Towards the Creation of a Formal, Auditable Standard for the Delivery of Distance Learning and E-Learning Programs for Mariners

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As a follow up to the paper presented in the IAMU AGA14 entitled *'Setting the Standard' – A Proposed Standard for Delivery of Online Courses"*, this paper describes the efforts of the authors at the Marine Institute in collaboration with the maritime certifying authority, Transport Canada to prepare a formal standard for the delivery of online courses for the progression of mariners in their certification. While developed in Canada, the technologies and delivery strategies involved are global. Thus the model for creating such a standard has international application.

Several tasks were undertaken in an effort to further refine the conceptualized standard elements presented in the AGA 14 paper. These include:

➢ Consultation with the maritime certifying authority. Transport Canada
➢ Interviews with relevant technical experts; and
➢ A review of several existing guidelines for the delivery of online courses

The guidelines reviewed focused heavily on course delivery pedagogy and failed to emphasise the technical elements we were interested in addressing in an auditable standard. An emphasis on technology is critical due to the nature of the course participants and the unique conditions under which they will participate in these courses.

This paper presents the findings of these efforts grouped into the following categories

➢ Technology Requirements
➢ Content Delivery Format
➢ Course Development
➢ Learning Management System
➢ Examinations

While this is still a work in progress, a draft standard under consideration by Transport Canada shall be discussed.

Keywords: distance learning; e-learning; audit; standards; Manila amendment; maritime education and training; MET; maritime training institutions; maritime universities

1. Introduction

Courses that are prepared and delivered by maritime training institutions to seafarers which facilitate their progression through levels of national certification are very well regulated. The STCW code gives sufficient guidance to national certifying authorities to have them develop their own certification procedures and standards which are territorially customized to permit flag states to regulate and audit maritime training institutions within their jurisdiction.

The creation of a standard at the international level is a delicate thing. It must balance the implementation of sufficient regulatory detail with an appropriate amount of generality permitting flag state regulatory authorities the opportunity to author national codes and standards that work within the context of the flag states' unique cultural, legal, technological and demographic environment.

Flag states have developed a level of familiarity and comfort with the STCW Code as it applies to the traditional delivery (or classroom delivery) of Maritime Education and Training (MET). National codes and standards for the delivery of MET are in place and systems on both regulatory and training institution 'sides' are well developed and adopted. On the national regulatory side, STCW compliant codes and standards have a long history of successful implementation. On the maritime training

institution side programs and courses both have historically been audited and found or made compliant with the national codes and standards via audits by the national regulating authority against their STCW standard.

With these existing standards in place, the authors have adopted a philosophy for the development of this standard which focuses on the delivery methods and technological tools that would permit distance/e-learning to occur and be effective. Fundamental to this is the philosophy that any standard created must be comprehensive, concise and auditable. The authors feel that the above would permit certifying authorities to have confidence in distance/e-learning as the delivery mechanism for MET as well as the certification of mariners trained through this mechanism.

A challenge for maritime national regulatory authorities has arisen with the release of the Manila Amendment to the STCW code in that regulatory authorities are recommended to permit training of seafarers for advancement in certification by distance learning and e-learning. At the same time there is no standard for implementation of these learning technologies and methods.

This paper describes the collaborative efforts of the authors with members of the Canadian maritime regulatory authority, Transport Canada (TC), to develop an auditable standard which they can use to certify Canadian maritime training institutions to deliver MET courses by distance learning and e-learning.

2. The Narrative of the Standard

2.1 First Draft

In a 2011 press release by IMO [1] it was stated that the 2010 Manila Amendments to STCW were created to enhance the STCW code to "ensure that the necessary global standards will be in place to train and certify seafarers to operate technologically-advanced ships for some time to come". One of the key elements outlined in this press briefing was the introduction of distance and web-based learning as methods of delivery for certification advancement.

Section B-I/6 of the STCW Code [2], as amended states that regulating authorities may allow the training of seafarers by distance learning and e-learning so long as it conforms to the original pedagogical standards outlined in the STCW 95 standard as well as a set of six guidelines. The guidelines state that each party (regulating authority and maritime training institution) should ensure that any distance learning and e-learning programme:

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 programme operates;

4. Provides learning outcomes that meet all the requirements to provide 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

6. Provides professional tutorial support through telephone, facsimile or e-mail communications.

The necessity of a standard is implied by bullet one above. Approval of a maritime training institution to deliver a program by virtue of distance learning or e-learning methods requires some basis for evaluation. The means of evolution currently employed to evaluate maritime training institutions and certify them to deliver MET using traditional means is by audit.

The introduction of this facility into the IMO guidelines for MET resulted in some preliminary discussions at the Marine Institute (MI) surrounding the implementation of future MET programmes. The MET programmes at the MI are audited and certified by the Canadian maritime regulating authority, Transport Canada (TC). Audits of our programs and evaluations are regularly conducted by TC against a standard they have authored and regularly amend to be compliant with STCW regulations, ensuring that MI's MET programmes are STCW compliant.

The authors have a combined cumulative experience with distance and e-learning programmes that spans over 30 years. In the last four years the authors have been deeply involved with the development of technologies and methods to enhance distance and e-learning methods. One of the challenges the authors envisioned in the creation of future STCW compliant MET programmes was the development of a standard which TC could use to regulate the delivery of MET programmes at certified training institutions.

In their paper entitled 'Distance Teaching Standard' presented at the IAMU AGA14 [3] it was stated that pedagogical standards for the creation and regulation of MET programmes are well established and require only minor modifications to result in STCW compliance facilitating distance learning and e-learning. The significant challenge in the authoring of a standard for the creation and regulation of such programmes is the technological requirement and describing how distance learning and e-learning technologies are to be used. In their 2013 paper the authors describe 5 broad categories which can be used as the beginning of an STCW compliant national distance learning and e-learning standard. These categories include:

1. Delivery Infrastructure;

2. Receiving Technology;

3. Content Format;

4. Learner Management System (LMS); and

5. Instructor Standards

In anticipation of TC creating and implementing a distance learning and e-learning standard as well as the interest at the MI for creating and using standards in adherence to our quality system, the authors endeavoured to draft a standard for the delivery of distance learning and e-learning programmes that would be completely STCW compliant and conform to the categories of concern listed above.

2.2 Transport Canada Consultation

Senior Inspectors of Marine Safety from Transport Canada visited the MI to conduct a regularly scheduled audit of one of our traditional delivery MET programmes in December of 2013. During their multi-day visit the authors had an opportunity to meet with the TC representatives and discuss the 2010 Manila Amendment as it pertains to distance learning and e-learning and how this would influence development of such programmes within our institution.

An interesting finding from this discussion was that the TC representatives we were meeting with had already been asked to begin work on authoring a standard to facilitate implementation of distance

learning and e-learning delivery of maritime certification programmes. To be specific, this standard was focusing on the technology and not the pedagogy of MET delivery. This task was considered a challenge as it was a deviation from their fields of expertise. Consequently, they were pleased to discover a possible source of information they could review in the creation of such a standard.

The authors presented the preliminary draft standard based on MI distance learning procedures. This draft was created to be one that encompassed the spectrum of categories presented in section 2.1 while being as open and non-excluding as possible. The result was a very loose standard containing many general descriptors in its categories that would have been quite easy to satisfy and comply with.

TC took this standard and considered it carefully. They provided feedback on our work with the intention that we might develop our standard into a document that they might work with and evolve into a national standard for Canada.

TC's initial feedback on our standard indicated that they felt the standard should be a balance between being rigorous and attainable while also being auditable. The standard must be rigorous in that it would be used to ensure that MET programmes are delivered using a high quality of delivery using a means that ensures confidence and integrity to the learners and the certifying authority. The standard must be attainable in that established maritime training institutions should have the capability of meeting this standard and attaining certification to delivery distance learning and e-learning programmes.

The standard must also be auditable in that it has to be able to be structured in a checklist format with unambiguous headings. TC also wished to see more technical detail and specifications. This would empower a regulating authority to audit potential maritime training institutions and certify them as deliverers of distance learning and e-learning maritime programmes without the auditors requiring in-depth technical knowledge of computer and software systems or distance/e-learning educational methods.

2.3 Consultations with Technical Experts

Response to this feedback entailed a multi-faceted approach. At the Marine Institute which is a part of Memorial University of Newfoundland, The authors have been successfully creating and offering online courses in a variety of programs up to and including the graduate student level. It was the author's intention to obtain a snapshot of our existing hardware, software and procedures and use this specific snapshot to create a template which would form the standard.

The authors are faculty who have been leading the way at MI and MUN with regards to course content and evaluation software packages as well as the development of course implementation and delivery methods [4]. How these software packages are used was taken into consideration, but further consultation had to occur with computer systems managers and technical support at the MI to determine information such as technical support procedures and schedules dealing with learner issues, software update and maintenance scheduling policies as well as data backup and security policies.

The Learner Management System (LMS) is the online software environment in which our distance learning and e-learning programmes reside. The particular LMS in use at MUN is one called Desire To Learn (D2L) and is maintained by the umbrella group within MUN responsible for university-wide applications and computer systems called Distance Education, Learning and Teaching Support (DELTS). DELTS is a much larger organization within MUN and is responsible for MUN's LMS as well as other systems that cross the borders of individual faculties, as well as providing technical support for these systems.

An interview/meeting was conducted with DELTS which was similar in format to the one conducted with technical support at the MI. In this meeting, information on relevant hardware, software,

networks, technical support, maintenance and data security relevant to the authoring of our draft standard was obtained.

2.4 A Review of Existing Standards for Distance Learning/E-Learning Course Delivery

The standards already in place with TC as well as the various certified maritime training institutions deal primarily with course content and pedagogy. These standards, originally crafted by TC to comply with STCW guidelines, have evolved over time and the certifying authority has developed a degree of confidence and understanding of their standards, well-equipping TC to administer the standard to the maritime training institutions. Conversely, the maritime training institutions to which these standards have historically been applied have evolved the content and documentation for their MET programmes to satisfy the evolving content of the TC standard.

While the content was in place, what was lacking were the elements necessary to regulate an institution's ability to deliver programmes using distance learning or e-learning methods. The focus of the review of existing standards is to identify the specific elements as well as the structure of appropriate standards that could be used to regulate the delivery of distance learning and e-learning maritime certification programmes using the categories identified in section 2.1 as an initial guideline,

A review of numerous existing standards for the development and delivery of distance learning and e-learning programmes including the Campus Alberta Quality Council, "Additional Quality Assessment Standards for Programs Delivered in Blended, Distributed or Distance Modes", [5], Southeastern Louisiana University Standards for Quality Distance Education, "Distance Education: Policy" [6] and the International Test Commission's International Guidelines on Computer-Based and Internet Delivered Testing [7] has shown that many provide very ambiguous descriptions of the various standard elements. These are most often focused on the pedagogy of distance learning/e-learning programmes as opposed to technological capability or specific delivery methods and tools as is the case with the Accrediting Commission for community and Junior Colleges 'Guide to Evaluating Distance Education and Correspondence Education' [8].

Another great portion of the available standards focuses on very specific, non-technical and non-infrastructure elements of the training institutions ability to deliver distance learning/e-learning courses. As an example of this, the Campus Alberta Quality Council [6] states under their *Technical Support* criteria that:

> *Academic staff are provided with an orientation to, and sufficient ongoing training/technical support for any hardware and software resources required in the program, and are also updated in a timely manner about any impending or actual changes that could affect their access to or involvement in their online programs.*

The authors are not in disagreement with this as an element in an academic delivery standard, but this is a description of a criteria that deals with one small part of the communication of technical support details to the academic staff and does not describe any details of the type, format or availability of technical support.

Of the standards reviewed only one partially aligned with the philosophy of the standards document we are creating. This one is the Ministry of Training, Colleges and Universities Policy Directive #9 [9]. This standard is designed specifically for private career colleges whose primary mode of programme delivery is distance education. It contains a standard in tabular format, assisting in making it auditable and able to be used for self-evaluation and containing some level of technical and teaching method detail modestly overlapping the suite of categories presented in section 2.1.

In general, it was concluded that no single standard encompassed the philosophy or scope of the standard that the authors are crafting. Some standards did give enriching ideas that can or have been included in the draft standard in its current state. The challenge remains to 'strike the balance' in creating a standard to be employed to regulate the technology, infrastructure and methods employed in the delivery distance learning and e-learning maritime certification programs, and have a standard that can easily be blended with existing content and pedagogical standards.

2.5 Standard – Latest Version

Following additional consultations with TC and the review of the original draft document by TC approved external reviewers, the categories of the standard have been expanded to include:

1. Instructor Evaluation and Approval;
2. Delivery Infrastructure;
3. Delivery Format;
4. Receiving Technology;
5. Content Delivery Format;
6. Standard Course Information (Presented in LMS);
7. Course Development;
8. Learning Management System (LMS); and
9. Examinations

The standard document consists of a narrative detailing each of the above categories in the appropriate government paragraph format. As an example, a portion of the narrative describing the standard on delivery infrastructure is:

X.X   Delivery Infrastructure

(1)   At the core of most distance delivery systems is some form of electronic communications and in almost all cases this communication system is the internet. This is expected to remain as the primary method of delivery of distance education for the foreseeable future. However based on historic performance it is anticipated that the ability to transmit and receive data communications will improve.

(2)   Consequently, any distance delivery of course material should take advantage of existing communication infrastructure. At the minimum this infrastructure shall consist of internet connectivity and telephone access.

(3)   The connectivity of the institution delivering the course material must be sufficient to ensure unrestricted access to material. In this case unrestricted is taken to mean at least 1 Mbps (1 mega bit per second).

In an effort to provide clarity for the exercise of auditing as well as guidance to maritime training institutions in their efforts to be certified in accordance with this standard, a tabular checklist of all content items in the narrative portion of the standards document is also provided as:

Delivery Infrastructure	
Able to host the course on dedicated web servers	✔
Able to provide telephone access to course providers	✔
Able to provide at least 1 Mbps connectivity to course materials	✔

This is a sample from the latest draft standards document and is presented to give an idea of the intended format of the final standard.

standards, but in the case of distance learning and e-learning standards, there will be an challenge in that effort and time will always be required to match the teaching and learning standard the technology of the day.

Technology will continue to evolve and change at an ever increasing rate, and if standards related to it are not judiciously and rigorously maintained then standards effective and state of the art today can quickly and quietly become outdated and irrelevant.

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Flexible 'On Country' Training for Indigenous Seafarers

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This paper presents the concept, challenges and results of Certificate II Coxswain and Certificate II Marine Engine Driver (MED3) training that was tailored for a specific cohort of indigenous candidates within a unique set of training parameters. The challenge presented to the Vocational Education and Training (VET) area of the Australian Maritime College (AMC) was to integrate with an existing maritime training program in the Torres Strait region of Far North Queensland and then take the program forward with student pathways into higher level vocational maritime qualifications. With relatively short notice, assessments were completely redesigned to minimise written components and to maximise workplace demonstrations of competence, learning material was re-written to be language-neutral, and presentations and diagrams were converted to functioning physical training aids.

The training commenced with a pilot course in November 2013. It was shown that the benefits of this training were that the students remained 'on country' (that is, in their traditional geographic region) and that on board the training vessel they were not just trained and assessed; they lived the lives of Coxswains and Marine Engine Drivers for a full four weeks. The feedback from students on completion of the course was overwhelmingly positive, and there was very high course completion rate. The governing partner agencies, AMSA and the TSRA, were entirely satisfied with the innovative and tailored training that delivered nationally recognised qualification outcomes to each of the participants. The innovative approach to maritime training and the successful results to date have caught the interest of the Great Barrier Reef Marine Park Authority, and a similar approach will be used to tailor maritime training for that authority's indigenous marine rangers in remote communities on Cape York. AMC's flexibility and innovation has also set the precedent for this style of delivery across all remote indigenous areas of northern Australia.

1. Introduction

Despite the technology and techniques available to the 21st century educator, the style of classroom delivery aimed at well-educated students doesn't work for every cohort. Indigenous Australians, some with low Language-Literacy-Numeracy (LLN) levels, and with English as a second or third language, are even more challenged by the traditional educational model which includes theory lectures and written assessment instruments. VET is specifically designed for delivering practical hands-on skills for direct transfer to a particular vocation, and this method lends itself to a more flexible delivery of training and assessment by practical demonstration.

This paper presents the concept, challenges and results of Certificate II courses (Coxswain Grade 1 Near Coastal, and Marine Engine Driver Grade 3 Near Coastal (MED3)) delivered to students in the Torres Strait region of Far North Queensland. The training was tailored for a specific cohort of indigenous candidates within a unique set of training parameters. With a very short lead time, staff from the Australian Maritime College's (AMC's) VET area developed and delivered an innovative program of training and assessment, based on the existing programs, which produced highly satisfactory outcomes for the funding organisation and the individual students.

2. Background

2.1 Torres Strait Islanders and their Communities
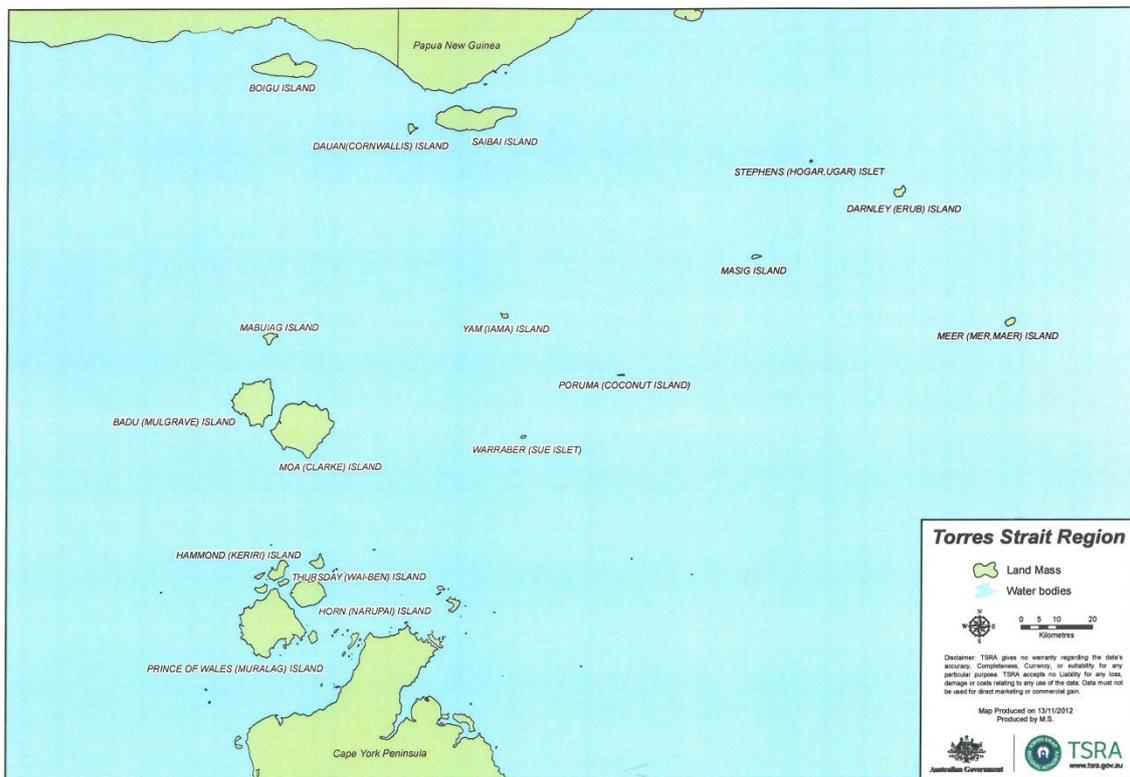

Figure 1 Map of the Torres Strait region [1]

As seen in Figure 1, the Torres Strait comprises the relatively small sea area that lies between the northern tip of Australia's Cape York, and the southern extremities of Papua New Guinea and adjoining part of Indonesia. The Torres Strait Islander (TSI) people live in twenty distinct communities spread across eighteen island and two Northern Peninsula Area communities, in a geographic area of 48,000 square kilometres. Throughout the TSI communities there are two main languages with a number of sub dialects [2].

Evidence of human settlement has been found in the Torres Strait dating back 2,500 years [3]. Life in the TSI communities has by necessity involved close interaction with the maritime environment. The TSI people have travelled on the sea and harvested marine resources throughout their history, and as a result they have very strong and highly robust traditional seafaring skills.

2.2 Government Funding for Greater Maritime Safety

For several years an Australian Commonwealth and Queensland State government initiative has been in place with the aim of increasing the safety and survival of people operating small boats in the Torres Strait. The Torres Strait Marine Safety Program (TSMSP) is a joint initiative of organisations including the Australian Maritime Safety Authority (AMSA), Maritime Safety Queensland (MSQ), the Torres Strait Regional Authority (TSRA), Queensland Police Service and National Maritime Safety Authority Papua New Guinea. The program was put in place to help address the unique geographical challenges facing residents of the Torres Strait, primarily the reliance by many of these people on seaborne transport over long distances across open ocean in small open boats. Through consultation and strong community relationships, the program has delivered increased boating safety education

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3. Future Steps

The authors and other faculty at the Marine Institute currently deliver distance/e-learning courses as part of the degree programs offered at their university as well as preparatory courses for mariners to write challenge examinations at the national certifying authority. Participants in these courses come from all over the world and frequently move across boarders while participating in the course.

Many of the challenges inherent in offering learning opportunities of this nature have been encountered by the authors. Although the demographic from which the courses have been offered as well as the particular national certifying authority have been restricted to Canada, the authors have developed a roadmap for the creation of an international or multi-national standard that could be used by maritime regulating authorities around the world to certify maritime training institutions for the delivery of online/e-learning MET.

In describing the efforts of several Asian universities to develop a quality assurance program for distance education and learning, Jun et. al [10] emphasize the importance of benchmarking one's training institution against others. Benchmarking provides a relative comparison of performance indicators which can be used to develop a realistic set of cross-national standards that may then be used to track and ensure quality of MET training.

To this end a significant first step in the creation of an international standard to be applied to distance and e-learning MET is that of benchmarking a representative set of institutions to determine a realistic and reasonable set of performance indicators. The performance indicators and the benchmark results could then be analysed and considered by an international committee of IAMU who can then structure this set of performance indicators into a quality assurance standard for consideration and submission to external bodies.

4. Conclusion

The unique circumstances surrounding maritime education and training require that great care and consideration be given to not only the course content and pedagogy of maritime certification programmes delivered by distance learning and e-learning, but also to the technologies employed and the methods in which they are employed. The fact remains that if a mariner is to be able to take a course by distance using electronic means, then it should be assumed that they would have reasonable access at any time from almost any location.

The standard as discussed in this paper and presented to Transport Canada members for consideration is detailed and customized for the Canadian cultural, legal, technological and demographic environment. It is a work in progress and one that will be continue to be revised iteratively following consultations with stakeholders as we proceed down this path of this effort.

It is worthy to note that standards of this type are necessary for regulated environments such as the maritime or aviation industry where stakes are high and a high degree of regulation of training is a necessity to ensure the safety and well-being of all persons involved.

Although this is the case, it can also be noted that credit for most programmes delivered at higher learning institutions is exclusively granted by the institution. In the case of MET, at least a portion of the credit is granted by the external certifying authority, resulting in the assumption of a goodly portion of the responsibility for the quality of the programmes and their delivery. With the responsibility shared between the maritime training institution as well as the national certifying authority (in our case, Transport Canada), there will always be a necessity for teaching and learning

across the region, an integrated safety campaign and various boating safety sub-projects [4]. The sub-projects have included the production and distribution of loan 'grab bags' of safety equipment, and the development of training and commercial licencing regulations for the outboard powered dinghies used as everyday transport between communities.

The Torres Strait Marine Pathway Program (TSMPP) has evolved from the TSMSP, and aims to provide islanders with maritime and maritime-related vocational career pathways. These pathways lead into careers through diverse and higher level qualifications, and literal pathways into maritime employment beyond the Torres Strait. Both AMSA and MSQ provide operational support and additional funding to the TSMPP, and AMSA's Thursday Island community liaison officer acts as a project manager for the program.

2.3 AMC's Engagement by the TSMPP

The challenge presented to the VET organisation at AMC was to integrate with the existing maritime training initiatives in the Torres Strait and then take the program forward with student pathways into the next level of vocational qualifications. The criterion set for the training project by AMSA and the TSRA was, in essence, to train and assess fifteen indigenous TSI students using as little language-specific material as practicable whilst underway in a chartered training vessel in the Torres Strait seaway. Whilst this was in many ways a simple continuance of AMC's core business, the specific needs and unique context of the project required renewed perspective on the college's training and assessment methods and resources.

3. Tailoring the Delivery of Training and Assessment

3.1 Culture and Language

Through a range of circumstances, the lead time given to AMC to tailor our Coxswain and MED3 course, and prepare to deliver it was approximately two weeks. This required our staff to rapidly gain an understanding of the TSI culture, research the geography of the proposed training area and obtain specific details of the training vessel.

The TRSA Cultural Protocols Guide [5] was the primary source of information regarding the cultural requirements of teaching TSI students and was used as a reference against which to benchmark AMC's standard course delivery and resources. There were many cultural differences to take into account within the training environment, such as the way in which to initiate discussions and conversation, and the manner in which to conduct a discussion with an individual without raising concerns or offending other group members. Very importantly the trainers needed to appreciate the traditional land and sea rights the students hold over the Torres Strait islands and waters, and the long campaign undertaken to obtain these rights. Whereas navigation or vessel handling training in Tasmania simply takes place in the local river or coastal areas, the Torres Strait is considered to be the 'country' of the TSI people. This required the respect of the academic staff but it also gave much greater meaning and applicability to the skills obtained from the course; the course outcomes relate directly to the lives of the students and how they live and work on their country.

A significant consideration in relation to the training development was that English is the second or third language for many TSI people [6]. The TSRA recommend using basic English and not complicated jargon that may cause confusion [7]. However in a discipline such as navigation the exclusion of jargon could in many ways be considered to be counterproductive. Technical terms and descriptions also form an integral part of the MED3 training material and are important to ensure that

the training and qualifications are transportable. With these challenges in mind the review of training and assessment material was undertaken to eliminate unnecessarily complicated language and jargon, and to ensure as much language neutrality as possible with technical terms and descriptions. During the process there was thought given to providing simple translations within the training material to accompany the English terms, however the range of languages and dialects spoken within the student cohort would render such a process unmanageable.

A support mechanism provided by the TSMPP partners was the employment of an indigenous mentor onboard the training vessel. The mentor was an employee of AMSA and had a level of experience in the subject matter being delivered. This innovative measure proved very effective, from basic translation functions through to providing moral support to students and cultural advice to the academic staff. As the training progressed and students gained the desired knowledge and levels of familiarity, the language difficulties gradually reduced, and the licencing requirement to communicate in English was ensured via the final summative assessments.

3.2 Training and Assessment Materials

In a heavily paper-based society, where legislation, regulations, codes of practice and training packages are available in either printed or electronic form, the natural format for training material and assessment instruments a written format. Notwithstanding the practical elements such as vessel handling, mechanical maintenance, chartwork and simulation, much of the existing Coxswain and MED3 material was printed in learner guides. The assessment of knowledge also tended towards written format. Given the language issues discussed above, such assessments would probably not provide the students with a fair opportunity to demonstrate their competence using their second or third language.

With these considerations in mind, a different style of learner guide was developed for the cohort. Rather than relying on reading a text and committing it to memory, the students were provided work books to complete. The workbooks led the students through the theory but provided simple aids to learning, such as labelling diagrams. The complexity of these tasks increased over the duration of the training and progressed, for example, through the basic steps of simple navigational tasks right through to the planning of a navigational passage through the coral waters of the Torres Strait.

On a very simplistic level, the students were presented with an innovative way to review buoyage symbols and markers on one particular morning. One of the staff went to the effort of sculpting a range of navigation marks and top marks from butter, and arranged these on the counter in preparation for breakfast. Whilst the educational benefits of the exercise may have been marginal, the gesture was taken with great pleasure and aided in increasing the motivation of the group throughout that day.

3.3 Packaging of Qualifications

AMSA's initial request for AMC to deliver the Coxswain training sought to create a pathway from the previous training for commercial dinghy (Traditional Inhabitant Boat) licences to the qualification needed to be master of a vessel up to 12 metres in length. The Coxswain qualification includes the mandated minimum level of engineering skills and knowledge, but is predominantly a deck or navigational qualification. With the release of Australia's new VET Maritime Training package in 2013, AMC's staff saw an efficient way to combine both the training and assessment of the Coxswain qualification with the MED3 course. This was a new approach for AMC, but with minimal impact on either course fees or duration of training this innovative approach has broadened the qualifications and licences of our Torres Strait graduates, and has provided an engineering branch to the seafaring pathways available to them.

4. AMC Staff Set Sail On Country

The training commenced with the four week pilot course in November 2013 (which excluded some course components previously completed by the candidates). AMSA, on behalf of the TSMPP, arranged the charter of a 32m vessel for the duration of the course, and this served as the training platform and the accommodation. The voyage set out from Thursday Island and slowly progressed through the waters of the Torres Strait, passing the islands and communities to which a number of the students belonged. The significance of conducting the training on country became apparent to the trainers very early in the course; the TSI people hold an extremely strong connection to their land and sea country. The students were very much at ease by virtue of being at or near their homes, and the familiarity they had with the waters meant they could tackle their training with an increased foundation of confidence. Clearly these are not advantages that would be realised if the training was conducted even a short distance from the Torres Strait. The negative impacts of isolating indigenous students from their country have been informally observed to some extent in the past when students have travelled from the Torres Strait or Cape York to undertake other courses in Tasmania.

In a determined effort to address some of the language-specific concerns of the course delivery, formative and summative assessments had been changed to a model in which students were immersed in the daily routines on board the vessel. The students spent much of their time putting newly acquired skills into practice in the workplace at sea. They also had the opportunity to do this in small teams alongside the vessel's crew, across subjects such as navigation, deck work and engine room duties. O'Callaghan recognises the benefits of teamwork in reinforcing learning outcomes and providing the opportunity to orally explain concepts [8]. Through this team-orientated approach, the crew, the academic staff, the indigenous mentor, and indeed emerging leaders with the student cohort could all model the behaviours and practices required for shipboard life and course-related duties. Australian indigenous culture typically relies very heavily on the spoken word, so the students responded very well to practical demonstrations of their training and assessment activities. An exemplar watershed moment in one student's training followed a visit to the engineering spaces on board the vessel. After struggling with the theoretical description of the vessel's steering system, the trainer took the student below to trace and examine the physical layout and system operation in situ. This practical approach gave the student a rapid and thorough understanding of the topic, and with a wide smile he exclaimed to his lecturer that, "It all makes sense Bro!"

An interesting comparison was made during the voyage between the modern navigational techniques and practices being taught by the staff, and the traditional navigational skills that had been acquired over time by the students. The visual use of landmarks and natural transits are mainstays of the traditional techniques. As the course progressed through the Torres Strait, various students shared the methods they used to safely navigate from one specific island to another. These resultant routes were plotted on the chart, along with the route determined by modern practice and the use of compasses, radars and GPS. In these instances the students were able to gain a better understanding of the modern techniques and rationale by building on their own experience, rather than learning the concepts without reference to their former practices.

5. Outcomes of the Training Innovation

5.1 Student outcomes

The initial Coxswain/MED3 pilot course demonstrated that the main benefits of this innovative training were that the students remained on country, and that on board the training vessel they were

not just trained and assessed but lived the lives of Coxswains and Marine Engine Drivers for a full four weeks. Despite a small number of minor lapses, the motivation and morale of the students remained very high throughout the course. The student feedback received on completion of the course (both formal and informal feedback) was overwhelmingly positive, and as pseudo observers the training vessel's crew cast a very positive light on the activities and the program that was conducted. Unlike general figures for VET completion rates across all disciplines in Australia, this course enjoyed a very high completion rate of 93%. Perhaps even more satisfying for the students is the licensing outcome whereby all students who completed the Coxswain/MED3 course successfully passed the Regulator's oral examinations and now hold the corresponding commercial licences.

The licensing outcomes yielded immediate results in the local communities. After graduating, two of the students took up positions as masters with the local ferry service linking two of the main islands. Two others have procured their own fishing vessels and have commenced operations within the Torres Strait, with the added economic benefit of having hired their crews from the local population. There are also two students showing great interest, and potential, in the next level of qualification (Master Class 5).

5.2 Client Satisfaction and National Recognition

The governing partner agencies, AMSA and the TSRA, were entirely satisfied with the innovative and tailored training that delivered nationally recognised qualification outcomes to each of the participants. The successful pilot course of study has results in the delivery of three further courses by AMC in the Torres Strait and has paved the way for pathways into higher levels of marine qualifications. Through involvement with these Commonwealth Government agencies, the training has gained national attention and is viewed as a preferred model for training in other coastal indigenous communities in the north of Australia. With the support of the TSMPP partner organisations, AMC was recognised for 'Excellence in Industry Promotion' in the Australian Transport and Logistics Industry Skills Council's 2014 awards for excellence.

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