Globalized Trends in Outcomes-Based Pedagogical Reform and Potential Implications for Maritime Education and Training

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Abstract Over the past decade in the United States and in Europe there has occurred a paradigm shift in educational assessment practices characterized in part by a transition from "input-based" factors such as duration, location, and the pedagogical content underpinning a specific educational qualification toward "outcomes-based" assessment. This is not a new trend, of course, but it is one in a dramatically accelerating stage, and is gaining traction on the highest levels by national and international educational administrators and scholars. In addition to the research which suggests that such an approach improves the overall quality of educational programs, an emphasis on learning outcomes (in Europe via the Bologna Accord and in the US via national accrediting bodies) creates more efficient, competitive, compatible and comparable universities while simultaneously respecting academic autonomy and institutional diversity. This desire to find a balance between efficiency and uniformity on one hand and respect for institutional autonomy on the other can be mapped onto certain issues faced by the IAMU. For the IAMU, too, has sought to address the challenge of developing uniform maritime curricula among its international member institutions, with such ambition often thwarted by a variety of national educational infrastructure matters.
The question, then, is how do these developments in international higher education relate to Maritime Education and Training? How well do STCW requirements lend themselves to an outcomes-based platform? What issues are raised for non-STCW courses and/or degree programs? How might this shift in orientation impact the way STCW requirements are evaluated? As the IAMU has been a resource for curriculum reform issues since its inception, this paper suggests ways that the newer, outcomes-based model of educational practices may bear upon MET in order to see what may be useful to our institutions, what cannot be aligned with our educational methodologies, what may be changed, and even, perhaps, how MET practices themselves can contribute in meaningful ways to these dialogues on globalized educational reform.

Keyword: *MET, learning outcomes, assessment, educational reform*

1. Introduction

The general topic of this essay – global trends in outcomes-based education reform and its relationship to Maritime Education and Training – emanates from the confluence of three distinct objectives. The first objective is a summation and evaluation of MET in the context of international higher education assessment practices. The second objective is an appraisal of the scholarship produced on this topic by the International Association of Maritime Universities in that the published proceedings of ten years of Annual General Assemblies now at our disposal should give rise to the occasion for some critical reflection. The third objective, fundamentally conjoined to the first two, is a review and reassessment of the mission and objectives of IAMU itself, most specifically with the goal deliberately stated in the charter "to develop a comprehensive Maritime Education System for following

generations [and to] develop standardized Undergraduate Curricula and an International Certification System for Competency" [1]. Such a macroscopic project, of course, runs the risk of oversimplification when compacted into a single essay, and thus my remarks will tend toward to the general rather than the specific. Nonetheless, it is hoped that the nature of this analysis – a review of past and current pedagogical methods with an eye to future changes -- may serve as a platform for further analysis and discussion.

2. National and Intranational Educational Systems and the Outcomes-based Model

In the United States, in Europe, Australia and elsewhere, there is a movement which, while certainly not new, has been gaining traction and has swelled to the point where it can now be said to constitute a paradigm shift in educational assessment practices. This movement is characterized by a transition from "input-based" factors of the educational system such as duration of a program, location of instruction, and the pedagogical content underpinning a specific educational qualification toward "outcomes-based" assessment: the measurement of what a student knows and is able to actually do at the end of a learning process. From this perspective, the "principal question asked of the student or the graduate will therefore no longer be 'what did you do to obtain your degree?' but rather 'what can you do now that you have obtained your degree?'" [2].

Traditionally, academic programs were constructed from the "ground up" via course design and instructor input: what is going to taught, how long it will be taught, what tools will be used to teach it, and what instruments will be used to determine how well students absorbed the material. As we all know, this "teacher-centered" approach has shifted to a student-centered approach which transforms the emphasis dramatically – it's not what you teach, it's what your student learn. Instead of examining the efficacy of the educational program through models which specified the number of units, number of contact hours, types of exams or selection of textbooks, this orientation focuses on learning outcomes.

While the genesis of this outcomes-based approach may be traced back to the behavioral objectives movement in the United States in the 1970s, or even to the educational reform of vocational centers in the 1920s, evolving terminology over the past years has served to confuse the field with an array of competing programs and acronyms. Outcomes-based education (OBE) can be said to encompass or be aligned with "performance-based education" (PBE), "competency-based education" (CBE), "competency-based training" (CBT), and so on. "Competencies" are clearly important in any discussion of a curriculum that incorporates STCW standards, yet the term itself is a loaded one, and is often invoked in differing and even contradictory ways. According to Kennedy, Highland, and Ryan,

> It is difficult to find a precise definition for this term. Adam (2004) comments that "some take a narrow view and associate competence just with skills acquired by training". The EC Tuning project7 which was initiated in 2000 used the term "competence" to represent a combination of attributes in terms of knowledge and its application, skills, responsibilities and attitudes and an attempt was made to describe the extent to which a person is capable of performing them. The lack of clarity or agreement in terms of defining the term competence is apparent in the ECTS Users' Guide (2005), which describes competences as *"a dynamic combination of attributes, abilities and attitudes".* The Guide goes on to state that "*Fostering these competences is the object of educational programmes. Competences are formed in various course units and assessed at different stages. They may be divided into subject-area*

> *related competences (specific to a field of study) and generic competences (common to any degree course)".* Since there does not appear to be a common understanding of the term competence in the literature, learning outcomes have become more commonly used than competences when describing what students are expected to know, understand and/or be able to demonstrate at the end of a module or programme" [3].

If we can agree that this definition is meaningful and useful, then regardless of the country of origin or international educational system or acronymic set used, the common denominator in all these programs is a commitment to the significance of "Student Learning Outcomes," and a cursory glance through the literature reveals a shared understanding of this term. To cite just a few examples: "Learning outcomes are statements of what is expected that the student will be able to do as a result of learning the activity." (USA); "Learning outcomes are statements of what a learner is expected to know, understand and/or be able to demonstrate after completion of a process of learning" (UK); "Learning outcomes are statements that specify what learners will know or be able to do as a result of a learning activity. Outcomes are usually expressed as knowledge, skills or attitudes" (USA); "Learning outcomes are explicit statements of what we want our students to know, understand or be able to do as a result of completing our courses (Australia); and "Learning outcomes are an explicit description of what a learner should know, understand and be able to do as a result of learning" (UK)" [4].

The focus on student learning outcomes thus has gained traction at the highest levels by national and international educational administrators and scholars. In the United States, the movement is acknowledged in terms of the kind of evidence requested by accrediting institution such as WASC (which accredits The California Maritime Academy), MSCHE (which accredits New York Maritime Academy) and NEASC (which accredits Massachusetts and Maine Maritime Academies), and by a growing body of external education specialists. In Europe, according to Stephen Adam, it is the Bologna Accords which have expedited the process and thus: "A new unified European higher education infrastructure, underpinned methodologically and practically by learning outcomes, is emerging fast. It is designed to make European higher education systems more efficient, competitive, compatible and comparable, whilst respecting academic autonomy and the requirement for institutional and national diversity" [5]. Other, program-based and discipline specific accrediting bodies have also embraced this model. Engineering departments, for example, have for years focused on outcomes assessment for quality assurance and evaluation of educational programs and the Accreditation Board for Engineering and Technology (ABET) has been a leader in moving to outcomes assessment as the primary mechanism for accreditation of these programs.

3. MET, STCW, and the Outcomes-based Debate

The push for outcomes-based reform in higher education becomes intriguing when contextualized within Maritime Education and Training. On the one hand if we were to look solely at STCW95 and its basis in specific competencies as the foundation of MET, then we might declare our programs to be in the vanguard of this reform movement, having embraced such outcomes nearly fifteen years ago. From the IMO website itself, it is stated that

> The 1995 STCW Convention is one of several key initiatives that underpin this new philosophy at IMO. It seeks to establish a baseline standard for the training and education of seafarers throughout the world and, by placing an

> emphasis on quality control and competence-based training, it establishes a structure that can ensure not only that the required standard is met, but that it is seen to be met. One of the key differences between STCW 95 and the previous Convention is the emphasis on competence rather than knowledge. STCW 95 stipulates in detail the required competences associated with different tasks, the knowledge and understanding required to perform them, methods for demonstrating competence and criteria for evaluating it. The Convention embodies provision for "hands-on" training and the development of basic skills through use of simulators, laboratory training equipment and other practical training aids. Although experience at sea will remain an important part of a seafarers overall career development, it will no longer be enough simply to "serve your time [6].

Much has been written of this in IAMU forums. Barrie Lewarn, before advancing to a sharper critical assessment of STCW, acknowledges that "STCW 78 focused on what seafarers needed to know to be deemed competent. Courses tended to be academic in nature, classroom based, teacher centred, with assessment based around formal written exams. Post STCW 95 the emphasis of training is supposed to be on what seafarers need to be able to do. Courses should be practical in nature, activity based, student centred, with assessment based around the demonstration of acquired skills [7]. Similarly, Cynthia Smith Robson notes of this pedagogical change a corresponding switch in testing practices: with "the advent of STCW95, mariner qualification was transferred from knowledge based to proficiency based examination. The Convention provides for several methods of testing, both written and practical.[…] For each competence listed in the STCW Tables, methods for demonstrating competence and criteria for evaluating the same are listed in exhaustive detail" [8]. And therefore, according to Vladimir Loginovsky, "As a result, MET institutions are no longer in a position to keep utilizing any MET techniques and pedagogy that do not address the demands for competency and knowledge assessments in the newer definitions of a competent and knowledgeable mariner, afloat or ashore" [9].

Yet, there are also criticisms of STCW95 and its competency-based approach as revealed in IAMU literature: for some, STCW95 is not nearly as "outcomes-based" as it purports to be, often because the very concept of outcomes-based learning is challenged by the rigid adoption of the IMO model courses. "IMO model courses are, conceptually, a good idea provided they are viewed as guides upon which teachers can build to develop appropriate teaching and learning experiences. In a number of countries marine administrations have taken the view that the courses they approve must follow exactly an IMO model course. The highly prescriptive nature of model courses eg number of hours required to achieve competence, is at odds with the CBT approach espoused by STCW 95" [10]. For Robson, writing in the proceedings of the 8th Annual General Assembly, the problem is not with adopting a competency-based model, but rather that "specific methodologies [for implementation] are not provided. These are left to the discretion of the assessor, to be developed according to the parameters outlined" [11]. And finally, to return to Lewarn, the process of change itself is fraught with problems: "Empirical evidence points to a level of dissatisfaction by educators as they seek to move towards a more output driven model of education. This dissatisfaction is partly caused by the overly restrictive and prescriptive approaches taken by marine administrations and the relative inflexibility of the input driven model of education still most commonly found in use today [which in turn] does reduce the potential effectiveness of teaching and learning in a CBT environment. The system impediments identified […] are worthy of more rigorous research if the philosophy espoused by STCW 95 is to be achieved" [12].

For these critics, the competency-based model current utilized in MET has simply not yet evolved enough and/or must be modified to some degree; for others, though, there are serious and perhaps fatal flaws in the system. Detractors of competency-based practices find it to be "excessively reductionist, narrow, rigid, atomized, and theoretically, empirically, pedagogically unsound and therefore 'largely unsuitable for the teaching and learning which goes on in higher education institutions, whether this occurs in general/academic or professional/vocational contexts" [13]. In their study, 'Contradictions in the Practices of Training for and Assessment of Competency: a Case Study from the Maritime Domain" Gholamreza Emad and Wolff Michael Roth found that "fundamentally the assessment system has changed the objectives of the education and training practices from learning skills and knowledge required on-board ships to passing competency exams" [14].

Finally, it should be noted that even if STCW competencies can be taught to the satisfaction of most maritime educators, MET, obviously, is not solely a delivery mechanism for STCW competencies. Not only does STCW simply prescribe baseline, minimum requirements for seafarers, but many maritime universities and academies embrace other learning outcomes to ensure breadth and depth of study and have also created entire non-licensing programs that contribute to maritime industry needs in the realm of public policy, international law, logistics, business administration, port maintenance, etc. To further complicate the matter of simply agreeing to a standard set of competencies and assessment tools for maritime programs, maritime academies often have multiple and different regulatory bodies. For example The California Maritime Academy is a campus of the California State University and thus enjoined with that public system's educational aims, objectives, and mandates; it is also a federally-sponsored maritime academy under the auspices of the U.S. Maritime Administration and therefore bound by specific regulations and requirements which are overseen by the U.S. Coast Guard for the certification of merchant marine officers under U.S. law. More autonomously, CMA values and maintains a system of beliefs and principles including the significance of experiential learning, the development of personal and professional ethics, and the importance of student-centered inquiry to confront the personal, moral, and social problems that are an inevitable part of human life. To cite another example wherein national and international regulatory bodies complicate maritime education and training methods and objectives, in Europe "the EU policy distinguishes between higher education (The Bologna Process) and vocational educational education and training (The Copenhagen Declaration, as amended) and sets different standards for the two. National MET systems in Europe differ mainly in that they may make part of the former or the latter, and quite frequently the two systems are combined" [15]. The question becomes: how then, to develop an outcomes-based educational system that can accommodate and answer to all of these internal and external obligations and responsibilities? The fact that many maritime academies straddle these divides places strain on a system that tries to be all things to all people.

4. IAMU and the Call for Uniformity and Commonality

Into this debate over the outcomes-based model of maritime education and training we can now insert the question of commonality. The Bologna process, with its desire for a high degree of harmonization across European university systems, may serve as a correlative. To re-assert the claim made by UK Bologna expert Stephen Adam, the drive for a unified European higher education infrastructure is motivated by a desire to make these "systems more efficient, competitive, compatible and comparable, whilst respecting academic autonomy and the requirement for institutional and national diversity" [16]. Rhetoric such as this, with its desire to find a balance between efficiency and uniformity on one hand and

respect for institutional autonomy on the other, could easily be mapped onto certain issues faced by the IAMU. For the IAMU, too, has sought to address the challenge of developing uniform maritime curricula among its international member institutions, with such ambition often thwarted by a variety of national educational infrastructure matters.

As noted in the introduction, two of the founding and central objectives of the IAMU are "to develop a comprehensive Maritime Education System for following generations [and to] develop standardized Undergraduate Curricula and an International Certification System for Competency." In an oft-cited speech to the IAMU General Assembly in Dalian in 2006, Nippon Foundation Chair Yohei Sasakawa appears to re-assert this objective: "There is an urgent need to ensure not only a high level of education, but also a uniform curriculum for all students […] We need to develop a new systematic, integrated curriculum" [17]. Prior to and since this call to action, many IAMU scholars have risen to the occasion. In 2005-2006, Boris Butman's IAMU Project, "Standardizing Marine Engineering Curriculum," compiled data on marine engineering programs around the world and sorted by sea-going time, credit hours for each course and laboratory, unit distributions for principal program components, and curriculum structures per semester and year [18]. Mohye El Din El Ashmawy's AGA 2008 paper advocates for IAMU to work toward the unification of MET universities to the point wherein the IAMU itself would have regulatory and accrediting authority over aspects of maritime education and training [19]. Cynthia Robson's 2007 AGA article on simulator training objectives calls for an "international rubric" in order to advance the "standardization of the methodologies of mariner competency assessment" [20]. In fact, Robson concludes her essay with an answer to the question posed by Peter Muirhead of the World Maritime University in 2006: "'is it realistic to expect marine simulators across the globe to be used uniformly by different assessors, against an agreed set of performance criteria, to measure seafarer competence?' The answer to his question is a resounding yes" [21].

Notwithstanding the narrower context of maritime simulator competency being addressed, the answer to the question in general of internationalization and standardization to my mind may not be a resounding affirmative. Because of multiple and overlapping systems of accreditation that drive many maritime universities, as well as the complex economic, cultural and organizational differences of these institutions, the objective of a truly universal and global standardized undergraduate curriculum may not be attainable. If the IAMU's goal of a "uniform curriculum for all students" moves beyond IMO model courses and baseline STCW competencies toward universal rubrics and the further standardization of unit loads and curriculum mapping, then creativity and innovation in curriculum design for each campus may be stifled. This, perhaps, is the problem of "being common:" the forces of globalization and the collective will of the organization push towards "common seas, common shores, and common solutions to common problems," but at the critical juncture of praxis, the pitfall to avoid is a capitulation to the lowest common denominator.

Perhaps a way out of this imbroglio – a way to circumnavigate the thorny, and perhaps fruitless attempts to construct a universal set of maritime curricula that can be all things to all people – is to re-orient the debate away from baseline STCW competencies for license-granting programs, summative analyses of laboratory hours in respective national maritime institutions, and the search for universal assessment rubrics. These are all worthy and necessary projects, but in the pursuit of universality, we may be missing the forest for the trees. To return to a few lines of Sasakawa's speech which have not claimed as much attention, he writes: "contemporary maritime education seems to place excessive emphasis on cramming students with inadequate knowledge and skills required to operate ships. What this does is to produce seafarers who lack pride in their work, and do not possess a true seaman's spirit. In this respect, I wonder whether the IAMU needs to review the balance of its study themes. I also think that the IAMU needs to make more effort to ensure that the knowledge and skills of seafarers are

utilized more effectively by the maritime community at large" [22]. The intangible qualities of "spirit" and "pride" may be difficult to measure, but they may also provide the broad philosophical backdrop upon which to drape the narrower concerns of specific skill sets. The objective, then, is to find the unifying seams across MET and our heterogeneous institutions. For licensing programs, the unity is STCW baseline competencies, but where else might we find unity that can transcend the complications of the differences enumerated above? After all, for STCW, the original desire for standardization was to elevate the long tail of underachievement rather than raising the bar at the more sophisticated and innovative end of the spectrum. The answer may lie in the creation and development of universal student learning outcomes on a multi-level scale that can be managed in an outcomes-based pedagogical model without restricting the intellectual freedom of any single maritime institution. The implementation and alignment of broad learning outcomes recently developed at Cal Maritime may provide some useful direction.

5. The CMA Model

In order to better understand and measure the comprehensive educational mission of the institution, last year Cal Maritime embarked on a project to craft Institution-Wide Student Learning Outcomes (IW-SLOs). The challenge was to develop a set of outcomes that would best reflect the unique nature of the Academy and simultaneously encompass a set of more generalized competencies because, as noted previously, Cal Maritime is bound by different oversight bodies whose interests and concerns do not necessarily overlap in concentric circles. Also, this set of outcomes needed to encompass *all* academic programs, regardless of the kind of licensure associated with individual programs. A committee of faculty and administrators first identified the constitutive features in Cal Maritime's academic and co-curricular programs and measured these features against cohort educational institutions across the country. The first draft of the IW-SLOs was deeply informed by the American Association of Colleges and Universities' 2005 national initiative "Liberal Education and America's Promise" (LEAP) as well as those learning-centered, outcome-oriented aspects of The California State University's newly-revised Strategic Plan. After successive revisions and in consultation with experts in the development of learning outcomes, a set of IW-SLOs (organized under four themes which correspond to the school's mission) was approved and an assessment council was formed and tasked with developing and sustaining an assessment plan (See Appendix 1).

Of course, the development and publication of specific Institution-Wide Student Learning Outcomes must be properly tethered to the individual academic programs, each of which have developed their own learning objectives (P-SLOs) and which are further refined and made more specific on the course level (C-SLOs) Every program, furthermore, has an assessment plan which situates and aligns its P-SLOs vertically between the course-level outcomes and with the IW-SLOs, and this alignment is crucial for efficacy in quality control management. For example, the set of learning outcomes for the Marine Transportation Program (see Appendix 2) corresponds to those outcomes on the institution-wide level but also drill down to the level of competencies required for STCW. Furthermore, the Program-level outcomes articulate the criteria used to measure each outcome, and, when these outcomes are attached to specific courses, desired performance levels (beginning, intermediate, advanced) are also attached.

6. Conclusion

Student Learning Outcomes are present in some form or another in nearly all institutions of Maritime Education and Training. One of the ever present challenges facing MET, and one which has concerned IAMU for the past decade, is that of curriculum standardization for better communication between institutions as well as improving the efficiency and safety of the maritime and shipping industries as a whole. In this way, the challenge mirrors those facing other organizations such the European Union on Education and the US Department of Education in their respective desires for easier mobility between institutions in an era of rapid globalization. The turn to outcomes-based models, instead of complicating and exacerbating the issue, may actually prove to be a useful means by which to work towards standardization. Might it not be possible to develop a set of universal outcomes? Might a collection of Institution-Wide (or University-Wide or Academy-Wide) outcomes be adopted on the level, of, say, the IAMU member organizations? This may work to satisfy one of the central objectives of the organization while the actual implementation and measurement of these outcomes on the curricular level could be designed by individual institutions in line with principles of academic freedom and with available resources. Of course the work of developing best practices on these levels could and should continue as different member institutions share rubrics, methodologies, and pedagogical innovations. We have common seas and common shores and common objectives, but we strive to foster uncommon schools, unique faculty, and exceptional programs. A way to navigate through across this divide may be found in the work of Leicester, Bloomer and Steward, who posit that the issues that arise in the dilemma between control and standards on the one hand (which they label "rock values"), and freedom of choice and diversity of innovation (using the metaphor of "the whirlpool") on the other hand. "The 'rock values are the good things that quality control delivers: consistency, transparency, reliability, protection against the system falling below a minimum standard, possibilities for consistent comparison of performance across time and between countries, the possibilities of continuous improvement. The whirlpool values serves diversity, dynamism, range of possibilities, spontaneity, autonomy, intelligent consumption, personal validity as a measure of usefulness, and a faith in humanity to make right choices for themselves" [23]. The challenge here is to keep improving the structures and processes of Maritime Education and Training, even as we prepare for and embrace changes that arise from ambiguous national and international policies and fluctuations in market forces. An attention to the innovations in other programs of higher education – both the successes and failures of an outcomes-based structure – may help inform the direction of MET in the future.

Appendix 1

The California Maritime Academy:
Institution-wide Student Learning Outcomes (IW-SLO)

Consistent with the mission of the California Maritime Academy to provide a college education combining intellectual learning, applied technology, leadership development, and global awareness, students will develop the following competencies. Through participation in curricular and co-curricular learning opportunities, our graduates will be able to:

A.	Coherently and persuasively share information	Communication	**Intellectual Learning**
B.	Comprehend, analyze and objectively evaluate new information and ideas; and to explain things in new and different ways, often through synthesizing or applying information	Critical and Creative Thinking	
C.	Exercise intellectual inquiry via the use of sound reasoning to identify and analyze problems, formulate solutions, predict outcomes, and make conclusions and inferences from numerical information	Problem Solving	
D.	Demonstrate an understanding of fundamental concepts in human development and the natural world	Human Development in the Natural World	
E.	Employ self-knowledge of the social and cognitive factors influencing the learning process; to engage in ongoing reflection and exploration of the purpose of personal development; and to synthesize and apply knowledge and experiences to new personal and professional applications	Lifelong Learning	**Applied Technology**
F.	Demonstrate competency in discipline-specific, maritime-related fields	Mastery of discipline-specific skills	
G.	Define a specific need for information; then locate, access, evaluate and effectively apply the needed information to the problem at hand; and effectively use simulators, computers and computing applications in order to create, access, store, process, analyze and communicate information	Information Fluency and Computing Technology	
H.	Work with others in achieving common goals, and when necessary, envision new goals; motivate and empower others to achieve them; interact constructively with a diverse group of people; and foster collegiality, goodwill and community among them	Leadership, Teamwork, and Personal Development	**Leadership Development**
I.	Behave and perform in a manner that is accepted in one's profession, as well as move oneself continuously toward a goal or set of goals	Professional Conduct	
J.	Apply standards of proper conduct and responsibility towards society in one's professional or personal life	Ethical Awareness	**Global Awareness**
K.	Demonstrate an awareness of diversity in the global culture and environment, as well as the responsibilities associated with promoting the welfare of state, country, whole of humanity and planet	Global Stewardship	

Appendix

Marine Transportation Program Learning Outcomes and Alignment to IW-SLOs			
	Program Learning Outcome	Performance Criteria	Aligned to IW-SLO:
1	Mastery of knowledge, techniques, skills and modern tools required to safely operate all sizes of marine vessels from large tankers to tugs	Demonstrated ability to operate bridge equipment including Radar/ARPA, GMDSS and ECDIS equipment, sextants, radar transfer plotting sheets, etc.)	F
		Demonstrated ability to use non-electronic navigational tools (plotting equipment, sextants, radar transfer plotting sheets, etc.)	
		Demonstrated ability to use shipboard equipment in the proper handling of cargo	
		Demonstrated ability to properly utilize shipboard safety equipment.	
2	Ability to apply knowledge of current nautical theories to allow adaptation to emerging technologies in marine equipment, systems and structures	Demonstrated ability to apply the fundamentals of stability and use computer programs to calculate stability in the handling of cargo	F
		Demonstrated ability to understand emerging technologies as applied to marine and shipboard operations	
		Demonstrated ability to use computer tools to assess the impact of loading on the ship's structure	
3	Ability to function effectively on teams	Demonstrated understanding of issues involved in working on a team	H
		Demonstrated ability to function as a member of a small team including providing individual contributions to the team	
		Demonstrated ability to lead a team	
4	Ability to function as a manager in a maritime related business	Demonstrated ability to function as a manager in a maritime related business	I
5	Ability to communicate effectively in a technical environment	Demonstrated understanding of effective writing skills	A
		Demonstrated ability to write an effective technical report	
		Demonstrated understanding of the principals of effective speaking	
		Demonstrated ability to conduct a professional presentation	
6	Recognition of the need for and an ability to engage in lifelong learning	Demonstrated understanding of the importance of lifelong learning	E
		Demonstrated ability to research new concepts and discover emerging technologies	
		Demonstrated ability to learn new concepts on one's own	
7	Ability to understand and apply professional, ethical and social responsibilities	Demonstrated understanding of ethical issues of the maritime industry	J
		Demonstrated ability to analyze a potential ethical situation and present a clear and compelling written discussion of same	
		Demonstrated understanding of social responsibilities	
8	Knowledge of contemporary professional, societal and global issues	Demonstrated understanding of issues of maritime law	D,K
		Demonstrated understanding of the issues of the environmental effects of the maritime industry	
		Demonstrated understanding of the regulations that impact the operations of ships	
9	Commitment to quality, safety, timeliness and continuous improvement.	Demonstrated understanding of the measures of quality and timeliness and how these measures are applied	J
		Demonstrated understanding of current management tools for continuous improvement such as ISO 9000, and TQM (Total Quality Management)	
		Demonstrated understanding of safety as it relates both to vessels and maritime facilities	
10	Ability to receive a Coast Guard License	Successful passing of all sections of the USCG third mate's license exam	F
		Successful completion of all STCW requirements for Officer in Charge of the Navigational Watch	
		Successful completion of all STCW requirements for Ratings forming the Navigational Watch	
		For students in QMED minor, successful completion of the QMED exam	
11	The ability to perform industrial operations planning including managing technical projects involving scheduling	Demonstrated ability to understand and develop job plans	J
		Demonstrated understanding of management tools including scheduling and cost	

2

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