analysis tool, will be considered in a proposal for the Chilean MET administration.

3.2 Data Collection

Firstly, it is essential to specify that the data collected was based on experts' responses that are expected to deliver rich and insightful data on this topic, based on their experiences in MET and its future challenges (Heath, Williamson, Williams & Harcourt, 2018).

Even though it is included in general terms in the international framework (STCW, 2011), development of distance assessment is provided just as a recommendation; therefore, before its implementation, it still needs to be evaluated in a national context.

In this sense, the author identified three main stakeholders that were allocated in the following order, for data gathering;

- 1) In the first place, the Chilean National MET authority was selected as the policy-maker, and as the controller of all maritime education processes in the state. As was mentioned in the previous chapter, DIRECTEMAR, by means of DIRINMAR and its two MET departments (Maritime Personnel and CIMAR), is the unique governmental organisation in charge of these activities on behalf of Chile.

The expected data to be obtained is in relation to answering the questions on how they are dealing with assessment issues during this year and to understand its organisational aspects. Moreover, it is expected to identify significant issues and concerns that need to be addressed before the implementation of distance assessment, including whether it is suitable for all the expected requirements, and finally why QSS is vital in this process.

- 2) The second stakeholder are Chilean METI's that have developed their own LMS for their students.

The expected data pertains to the achievement of learning outcomes by using distance assessment as an evaluation tool, the suitability of distance assessment for academic purposes and the benefits and inconveniences that they have experienced based on this year's experiences.

- 3) Finally, the third stakeholder is a global company that designs and develops distance learning material for different METI's and for various state parties to the STCW Convention, as amended.

The expected data that the author aims to obtain is about significant concerns that the developers need to be aware of before starting the creation of a new course, the suitability of their products for all the requirements of the international framework, benefits and difficulties for its implementation, their future expectations, and finally experiences obtained throughout the years.

Therefore, the first two stakeholders (National MET Administration and Chilean METI's), represents the current assessment situation and it is where the gap appears. On the other hand, the Global courses provider, is introducing tools that are possible and practical solutions to the presented problem, and new elements that are in a development phase that could also led towards solve this gap, especially for skill-based demonstration.

Semi-explorative questionnaires concerning specific issues that each one of the stakeholders deals with were developed by the author.

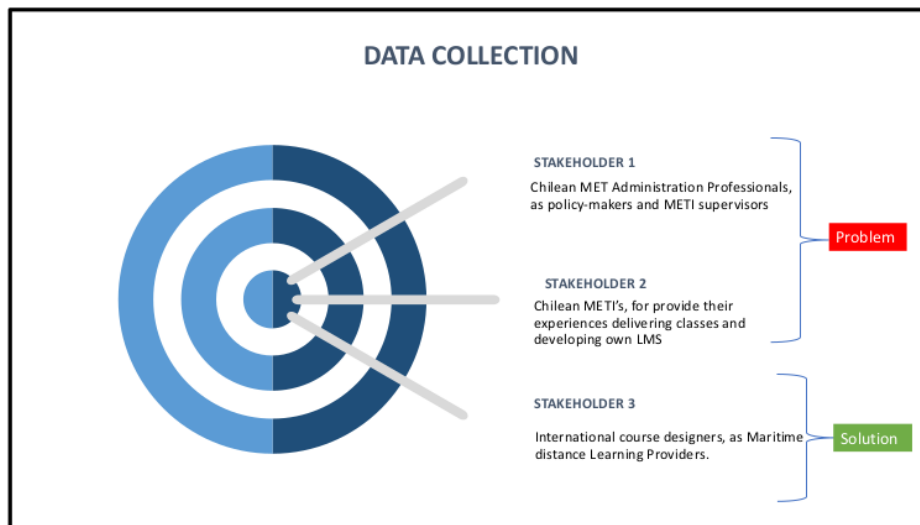


Figure 3. Scheme of the data collection identified stakeholders.

3.3 Data Codification

After gathered information through interviews, it is essential to explain how it was codified. For those processes, the author used two approaches: deductive and inductive.

In this sense, the deductive approach uses a structure or a predetermined framework to analyse data and is aimed and testing theory, whilst the inductive one analyses data is concerned with the generation of new theory emerging form the recently obtained data (Burnard, Gill, Stewart, Treasure & Chadwick, 2008).

The deductive approach was selected because selected stakeholders started from the premise that these distance assessment tools are bringing significant and positive benefits to the industry. With their insights, will confirm the benefits that distance assessment is bringing to the MET process (Medelyan, 2019).

On the other hand, inductive coding was used, to bring new knowledge, based on stakeholders experience, that might be useful for a deeper understanding of the gap.

Finally, these two approaches for codifying data were triangulated to get rich, consistent and more comfortable to interpret information to get a better analysis.

3.4 SWOT Analysis

With the analysed information, the author uses a SWOT analysis as an internal management tool (Sammut-Bonnici & Galea 2017), evaluating possible strengths, weaknesses, opportunities and threats inside the organisation. This tool provides interior elements (strengths and weaknesses) combined with externalities to the organisation (opportunities and threats). It will help the organization to improve its decision-making and would help to be aware for the future.

Additionally, it is essential to specify that this tool will help to provide an understanding of the organisation's overall environment and could be used as a guide; nonetheless, its use could result in oversimplification and subjectivity if it is not correctly (Patias & Leventi, 2017). In this sense, it is crucial not to rely on respondents with a single perspective; therefore,, the author selected stakeholders with different perspectives.

This analysis will interpret the findings and will relate those with OL concepts bounded with cultural elements that will probably appear from the interviews as well. Moreover, and considering these concepts, the author's idea is to propose a policy to the Chilean MET organisation to develop their own structure and standardise it for application to all national METI's.

3.5 PESTLE Analysis

Despite the SWOT Analysis that will be developed, and after an evaluation of the external factors that could affect the implementation of distance assessment in the Chilean MET, the opportunities and threats will be examined by using a PESTLE analysis.

This management tool could be used to develop risk response strategies based on the capacities of the top level of the organisation. Moreover, according to Thomas (cited by

Perera, 2017), a proficient understanding of externalities and their consequences would help the organisation to have a better understanding of these impacts, and with that minimise the risk of failure.

After finalising both analyses, the author expects to understand in a broader sense the main issues to be solved and determine the extent to which distance assessment will be suitable for minimizing the currently existing gap.

3.6 Research ethics

For being transparent with the respondents, they gave their consent before participating in the research; furthermore, they were permitted to revoke their participation at any time.

Additionally, WMU's Research Ethics Committee approved the semi-structured questionnaire before collecting data and also, an information sheet detailing the research objectives and how the information would be protected was shared with all participants.

Chapter 4 National MET Administration Findings

4.1 Introduction

This chapter aims to address a comprehensive analysis of the Chilean MET administration, its relationship with the seafarers' certification and assessment process, and other significant issues to understand. Moreover, and in relation to the assessment process, a particular MET will be used as a practical example to show how the organisation is dealing with distance assessment.

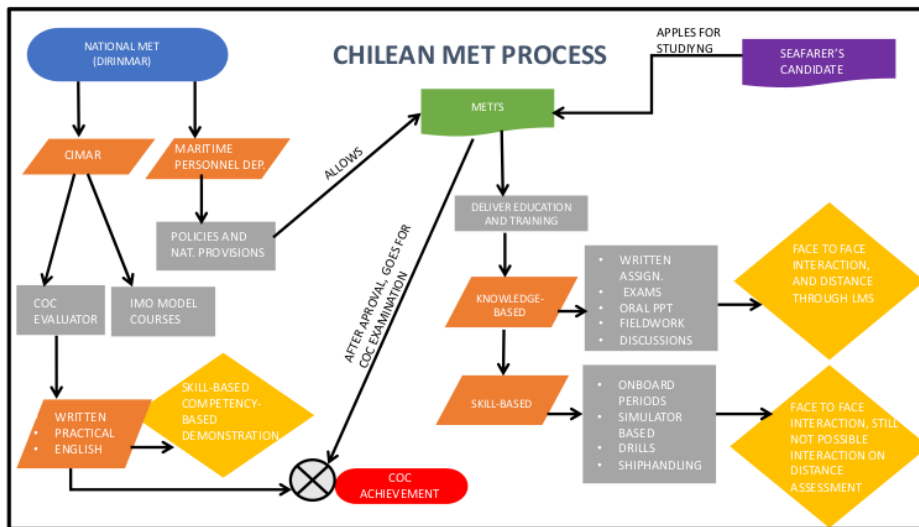


Figure 4. Chilean MET Process, with current assessment gap.

Firstly, will be an explanation on the National Framework that set the boundaries and responsibilities of the National MET administration.

Secondly, the seafarer's candidate process to achieve an specific COC and the respective assessment that must realise for it.

Thirdly, a METI's complete program will be reviewed explaining the complete process highlighting skill and knowledge-based assessments to achieve for the full certification.

Additionally, National MET Administration requirements and a current explanation of the distance assessment interaction that the mentioned authority is dealing with.

Finally, two National stakeholders insights will be analysed to understand the current situation on distance assessment for these organisations.

4.2 The Chilean MET Organisation

To understand how the National Government of Chile organises its Maritime Authority for MET functions and to analyse how the Maritime Education and Training system in Chile is established, it is essential to review a number of national legal Frameworks.

Firstly, Law N° 292, which establishes the organisation of DIRECTEMAR, in its 3rd article states that it has the responsibility for the safety of lives at sea and the accomplishment of the national and international provisions about it. Moreover, the Directorate must ensure all the frameworks related to the laws, regulations, and other issues regarding the Merchant Marine, both technical and professional.

Secondly, Navigation law N° 2.222 establishes that DIRECTEMAR has the responsibility of controlling the treaties' accomplished on its competence related to the safety of navigation on its jurisdictional waters, and it represents the State of Chile for meetings and technical meetings related with it.

Thirdly, it is essential to mention that Chile is a state that ratified the STCW 78 convention as amended in 1987, by its Supreme Decree Number 662; therefore, it is a party to it. Furthermore, article 66 of the mentioned Framework gives the Director responsibilities regarding the titles and certification of the officers of the vessels, the requirements for certification, watch-keeping, and in general all the issues that involve seafarers in Chile. Article 74 specifies that the Maritime Authority is the competent organ that qualifies and controls competences, professional preparation, and the physical conditions for any person that performs duties in Chilean ships.

Additionally, DIRECTEMAR's Organic regulation, approved by the Commander in Chief of the Navy by Resolution N° 6491/2846 June 2013, establishes that this Authority is the National Maritime Administration of the coasts and all the waters under its jurisdiction. Additionally, it possesses the technical control of the Merchant Marine and all the maritime activities to support the development of the nation.

For controlling these activities, the organisation has a technical Direction of Maritime Interest and Aquatic Environment (DIRINMAR). Its responsibilities are to verify the suitability of the onboard personnel on ships and specialised vessels, including fishing and sports, as well as diving and port workers. Moreover, DIRINMAR for the accomplishment of these duties, has two main divisions that relate to MET aspects, the Maritime Personnel Department and CIMAR.

The Maritime Personnel Department has the direct responsibility for the control and accomplishment of all the national and international regulations regarding the formation, capacitation, qualification, and certification of maritime personnel. Moreover, it controls the examination schedules and the study programmes of the METIs (maritime universities and institutes for seafarers), and manages the database of maritime personnel and others.

Consequently, the Central level Office controls every process of the certification and training of the seafarers, with the support of the Captain of the Port Office's that also has a division that locally monitors how the educational centre works.

On the other hand, CIMAR is principally a public Training Centre managed by the Maritime Authority. Its mission is to instruct and train merchant marine and fishing vessels personnel in all the aspects required by the international conventions ratified by the Chilean government, and in particular, those provisions specified in the STCW and the STCW (F) Conventions (Gracia, 2000). However, it has another vital function related to certification. After the qualification of an officer from a competent education centre, it needs to certify competences in this centre, so it is a crucial part of this process.

According to article 96 of DIRECTEMAR's organic regulation, CIMAR has four main functions:

- 1) To impart, training, improvement and updated courses required to seafarers, fishers and others that have duties on board special vessels;
- 2) To evaluate competences of seafarers, fishers and others;
- 3) To assess application exams for titles, licenses, and certificates before their distribution to the national territory;
- 4) To evaluate professional assignments, professional logbooks, calculations, and watch control presented to the Maritime Authority as promotion requirements for Chilean seafarers and fishers.

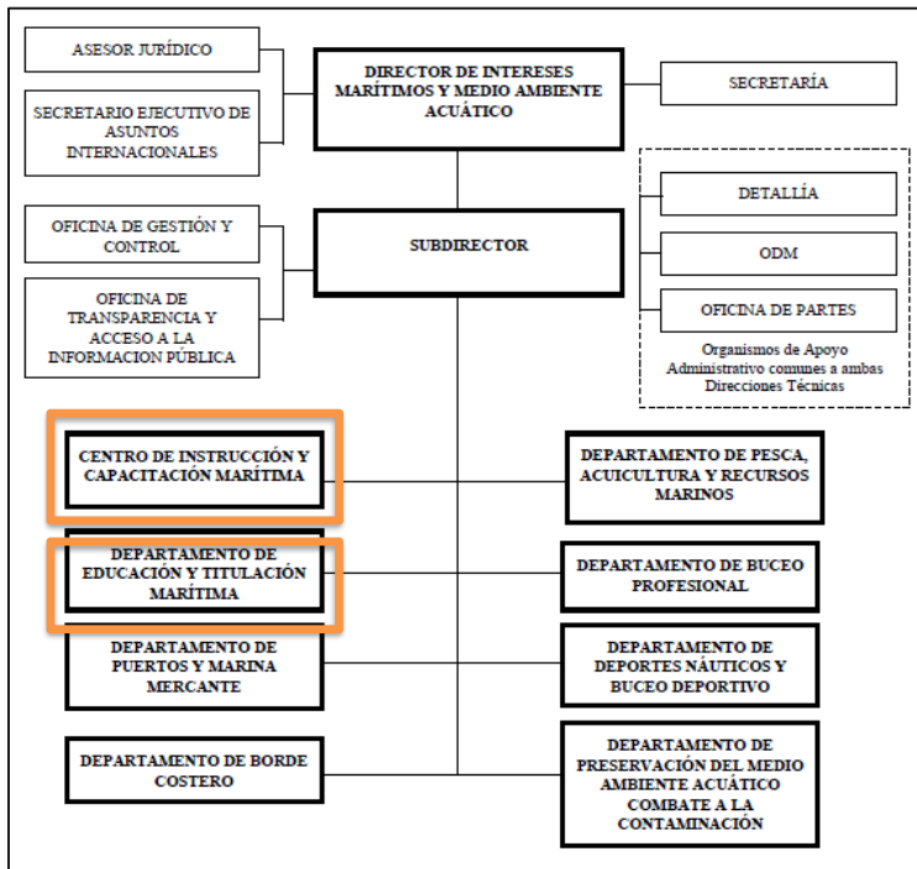


Figure 5. Scheme of DIRINMAR and its two MET related departments.

On the other hand, concerning the educational process, it is essential to specify that the educational system in Chile is regulated by the Ministry of Education and includes preschool, primary, secondary and higher education. In this sense, regarding seafarers' career progression, deck and engineering students have to realise a four-year university programme (8 semesters) to obtain an academic degree for both of deck and engine licenses, which are approved by the administration, and the previously mentioned Ministry.

In terms of the Chilean framework for seafarers, the graduation process of Merchant Marine Officers, in which national and international standards are applied, a final method of assess the suitability to access each of the titles of the respective career is imparted.

This assessment, which is carried out in the Maritime Instruction and Training Centre, CIMAR, has three parts: a "Written Exam", "Practice in Simulator" and English language, a process that is controlled by an evaluation commission.

The Written exam is a knowledge-based assessment, based on the IMO courses (7.03 and 7.04, for deck and engineers respectively), in which the students have to succeed at least with a 60% of proficiency. This is the first part of the process.

The practical part is compound by a worthwhile exercise of 90 minutes length, in which the instructors using rubrics, (were deck candidates has to demonstrate proficiency in bridge simulator, the engineers have to do in an engine simulator), in a skill-based environment, must approve specific drills supervised by certified instructors.

Finally, the English exam aims to measure comprehension, orthography and the clarity of the exposed ideas. It has two parts, a written part and an oral examination; the written part is related to nautical terminology, translation and comprehension of acronyms and maritime signs, in the knowledge-based domain. The oral presentation is a skill-based exam that expects that candidates demonstrate competencies in situations, that could be presented in simulator and others. This part is based on the IMO model 3.17, Maritime English.

This assessment is realised four times a year at CIMAR's facilities located in Valparaiso. Additionally, the schedule is published a year before, for assuring all seafarer candidates and those licensed ones that need to be promoted, know the dates for being there when they have to.

Furthermore, it establishes that at the end of the professional education and training provided by the national METI's, students earn the Third Pilot COC (Officer in Charge of the Navigation Guard) and Third Engineer COC (Officer in Charge of the Engine Guard). This

educational process must be carried out in higher education institutions recognised by the state (Universities and Professional Institutes, and technical centres). These METI's must have their study plans and programs previously approved by DIRECTEMAR.

Finally, to highlight the importance of the assessment part in the Chilean MET framework, it is vital to mention that for every officers' promotion and despite the expected required time onboard for it and the required IMO model courses, the candidate must realise a course for the specific position and licence that is applying for, and be assessed by the authorised METI that is delivering the mentioned programme.

Therefore, skill-based and competency-based approaches are evaluated in compliance with the SCTW, as amended, and integrated to the national framework.

The training of officers is based on the courses IMO 7.03 "Officer In Charge of a Navigational Watch", IMO 7.04 "Officer in charge of an engineering watch", 2014 edition and various model courses, as appropriate.

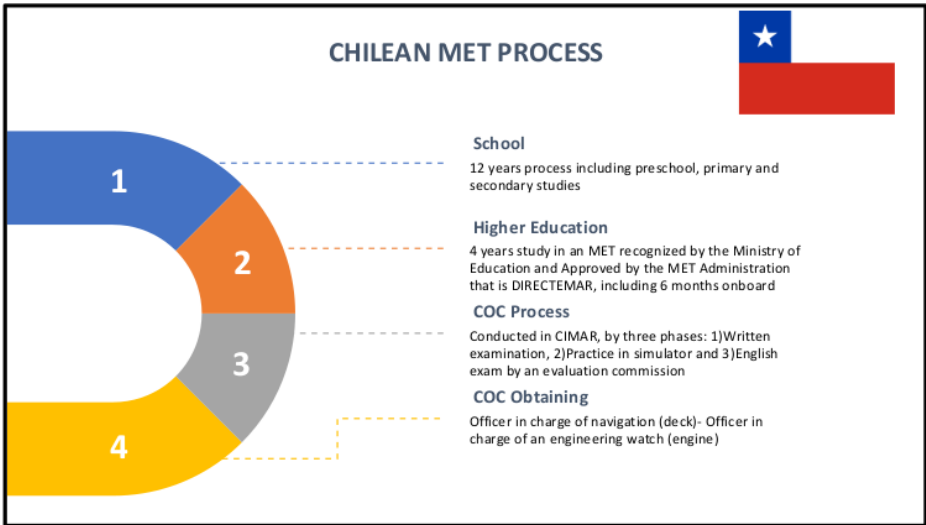


Figure 6. Chilean MET COC Process.

4.3 National MET assessment process

This section aims to explain the Assessment process in the Chilean MET in two vital parts of the seafarer's career progression, which are COC achievement for obtaining the respective licence and IMO Model Courses for career progression. For those, several skill-based and cognitive-based domains must be demonstrated by the applicant.

As was mentioned previously, for skill-based training under regulations on Training, Qualification and Professional Career of Embarked Personnel", approved by Supreme Decree (M.) N° 90, dated June 15, 1999, the practical embarkation of the aspiring officer is regulated in the following article:

- 27°.- The aspiring officer must prove compliance with the actual embarkation in instruction, established in the preceding article, under the supervision of a competent officer designated by the Captain; pass the Record Book of the training period at sea and obtain good marks from the Captain.

Each training institution provides the applicant with a "Training Record Book", which must be presented at the Department of Education and Maritime Qualification of DIRINMAR, once the period of practice onboard has finished, as a mandatory requirement for the respective qualification.

Onboard time in practice for each title is indicated in Table 1:

Table 1. *Sea time Required in the Chilean Framework*

National Merchant Marine Title	Onboard time required	International Title of Merchant Marine	IMO model course
Third Pilot	Six months	Officer in Charge of a Navigational Watch Rule: II/1	IMO 7.03 "Officer in Charge of a Navigational Watch"

Third Engineer	Six months	Officer in charge of an Engineering /Watch Rule: III/1	IMO 7.04 "Officer in Charge of an Engineering Watch"
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In addition to the practical time that will ensure the practical-based training, the Chilean Framework has established an academic degree in a cognitive-based approach, for the licences mentioned above.

As an example of the above mentioned, the Andres Bello's University curriculum will be explained and exemplified (Table 2).

As a Bachelor of Merchant Engineering, students may apply the principles of basic sciences and engineering in the development of projects and problem solving, making use of the knowledge and techniques of the speciality. Likewise, students are capable of managing, administering, formulating and evaluating engineering projects, using economic-financial concepts, and considering the risks, norms and standards in force.

Furthermore, graduates will have a training under national and international standards set by the National Maritime Authority and the International Maritime Organization. They will be able to perform functions at an operational level in the shipping industry, and in turn, assume responsibilities associated with the care of equipment, and its administration and maintenance in public or private companies. Besides, the student need to acquire an understanding of the values the ethical aspects of the profession and respect for the environment in the different activities in which they participate.

Consequently, Engineer in Merchant Marine, contributes to the economic development of the country, through the activities of the shipping business. Furthermore, the student will acquire professional skills to face and adapt to a globalized world and join interdisciplinary workgroups in public or private institutions.

Table 2. *Andres Bello University's Merchant Marine Engineer Career.*

1 st Semester	2 nd Semester	3 rd Semester	4 th Semester	5 th Semester	6 th Semester	7 th Semester	8 th Semester
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Maths introduction	Calculus	Technical Draw and Plans	Elasticity and materials resistance	Machines and tools	Engine maintenance 1	Engine maintenance 2	Technical Maritime English
Physics	Engineering processes	Naval Technical Mechanics	Electrical engineering	Electric machines	Electronics	Automatic Control	Electrical Machines 2
Introduction to marine engineering	Experimental Physics	Electricity	Thermodynamics	Internal Combustion1	Internal Combustion 2	Marine Machines	Engine Room Resource Management (ERM - IMO 2.07)
Communication skills	Regulation and laws	Firefighting and abandon ship (IMO 1.19; 1.23; 1.20; 2.03)	Naval Construction and buoyancy	Engine Room Management	Steam Plants	Safety of personnel and environment (IMO 1.21; 3.26; 1.39; 1.38)	Integrated management systems
English 1	English 2	English 3	English 4	Environmental care (IMO 1.01)	1 st Aids and medical care onboard (IMO 1.13; 1.14)	Maritime Port Investment evaluation	Bachelor of Engineer Seminar
---	---	---	Practical Training (Onboard)	Critical Thinking	Costs and finances	Project Portfolio	Project Title
---	---	---	---	---	---	---	Practical Training (Onboard)

Even though the Merchant marine careers are approved by the Chilean Administration and the academic institutions are recognized by the Ministry of Education as Higher Education Institutions, to obtain their COC, the candidates have to face an assessment by DIRECTEMAR, conducted by CIMAR in its facilities, to demonstrate the competencies achieved during their studies.

After reviewing the provisions, it is essential to mention that the MET administration, in addition to providing seafarers certification, is in charge of all maritime licenses and requirements, such as sports and special vessels, including fishing activities, which will not be covered during this study.

Due to the Covid-19 situation, currently, the organisation is authorising up to six month extensions for license expirations and IMO model courses. This is to avoid affecting the

career progression of seafarers; nonetheless, this partial solution covers only some of the aspects that are not included in a policy.

Currently, due to the above mentioned as well, the organisation, by its own means, and according to requirements presented by maritime users, has delivered some IMO model courses as Table 3 shows:

Table 3. *Courses currently delivered by CIMAR on e-learning*

IMO Number	Name
IMO 1.21	Personal Safety and Social Responsibilities
IMO 1.39	Leadership & Teamwork
IMO 4.02	Oil Pollution Preparedness, Response and Cooperation (OPRC)
IMO 7.11	Basic Training for Ships Operating in Polar Waters

DIRECTEMAR, through CIMAR, has developed an LMS to facilitate the training of maritime personnel, and to minimise the effects of the pandemic on seafarers' career progression. The LMS focusses solely on the cognitive domain, assessing only knowledge. Currently, it is an open question if CBT can be achieved through the LMS, which includes skill-based competencies.

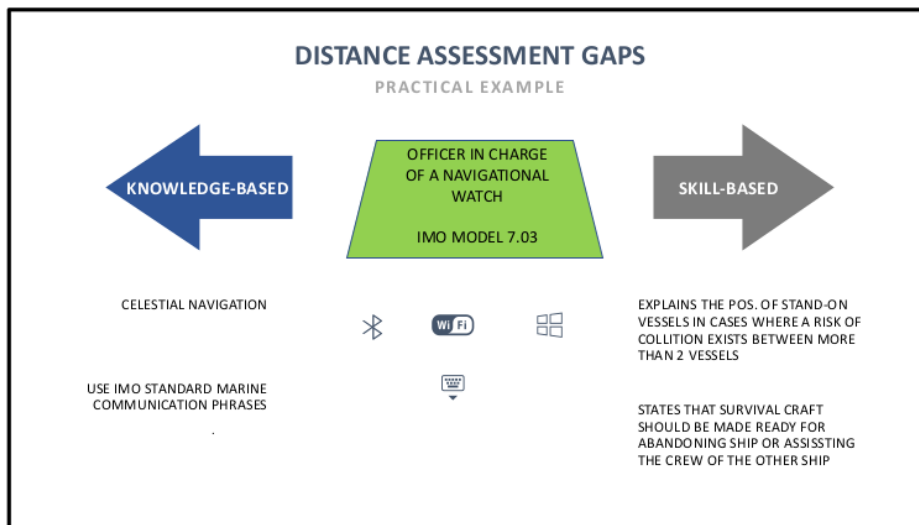


Figure 7. Scheme of current distance assessment gap.

Using the example of the IMO model course 7.03, “Officer in charge of a navigational watch”, as in Figure 6, the knowledge-based assessment can be realised in several forms. According to the current provisions given by DIRECTEMAR, written assignments, exams and oral presentations, might be realised without inconveniences. However, there is no policy with clear boundaries to allow its use by different METI’s, including essential elements such as, IT requirements, control measures, and other provisions that national provisions should include for a standardisation.

On the other hand, skill-based competencies are also facing a lack of standardisation, and currently these tools, are not approved by the Chilean MET administration. This issue, if not well covered in a policy, could lead to two significant problems: 1) affecting national seafarers’ career progression; and 2) if not written in a national policy, METI’s could assume an authorisation, and realise their assessments without any boundaries and IT minimum requirements, for seafarers certification.

Consequently, QSS plays a vital role in METI’s and other HEI standards, and OL, based on cultural aspects of the Chilean organisations, could tend to assume some issues. This factor

makes it appropriate to standardise the mechanisms that could help to assess skill and knowledge-based elements of training.

Therefore, the findings from National stakeholders, (National MET administration and Chilean METI's) are presented below.

4.3 National MET organisation insights

Firstly, the national MET administration identified that to have the best possible endowments for maritime transport and to assure the standards given by the STCW Convention, as amended, continuous improvement must be an essential objective of every party.

In this sense, policies should strengthen the training stage and seafarers' competence assessment process, have well-prepared seafarers in the vocational and academical approach, place an emphasis on 21st-century skills such as good communication, resilience, and situational awareness. Furthermore, with the capacities to identify risks during navigation approaching the correct decision-making especially in critical moments of onboard operation.

Within the framework of this precept, quality management systems must incorporate competence assessment as a fundamental process. The interviewed from the MET National Administration said, "Today, differences can be observed in standards established by different States party to the convention. In some cases, the theoretical course is enough to obtain the certificate. On the other hand, there is a more important requirement, which is that trainees undergo a different and unique evaluation that allows them to demonstrate their practical skills".

Nevertheless, the mentioned organisation must be aware of possible inconveniences in conducting assessments and should take the measures to minimise them. Therefore, distance assessment would solve the problems related to seafarers' career progression that were identified due to the Covid-19 pandemic and other issues related to the national geography.

However, these technological advancements are not going to achieve the expected goals without proper instructors, qualified in the use of these tools. Currently, distance assessment can only evaluate knowledge-based training; therefore, it can only be used for those educational purposes.

Finally, it should be borne in mind that the focus of the STCW Convention, is the "Human Element", which is complex and multidimensional.

Therefore, the educational emphasis is on the balance of technical competencies and soft skills; That fair proportion will lead to significant and flexible leadership.

To conclude, the National MET is aware of the existence of inconveniences in assessment realisation and has taken some measures for minimising this gap. However, the most important element to consider is the human element with their complex and diverse characteristics, and after the achievement of its needs, then the administration should focus the attention on the tool for a distance assessment.

On the other hand, this crucial part in the evaluation process should consider a mechanism to achieve 21st skills demonstration, and that would be a challenge for the instructors.

4.4 METIs distance assessment insights

The second national stakeholder interviewed was a representative from the Chilean METI. Along with the previous stakeholder, the METIs are going to be directly affected by changes to distance assessment.

In this sense, the interviewed precise, "the experience obtained through the courses that are currently authorised by the MET administration has been successful, in terms of the achievement of the expected goals for our organisations. Moreover, in addition to students' efforts to adapt to this new form of assessment, their instructors have also improved their IT skills".

Furthermore, with online and offline content, the student can have access 24/7 to their LMS. Currently the Blackboard LMS system is used, and the impacts have been very positive, because the assessments were successfully solved through knowledge-based exams included on their LMS. The instructors have been provided with applications that have simplified their knowledge about these platforms, and due to this, they believe that the Chilean MET should take advantage of these tools, and use them for instructional purposes as well.

Nevertheless, and despite the above mentioned benefits obtained, the national METI's believe that is essential to standardise distance assessment in federal policy to avoid having Maritime Universities and technical schools with a very basic LMS and simple e-learning assessments. Moreover, a standardising distance assessment would avoid schools which do not fill the requirements, thinking just providing these elements just as a business in which everybody can be included, avoiding essential issues to be achieved, for educational purposes.

The educational aspect is crucial in seafarers career progression, and general provisions should be clear without space for ambiguities that could lead to not having competent personnel to operate the national vessels.

To conclude, based on the experience obtained from these two national stakeholders, distance assessment has helped to minimise the issue of not having face to face interactions. Knowledge-based assessments are currently an effective tool for helping to achieve assessments to seafarers candidates when METI's does not have the possibility of face to face interactions.

Moreover, an standardisation of these tools will be necessary to assure that is an effective tool for address the expected LO that will be assessed.

Chapter 5 Distance assessment analysis

5.1 Main issues

After having reviewed the Chilean MET Organisation and certification and assessment process, including distance assessment issues, this chapter considers new possibilities that distance assessment could bring to the MET administration. These possibilities both include provisions for knowledge and skill-based assessments.

The analysis is primarily based on interviewing a global courses developer aiming to review possibilities that are currently in use and some in a development phase, which would help to minimise distance assessment issues.

Furthermore, the Chilean MET preparedness for addressing distance assessment will be analysed in a SWOT analysis to clarify the insights.

Finally, for having a broader view of the distance-assessment issues, a PESTLE analysis was carried out as a complementary tool for studying the external factors related to central issues that needs to be covered for MET distance assessment. The result will be used to propose a national policy for distance-assessments, and in the future a circular to be discussed in the HTW Subcommittee at the IMO.

5.2 Global course developer insights

To properly address and identify different solutions for distance assessment, the interviewed courses developer is an essential stakeholder that would help to understand, and then to solve the mentioned issue.

Firstly, for the design process, it is crucial to specify that the relationship between the learning objectives and learning outcomes will define whether the e-learning mode is or is not the right vehicle.

Typically, these companies offer development of LMS with all the content included, designed by a multi-disciplinary team composed of project managers, instructional designers, multimedia and media experts (video, subtitles and others) from different backgrounds, not just from the MET perspective. Among its benefits, it offers immediate acquisition of data, such as grades, assessments, shared documents, videos, feedback and many other tools.

Furthermore, for the cases that e-learning is suitable (probably 100% of the cognitive-based), it was proved to minimise the pandemic effects and supports seafarers' career progression. Due to this, some administrations have been using this assessment tool.

In this sense, knowledge and skill-based assessments are now an existing possibility and it will depend on the national administrations to allow its use. However, skill-based assessments are still in development, so is preferable to wait until these technologies became massive, and interested parties should assure the infrastructure for allow its use.

Nevertheless, and despite the benefits as mentioned above and some issues to be solved, those interviewed believe that a national policy for distance assessment would be necessary for standardisation; however, the main problem that needs to be addressed is the expected outcome to achieve compliance with the requirements. Therefore, if it is possible to accomplish this with the use of e-learning for assessment; then, the MET administration should determine how to address it.

Finally, it can be forecast that within short new solutions concerning HMD technologies are currently in the pipeline, and can be predicted that will have a rapid increase in the MET industry, it will be used for skill-based training and assessments. These changes are not going to have an immediate disruption in the industry. Still, it is expected that the economic, commercial and end-user will be the driving forces which would bring this into action.

5.3 Distance learning possibilities of assessment

As was mentioned in chapter two, seafarer's career progression looks forward to reaching vocational, and the academic approach was candidates must be able to demonstrate a

specific understanding of the subjects studied and proficiency during their tasks. Moreover, knowledge-based and competency-based systems need to be integrated to achieve the expected learning outcomes, to obtain a COC, or get a specific certification to advance in the career progression, such as the IMO model courses.

In this sense, and based on insights obtained from the cited Global Courses Developer and from current use of Distance assessment in the National stakeholders, types of knowledge-based assessments that could be useful for achieving this part of the evaluation process, in an LMS context, could be written assignments, online discussions, fieldwork, presentations and exams, and all of them are suitable for seafarers career.

Therefore, for academic purposes, the IMO model course 7.03, "Officer in charge of a navigational watch", will be analysed to show how the assessments as mentioned earlier could be used for some LO achievements.

Table 4. *Examples for MET knowledge-based assessments, through e-learning*

Type of assessment	Competence	Training Outcomes	Example
Written assignment	1.2 Maintain a safe navigational watch	The content, application and intent of International Regulations for Preventing Collisions at Sea, 1972, as amended.	In a written assignment, describe how to navigate in a traffic separation scheme, with reference to entering and leaving separation scheme, crossing lanes, the use of inshore traffic zones, and others.

Online discussion	1.2 Maintain a safe navigational watch.	Keeping a safe navigational watch.	In an oral examination, describe the duties of the officer of the watch while at anchor.
Fieldwork	1.3 Use the ECDIS to maintain the safety of navigation.	Explains the major characteristics of ECDIS data, such as data term and definition; data contents; data structure; attribute; data quality and its accuracy.	Putting the student in a determined and controlled situation where they need to solve this situation, applying the respective COLREG rules.
Presentation	1.7 Use the IMO Standard Marine Communication phrases and use English in written and oral form.	Use IMO Standard marine communication phrases.	With the use of HMD, show and demonstrate their proficiency on the ECDIS use.
Exam	1.1 Plan and conduct a passage and determine position.	Celestial Navigation.	To approve an exam of positioning the vessel using celestial navigation tools.

As shown on Table 4, some possibilities that could be suitable for knowledge-based training are presented, with the type of assessment to be used, the competence to demonstrate, its required performance and the exercises.

Moreover, for competency skill-based assessments, following the same line, Table 5 shows some evaluations that could be reached with IT tools, also will be presented for the IMO 7.03 course.

Table 5. *Examples for MET skill-based assessments, through e-learning.*

Type of assessment	Competence	Required performance	Example
Part task simulator bridge exercise	1.2 Maintain a safe navigational watch	Explains the position of stand-on vessel in cases where a risk of collision exists between more than 2 vessels.	In a part task simulator environment, put the students vessel in a situation that needs to demonstrate proficiency in the exercise.
VR practical exercise by HMD	1.5 Respond to emergencies	States that survival craft should be made ready for abandoning ship or assisting the crew of the other ship.	By using an HMD, put the student into a situation in which they need to take decisions based on the competencies being measured, to demonstrate proficiency.

The above mentioned examples are based on the possibilities that were revealed in the interview the Global Course developer and the insights gained from investigating the

Chilean MET organization and assessment process. However, this is just a possibility for a party after the IT requirements been established and the MET administration authorised its use. For the implementation of these examples, it will be crucial that instructors have rubrics that demonstrate the level of approval for the exercises.

Therefore, these possibilities can be considered as examples to be considered on standardisation for distance assessment, making clear boundaries on skill and knowledge-based ones.

Additionally, distance assessments gaps previously presented, are solved by the use of different e-learning tools for addressing the fulfilment of these LO. For instance, for knowledge-based assessments in celestial navigation, which is training outcome for the competency 1.1 Plan and conduct a passage and determine position, of the IMO model course 7.03, an assessment could be realised by a regular examination using an e-learning tool.

On the other hand, for skill-based assessment when the candidate is expected to demonstrate proficiency in a practice drill in a survival craft, to become ready for abandoning ship or assisting the crew of another vessel in a CBT (the competency 1.5 Respond to emergencies) a tool that could be suitable is the use of an HMD in a VR environment.

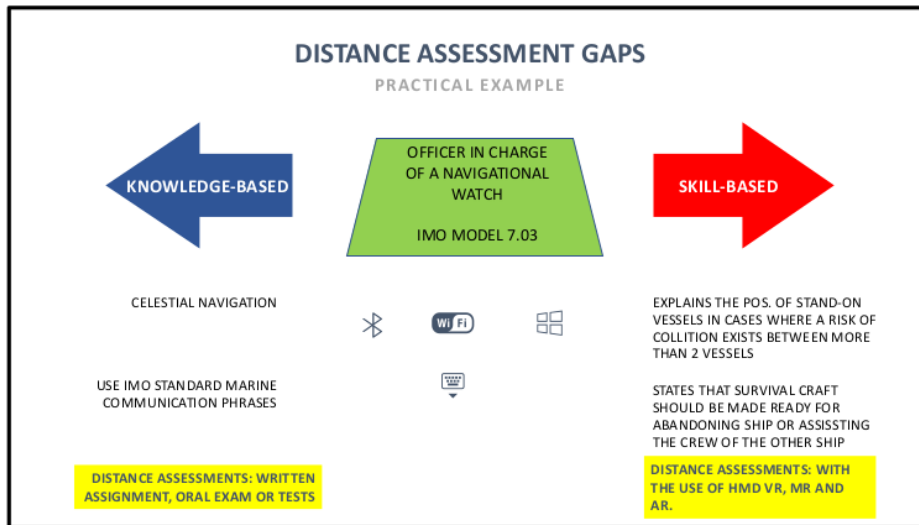


Figure 8. Scheme of new possibilities with new assessment tools.

Furthermore, and about the suitability of the assessment method to use will depend on the training tool applied. In this sense, for CBT, the evaluation process would preferably be done in the same environment that was practised, in a constructive alignment to the LO (Castells et al., 2016).

To conclude, and after summarising the main findings from the identified stakeholders for this study and having analysed the possibilities that e-learning could bring to assess seafarers towards their career progression, the next subchapter will apply a SWOT analysis. The SWOT analysis will be used to analyse the internal and external factors affecting the Chilean MET administration for its distance assessment preparedness.

5.4 SWOT analysis for Chilean MET administration on distance assessment preparedness

Table 6. SWOT analysis for Chilean MET distance assessment preparedness.

Internal	
Strengths	Weaknesses

<ol style="list-style-type: none"> 1. Chile is a party to the STCW and part of the White list. 2. Clear boundaries and responsibilities for the creation of a policy. 3. Firm QSS policy for minimising the existence of poor METI's. 4. The administration is a facilitator and adaptable to changes, according to stakeholders' requirements. 5. Fluid communication between the MET administration and involved stakeholders. 6. CIMAR in its functions as an METI is a feasible model to other institutions that the national administration complies with the requirements. 	<ol style="list-style-type: none"> 1. Lack of relationship with other governmental agencies for distance assessment purposes, including the Ministry of Education, for using its IT infrastructure and Communications office to assure access to the internet for isolated locations. 2. Own infrastructure is not optimal for distance assessment control. 3. Centralisation, making it difficult access to it. 4. Fully developed just for knowledge-based assessments, competence-based assessments are not fully developed. 5. Distance assessments hidden curriculum.
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External	
Opportunities	Threats
<ol style="list-style-type: none"> 1. MET administration acts as a facilitator for the accomplishment of the assessments schedule, and is open to allow more examinations. 	<ol style="list-style-type: none"> 1. Increase of below standard METI's that may lead to informal and below traditional seafarer graduates. 2. If not well prepared, could face fraudulent practices.

<p>2. Possibility of developing new technologies for distance assessment, such as VR, by the use of HMD.</p> <p>3. Due to pandemic, the government will be interested in e-learning activities development.</p> <p>4. Business for course designers due to METI's investment in e-learning.</p> <p>5. High increase in job opportunities related to access to Maritime Education (not only seafarers).</p> <p>6. CIMAR is developing its own LMS to deliver courses and ensure fluent communication with stakeholders.</p>	<p>3. Not suitable for skill-based competencies.</p> <p>4. Those METIs that are not capable of developing distance assessments, would be at a disadvantage to those who are, leading to possible shut down of METI's.</p>
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5.5 PESTLE analysis for distance assessment impacts

After analysing how the Chilean MET administration is prepared for its future challenges for Distance assessment implementation, the aim of this PESTLE analysis is to interpret in which way the threats and opportunities, that were previously presented, may affect distance assessment implementation for the Chilean MET.

Therefore, the identified Opportunities and Threats, as the external factors that will affect the Chilean MET's awareness of distance assessment, will be described through this management tool before the new policy proposal.

Table 7. *PESTLE analysis for external factors in distance assessment.*

Aspect	Issues
Political	<p>It can be forecasted that the political will is going to support this idea in relation to facilitating accessibility to seafarers licences for students from isolated places. This issue might be a solution to lack of jobs opportunities, especially for students that are not familiar with the profession.</p> <p>On the other hand, despite several inconveniences that Chile might be facing, the global trade has had a slight increase throughout the years and it is predictable that this trend will continue because the shipping industry handles most of the goods that are mobilised in the state.</p> <p>Due to the Covid-19 pandemic, educational government policies have facilitated e-learning as a primary tool. In this sense, maritime education, with all its exigencies will have to apply assessments in this method, in order not to affect seafarers progression.</p>
Economical	<p>Due to the lack of labour, distance assessment can be an economic opportunity for different reasons:</p> <ol style="list-style-type: none"> 1) For the opportunities to access formal education and lead to social mobility, in the seafarers' profession. 2) Software developers that might be suffering because of the pandemic or losing their jobs, can observe this as an opportunity.

	<p>3) Some METIs can be benefited if they implement this solution, giving access to their content and probably will hire more IT specialists.</p>
Social	<p>To be trend adaptable, and concerning lifestyles, everything that deals with technology is a new opportunity for improvement and will bring more seafarer candidates due to the access it facilitates.</p> <p>On the other hand, in relation to cultural issues, if distance assessment in MET become widespread, it is predictable that less well-developed schools will try to get into the maritime industry, just to obtaining profits and probably some governmental benefits.</p>
Technological	<p>Development of new technologies such as the HMD for achieving VR, MR and AR, can be a new challenge for the state. It can also can be predicted that software designers could consider this as a new opportunity for success.</p> <p>On the other hand, it can be forecasted that some instructors might need some IT skills courses, not to get lost during the delivery of e-learning classes and for designing distance assessments because those must be aligned with the learning outcomes and achieve the STCW requirements.</p>
Legal	<p>Before fully implementation and authorisation, the National MET administration should have a policy that answers the following questions: when, how, where, by whom and by which circumstances will distance assessment be authorised. This issue is going to allow Chile to have distance assessments for seafarers.</p>

	In this sense, all the interested stakeholders must have some input to give an in-depth analysis of this case, and under the boundaries of a national framework, could obtain their certifications.
Environmental	<p>For this study, environmental concerns were not considered. However, distance assessment would minimise unnecessary travel for assessment purposes, in those that are not competency-based.</p> <p>Furthermore, changing the exams from papers to online or offline tests, and data collection stored in cloud-based platforms or another software's, is another method of minimising impacts to the environment. Distance assessment is, therefore, a cost-efficient method related with sustainability.</p>

Finally, after analysing the internal Chilean MET's awareness of distance assessment implementation in a SWOT analysis, and considering its threats and opportunities, a PESTLE analysis was presented. There are several issues that need to be addressed before the implementation of any policy based on the findings that these tools provided. These elements will be discussed in the next chapter.

Consequently, the issue that is essential to understand in an MET context, and will be the main issue to highlight, is the fact that distance assessment is suitable for just some aspects, mostly the ones directly related to the knowledge-based domain.

Chapter 6 Discussion and Conclusions

6.1 Introduction

This chapter aims to evaluate the main findings and the analysis presented previously, to have a better understanding of these components. Moreover, this discussion will lead towards the determination of the factors to consider before the implementation of a national standardisation for MET distance assessment.

In this sense, for a comprehensive understanding of the above-mentioned statement, this discussion chapter will be structured by the research questions, as follows:

1. How is the Chilean MET administration process for seafarer's career certification?
2. What are the current gaps in the current Chilean MET assessment system?
3. Can distance Assessment for Chilean seafarers be an effective tool for MET progression activities?
4. How can distance MET assessment be standardised in a national organisation?

Finally, the primary purpose of this chapter is to obtain essential considerations that the Chilean MET administration needs to achieve before the development of a new policy for distance assessment standardisation.

6.2 Chilean MET Assessment process for seafarers certification

The National MET complete process for assessing seafarers has its boundaries regulated by the Chilean framework and under the STCW provisions to accomplish the expected standards. This is recognized as a clear organisation for all Chilean seafarers.

However, its problems are related to the centralisation of it where every candidate that is expecting to have a progression on their career must be assessed in CIMAR's facilities, which are not always is accessible for everyone.

For this purpose, distance assessment is a tool that could help to mitigate this issue, and if well prepared, could open access to more people, leading to an increase in the amount of seafarer's candidates that can contribute to the National maritime industry.

In this sense, knowledge-based assessments are currently being used by different national stakeholders and CIMAR is addressing this issue adequately. However, skill-based assessments are still in a development phase and with that, several possibilities will emerge as new distance assessment tools that would help demonstrate competencies by seafarers.

The existing gap still remains on how to assess skill-based competencies, element vital through seafarers career progression. However, as Figure 9 shows, different tools are in the pipeline, that can effectively minimise the distance gap that affects the Chilean MET process.

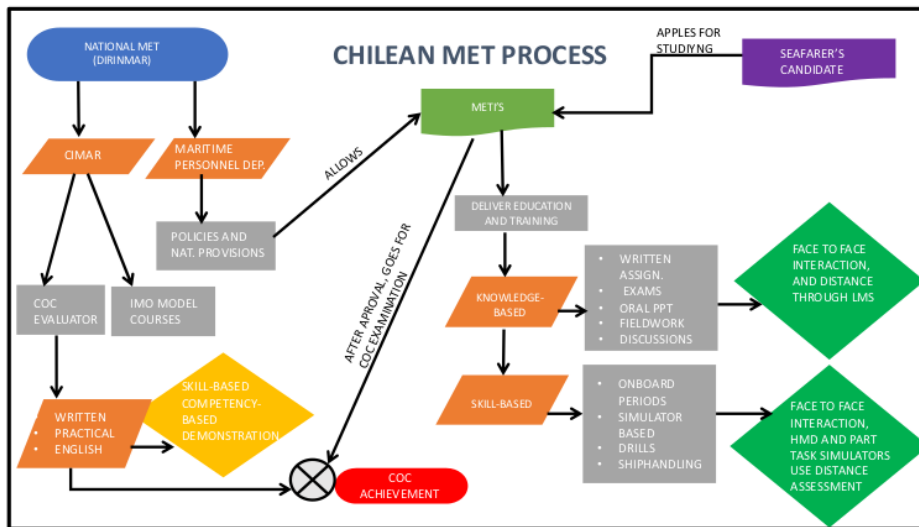


Figure 9. National MET Certification process, with new distance assessment tools.

6.3 Role of the Chilean MET administration in Distance Assessment

Firstly, to understand the role of Chilean MET in distance assessment, the national framework for MET purposes, which is derived from the international framework, was analysed in-depth. Consequently, it was discovered that DIRECTEMAR covers the total control of all related activities. However, for specific issues mainly directly related to general educational purposes, it needs to be aligned with the Ministry of Education.

DIRECTEMAR, throughout its Maritime Personnel Department and CIMAR, has direct accountability for every process of the certification and training of seafarers. Due to this, it is directly responsible for policy-making decisions to allow distance assessments as a cost opportunity, when face to face assessment is not possible. This is especially relevant in a state like Chile were aside from the global pandemic that has affected every country, distance issues are always a concern for a centralised organisation.

Nevertheless, to make correct decisions on this topic, it is essential that all the involved stakeholders directly participate, and every aspect related to cultural issues mentioned in Organisational Learning should be addressed.

The MET administration has shown that it is flexible and prone to facing new challenges in a proactive way. This issue would facilitate the distance assessment development involving different stakeholders, integrating the needs and expectations of each one. However, the best possible practicable evaluation process is the primary goal, and the achievement of this must be based on the seafarers quality, and that cannot be forgotten.

6.4 Effectiveness of distance assessment for all MET activities

As was analysed with practical examples, distance assessment can provide new assessment possibilities for the administration. Nevertheless, it is currently only available for knowledge-based evaluation in the Chilean organisation.

Taking this into account, it will be necessary to identify the real existing possibilities to address this issue, and allow its use for existing distance assessment methods that can minimise the current gap in the seafarer's evaluation process.

On the other hand, it can be forecasted that new technologies will arise soon, and HMD would offer several possibilities that are in the development phase. Therefore, a skill-based assessment would be a real option in the next few years.

Finally, the main task for the MET administration for these purposes might be to set the limits on this. For that reason, before the authorisation of the use of these new technologies, they should be tested and analysed in terms of their suitability for particular COC's. As an example, could the management level be assessed with HMD?.

A clear question would be, for example, whether VR will have the same qualities as a simulator or onboard practical assessments. That issue may be covered in a further study, with quantitative research, after some time when HMD would be entirely in use.

6.5 Issues to consider for distance assessment standardisation

The previously stated can only be legalised in a written national policy to strengthen boundaries and set the limits, to not see distance assessments as a new commodity, only as a cost opportunity when face to face interaction is not possible.

Moreover, knowledge and skill-based assessments are currently facing a lack of standardisation. This issue, if not well covered in a policy, could lead to have significant impacts on national seafarers' career progression, and if not written, METI's could assume a non-established authorisation, and realise their assessments without any boundaries and IT minimum requirements, for seafarers certification.

A policy should be written to standardise the current knowledge-based assessments. When fully developed skill-based assessments, the technical IT requirements must be precise. They should address the best practical and possible standards to assure that those assessments will accomplish the expected international requirements.

Consequently, having a written policy will avoid ambiguities, and a QSS would have a significant role in these purposes, to avoid fraudulent practices and other problems that may appear.

In light of the above, Appendix 1 of this study, presents a proposal to be submitted to the HTW subcommittee, to address these critical considerations.

6.6 Conclusions

Firstly, to have a comprehensive understanding of the role of Chilean MET in distance assessment, the main evaluation concepts and characteristics were explained with the purpose of identifying why the distance assessment process needs to be analysed.

Secondly, to identify the boundaries between the MET administration and distance assessment, the existing international framework was researched in detail.

Furthermore, an evaluation of distance assessment was realised, and it was explained why it could be useful for seafarers' career progression. Moreover, some suitable MET distance training tools were analysed and presented in the LMS context, including ones that are currently in use by different METI's and that could be more useful for assessment purposes.

Lastly, key elements were reviewed for national policy development, some of them related to OL and QSS, which will differentiate between states how this framework should be addressed.

To conclude, there is no doubt that distance assessments can provide new possibilities for seafarers' career progression achievement. Also in given circumstances when face to face interaction is not possible, such as the situation that has arisen during the COVID pandemic. For the Chilean jurisdiction distance assessments could lead towards allowing more access to the seafaring career, because it will give more opportunities to interested people that live on isolated locations. Nevertheless, several issues need to be solved before the establishment of a national policy for the implementation of such assessments.

These issues include, setting the minimum IT requirements for its use, specifying boundaries for the responsibility levels, involving the participation of all stakeholders in its implementation, ensuring a transparent QSS system and assuring the best possible practical assessment in alignment with learning outcomes.

6.7 Limitations

A significant limitation was the fact that this analysis was applied to just one jurisdiction, and probably to have a broader understanding of the gap, more states will need to be studied to bring more insight to the analysis.

6.8 Recommendations and further investigations

When HMD is fully developed, a quantitative study on the proficiency of the new graduates after some time onboard could be realised to analyse how well were the ILOs were attained. In this sense, this study would determine if HMD technologies, will have the same level of reality perception as a simulators or onboard practical assessment.

Moreover, a QSS that would play an essential role in assuring the efficiency and effectiveness of distance assessment could be covered in future research, considering control measures and several important provisions to address.

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Appendices

Appendix 1: HTW distance assessment proposal



E

WMU-HTW COMMITTEE
xx session
Agenda item xx

WMU-HTW/2
22 SEP 2020
Original: ENGLISH

DISTANCE ASSESSMENT FOR SEAFARERS CERTIFICATION
Proposal for amendments to STCW 1978, as amended to discuss
Submitted by The Republic of Chile

SUMMARY

Executive Summary: This document provides information and conclusions concerning the importance on establish a standardization on Distance assessment procedures and for the national administrations, METI's and E-Learning maritime course designers.. It originates from concerns in relation to this year's Global Pandemic and could be considered as an appropriate tool for minimizing gaps for states which have difficulties on accomplish with its annual schedule for assessments. It further recommends that the Organization, via the WMU-HTW sub Committee take appropriate action to consider the amendment of STCW Convention 1978 as amended to incorporate more recommendations and guidance to Code B I/6.

Strategic direction: X.X
High-level action: X.X.X
Planned output: X.X.X.X
Action to be taken: Paragraph 10, 11
Related document: STCW as amended Code B I/6 Distance training and assessment

Background/Introduction

1. The minimum standards of training, certification, and watchkeeping for seafarers at different levels are set in the STCW convention. Due to contemporary pandemic issues that currently

are affecting the global community, the human element on safety for certification and careers progression purposes, the training standards need revision.

2. There is an increasing awareness in the industry, especially in the seafarers and METI's due to the difficulties related to the Covid-19 pandemic to that would led to not have face to face interaction affecting the assessment of seafarers for their career progression and other issues that would affect their personal development.
3. National MET administrations should consider this issue as priority and establish work groups to standardise these academic tools according to the reality of each state. Moreover, different stakeholders related to seafarers career progression should be aware of this issue and present their inquiries to the authority.
4. Furthermore, boundaries should be determined for skill and knowledge-based assessment in a constructive alignment with the expected learning outcomes to achieve. In this sense, each party should set the standards for these evaluations, and determine which tools to authorise for address this fundamental part of the seafarers career certification process.
5. Revision of the training requirements in the STCW Code B I/6, should be considered for further details to the parties.

Action requested by the Committee.

The Committee is invited to organise a workgroup considering the main factors to consider in order to provide guidance on distance assessment for seafarers

Appendix 2: Consent form



Interview Consent Form

Dear Participant,

Thank you for agreeing to participate in this research survey, which is carried out in connection with a Dissertation which will be written by the interviewer, in partial fulfilment of the requirements for the degree of Master of Science in Maritime Affairs, specialisation in Maritime Education and Training (MET), at the World Maritime University in Malmo, Sweden.

The topic of the Dissertation is "An empirical analysis for Distance Assessment in the Chilean MET Administration."

The information provided by you in this interview will be used for research purposes, and the results will form part of a dissertation, which will be published online and made available to the public. Your personal information will not be published. You may withdraw from the research at any time, and your data will be immediately deleted.

Anonymised research data will be archived on a secure virtual drive linked to a World Maritime University e-mail address. All the data will be deleted as soon as the degree is awarded.

Your participation in the interview is highly appreciated.

Student's name: -
Specialisation: Maritime Education and Training (MET)
E-mail address: w1903464@wmu.se

I consent to my personal data, as outlined above, which is used for this study. I understand that all personal data relating to participants is held and processed in the strictest confidence, and will be deleted at the end of the researcher's enrolment.

Name:

Signature:

Date:

Appendix 3: Research ethics protocol



WMU Research Ethics Committee Protocol

Name of principal researcher:	-
Name(s) of any co-researcher(s):	-
If applicable, for which degree is each researcher registered?	Master of Science in Maritime Affairs, specialisation in Maritime Education and Training (MET)
Name of supervisor, if any:	Dr. Johan Bolmsten, PhD
Title of project:	An empirical analysis for Distance Assessment in the Chilean MET Administration.
Is the research funded externally?	-
If so, by which agency?	-
Where will the research be carried out?	<ol style="list-style-type: none"> 1. Maritime Instruction Centre (CIMAR), Valparaíso - Chile. 2. The simulator manufacturer, Kongsberg - Norway. 3. Videotel Marine International, London - UK. 4. Potential location: Other MET E-Learning Services Provider
How will the participants be recruited?	Online video call interview
How many participants will take part?	Approximately less than ten
Will they be paid?	No
If so, please supply details:	-

How will the research data be collected (by interview, by questionnaires, etc.)?	The researcher will use semi-structured interviews using flexible questions.
How will the research data be stored?	Recorded interview data will be saved in an external hard drive and stored in a locked cabinet.
How and when will the research data be disposed of?	The data will be deleted from my laptop upon completion of my MSc studies, degree scheduled to be awarded on 1-Nov-2020
Is a risk assessment necessary? If so, please attach	-

Signature(s) of Researcher(s):

Date: 24-July-2020

Signature of Supervisor:

Date: 24-July-2020

Appendix 4: Semi-structured interview questions MET organisation



Information Sheet for CIMAR

Dear Participant,

Thank you for agreeing to participate in this research survey, which is carried out in connection with a dissertation which will be written by the interviewer, in partial fulfilment of the requirements for the degree of Master of Science in Maritime Affairs, specialisation in Maritime Education and Training (MET at the World Maritime University in Malmo, Sweden.

The dissertation topic is "An empirical analysis for Distance Assessment in the Chilean MET Administration."

The research objectives are focusing on the following goals;

- Describe the Chilean MET Role for distance Assessment.
- Demonstrate the effectiveness of MET distance assessments.
- Analyse the Possible distance platforms that could be useful for standardisation in the Chilean MET system.
- Propose to the Chilean MET suitable distance platforms that would be useful for their tasks.

This research aims to provide a proposal for distance assessment that could be used for the Chilean MET Administration to evaluate seafarers for their different requirements, COC evaluation, and model courses.

Generally, these exploratory research interview questions are;

- Does your MET administration's policy needs to have any modification?
- Do you have any inconveniences for seafarer's assessment annual schedule?
- Currently, how is your organisation mitigating schedule issues in order to not affect seafarers career?
- Do you think that having a policy in distance assessment your national MET will minimise the mentioned gap?
- Based on Provisions given by STCW Code B I/6, do you think that the MET administration should have a standardisation for distance learning?
- Do you have any suggestions or recommendations for the tools that could help to minimise effects produced by distance issues?

Appendix 5: Semi-structured interview questions MET courses providers



Information Sheet

Dear Participant,

Thank you for agreeing to participate in this research survey, which is carried out in connection with a dissertation which will be written by the interviewer, in partial fulfilment of the requirements for the degree of Master of Science in Maritime Affairs, specialisation in Maritime Education and Training (MET at the World Maritime University in Malmo, Sweden.

The dissertation topic is "An empirical analysis for Distance Assessment in the Chilean MET Administration."

The research objectives are focusing on the following goals;

- Describe the Chilean MET Role for distance Assessment.
- Demonstrate the effectiveness of MET distance assessments.
- Analyse the Possible distance platforms that could be useful for standardisation in the Chilean MET system.
- Propose to the Chilean MET suitable distance platforms that would be useful for their tasks.

This research aims to provide a proposal for distance assessment that could be used for the Chilean MET Administration to evaluate seafarers for their different requirements, COC evaluation, and model courses.

Generally, these exploratory research interview questions are;

- Which are the distance training and assessment tools that are you using?
- Which tools are the most suitable for distance assessment, that could be included in any MET Administration policy?
- Based on Provisions given by STCW Code B I/6, do you think that the Chilean MET administration should have a standardisation for distance learning?
- What are your main problems on the delivery of these services?
- How do you obtain feedback on your services?
- How can be the inconveniences minimised?
- What are your suggestions and recommendations for the proposal?

Your participation in the interview is highly appreciated.