GLOBAL MARITIME PROFESSIONAL

BODY OF KNOWLEDGE **2019**

This GMP Body of Knowledge is the result of a Joint Project (The Global Maritime Professional Initiative) between the Nippon Foundation and the International Association of Maritime Universities (IAMU)

IAMU
International Association of Maritime Universities

THE NIPPON FOUNDATION

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Acknowledgments

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- Dr. Cleopatra Doumbia-Henry (President, World Maritime University);
- Prof. Dr. Ismail Abdel Ghafar Ismail Farag (President, Arab Academy for Science, Technology & Maritime Transport); and
- Prof. Jari Multisilta (President, Satakunta University of Applied Sciences).

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The Global Maritime Professional Body of Knowledge is the result of a joint project between the IEB of the IAMU and the Nippon Foundation – The Global Maritime Professional (GMP) Initiative.

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Foreword

Throughout history, mariners established informal codes of professional conduct to ensure their safety and security on the high seas. Such guidelines as the Mariners Creed from the early 20th century or the Modern Mariners Creed from the early 21st century, provide evidence of how modern mariners have sought a globally relevant articulation of the values and ethics necessary to be successful in the harsh and unforgiving environment of the world's oceans. In our modern era, we have experienced a strong trend toward greater professionalization of everyone pursuing a maritime career, beginning with the 1978 Standards of Training, Certification and Watchkeeping for Seafarers (STCW) Convention which entered into force in 1984. Subsequent improvements, including the 1995 Revision and the Manila Amendments of 2010, further outlined professional competency standards intended to enhance safety on the sea.

The IAMU supports such efforts through the development and sharing of model courses between member universities. IAMU also provides unprecedented collaborative opportunities to explore a wide variety of important issues in maritime education, training and research. As we prepare the next generation for maritime service we recognize that technical competencies alone, while necessary to thrive in the modern maritime ecosystem, are not sufficient for long-term success in a highly complex, globalized profession. Following agreement at the 17th Annual General Assembly Presidents Forum, IAMU embarked on a bold initiative to formulate a comprehensive guideline for the next generation of leaders: The Global Maritime Professional (GMP). The GMP initiative envisions significant curricular improvements in academic preparation and adds a new element, leadership and ethics; both are increasingly necessary as technology and globalization continue to disrupt our profession. Preparing our graduates for this new environment is essential.

In light of this new seascape, I am pleased to share the work of your IAMU colleagues who have crafted a superb guideline, hereafter known as the GMP Body of Knowledge. Within the Body of Knowledge you will find a shared description of a global maritime professional, an articulation of competencies required to master the new maritime work environment, a set of recommended learning outcomes, and suggestions for curriculum development. This thoughtfully and collaboratively developed guideline delivers a wonderful outcome for our entire membership. I ask you to join me in thanking the committee members, who skilfully created and delivered this standout work that will benefit our universities for decades.

All the best.

Thomas A. Cropper; Rear Admiral (Rtd.), USN, USMS.
President, California State University Maritime Academy.
Chairperson, IAMU International Executive Board, 2019.

Executive summary

The global community is changing, and while such change has always happened, its pace in the 21st century is unprecedented. Markets are changing, products are changing, social norms and preferences are changing and industry is changing. Education is responding to such changes and even driving them in some contexts. This change, however, has not been as significant in the maritime industry as it has been in others. The conservative nature of the industry as a whole is reflected in its relatively slow response to change; a tendency just as prevalent in maritime higher educational institutions.

While the traditional approaches to maritime education and training – in particular, seafarer education and training – have served the industry well and continue to do so, a recognition of the rapid changes in a number of industry-influencing factors makes it imperative that maritime higher education institutions interrogate the effects of such changes, as well as their own contributions and optimum response to them.

The International Association of Maritime Universities is currently the best global representation of higher education in the maritime context. It comprises, as at December 2018, sixty-seven (67) members from thirty-five (35) countries. The membership is made up of high-level Universities from all parts of the globe (Africa, Asia (Pacific and Oceania), the Americas (North and South), and Europe together with two special members (the World Maritime University and the Nippon Foundation). It has, since its inception in 1999, with the significant support of the Nippon Foundation, offered a forum where the world's best maritime universities can engage in academic discourse, research and community development.

In light of the Association's fundamental goals as articulated in its basic agreement and in subsequent statements (Tasmanian Statement of 2014 and Haiphong Statement of 2016), as well as in recognition of current global trends, the membership of IAMU through its International Executive Board (IEB) and with the support of the Nippon Foundation, has sought to formulate a vision for a Global Maritime Professional (GMP). This initiative is intended to meet the envisaged needs of industry and a rapidly evolving educational and career context while catering for the professional development aspirations of individual seafarers. The new concept of a Global Maritime Professional has been described as:

> *An individual who is a professional in the maritime industry and who is equipped with all the relevant technical competencies relevant to their specific operational role in the industry and as required by international requirements, with high level academic skills including logical and critical thinking and who – in addition to their technical competency – exhibits a high level of professionalism and ethical behaviour, human relations skills, emotional intelligence and multicultural/diversity awareness and sensitivity. Such an individual exhibits significant leadership skill and is able to optimally work with teams and also take personal initiative. They additionally exhibit a high sense of environmental consciousness and the need for sustainable practices and have an excellent grasp of contemporary issues affecting the maritime industry.*

To address the educational needs of such GMPs, the IAMU through a task force and subsequently a committee, analysed the knowledge, skills and attitudes needed by such GMPs and set out a number of related Intended Learning Outcomes.

This Body of Knowledge (BoK), sets out that process and the detailed learning outcomes that have resulted from the work of the committee. It is the aim of the IAMU that, through the BoK, students graduating from across the membership of the Association, will exhibit the learning outcomes for the GMP as defined in the text. The primary users of the BoK, the member Universities, are therefore encouraged to examine the learning outcomes agreed in the BoK and thereafter within the academic freedoms and requirements of their own jurisdictions, develop curriculum (syllabi, learning activities, assessment methods etc.) that will aim at the achievement of these learning outcomes in a consistent manner.

The specified learning outcomes in the BoK are associated with learning outcome taxonomies in three educational domains: cognitive, affective and psychomotor. They are related to different GMP tiers covering various levels of certificates of competency and academic degrees. All of these are presented in a series of tables and guidelines on how the IAMU member universities may use the tables.

To conclude the BoK, a discussion of the future and IAMU's engagement with it is presented. It is argued that significant change is underway and that IAMU should strategically position itself to seize the opportunities these changes present and to mitigate their negative effects. It is suggested that traditional maritime universities should look beyond their traditional collaborations and form new partnerships with other industries as well as with governments in a continuous triple-helix approach.

Finally, the BoK recommends linkages with ongoing work of the IAMU and mechanisms to encourage achievement of the learning outcomes agreed in the BoK.

Chapter 1. Background: Key facts and trends

1.1. IAMU Basic Agreement (Article I) and Mission

The International Association of Maritime Universities is the global network of leading maritime universities providing Maritime Education and Training (MET) of seafarers for the global shipping industry. All members of IAMU share the understanding:

- that globalization has been progressing rapidly in the international shipping arena;
- that Safety, Security and Environmental Protection are crucial issues for the maritime sector; and
- that passing on maritime skills and knowledge to the following generations needs to be achieved on a global scale.

All members of IAMU also recognize the significance of maritime education and training and note that:

- the shipping industry is a service industry, in which human resources are the critical element;
- it is only feasible to secure and to preserve highly qualified human resources in the maritime industries through effective education and training; and
- effective education and training in the maritime sector derive from scientific and academic rigor and development of a clear link between practical skills, management techniques and a focus on quality.

Based on this shared understanding, it has been mutually agreed:

- that members shall cooperate with each other in a range of scientific and academic studies, developments, and practical applications associated with Maritime Education and Training;
- that members shall endeavour to achieve measurable and worthwhile outcomes for Maritime Education and Training through IAMU activities;
- that members shall publicize the results of their activities as extensively as possible both within and outside IAMU, and shall endeavour to accumulate scientific results for the benefit of the international maritime community; and
- that the members shall thereby contribute to the enhancement of Maritime Safety, Security and Environmental Protection.

The Mission of IAMU (quoted) is:

A. To create and maintain a global network of members dedicated to building human capacity in the maritime sector;
B. To provide opportunities for developments in Global MET system through scientific and practical approach;
C. To develop and support effective MET systems for passing on maritime skills and knowledge to future generations of global seafarers that ensure safety at sea, maritime security and the protection of the environment;
D. To disseminate the results of research and scholarly work produced by IAMU members to interested parties; and

E. To communicate with other maritime associations and the United Nations agencies such as the International Maritime Organization and the maritime industry to ensure that the Human Element and MET play the key priority role to supply industry with high quality professionals to promote safe, secure and efficient shipping on clean oceans.

1.2. Evolution of the education and training underpinning maritime operational careers

Maritime transport remains the "lifeblood of the world economy". In 2017, 93,161 vessels with a total deadweight tonnage of 1.86 billion, transported in excess of 80% of world trade[1]. If shipping is the "lifeblood of the world economy", the approximately 1.65 million seafarers[2] who crew those vessels may be said to be the "lifeblood of shipping".

Shipping itself has a very long history and a rich tradition. Everywhere in the world where large bodies of water are found, water transport has existed for centuries. Careers associated with water transport were primarily developed via on-the-job training and to some extent, shore-based education. Over time a degree of balance between some form of school-based education and onboard training became standard in all jurisdictions. However, the curriculum of seafarer education and training remained substantially under the jurisdiction of individual nations.

The first international attempt to regulate the crewing of ships involved in international trade took place under the auspices of the International Labour Organization (ILO) with the ILO Convention 53 on "Officers' Competency Certificates" in 1936, and Convention 74 on "Certification of Able Seamen" in 1946. While these laudable first steps sought to internationally regulate national action on the competencies of seafarers, they did not set specific standards for such competencies. The need for such standards became clearer in the early 1960s to late 1970s with efforts in this direction culminating in the promulgation of the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) 1978, as amended. The STCW Convention was the first international convention to set international standards for seafarer training, certification and watchkeeping. However, there were a number of limitations to this convention in its first iteration and subsequent major revisions in 1995 and 2010 have sought to align the standards with the evolving nature of industry, law and socio-cultural dynamics. Today, internationally compliant seafarer education and training is focused on the technical competencies and affective competencies required by the STCW 1978, as amended.

[1] United Nations Conference on Trade and Development, Review of Maritime Transport 2017

[2] BIMCO Manpower Report – The global supply and demand for seafarers in 2015

1.3. The status quo

Despite the continuing improvement in the international legislative framework, there have always being attempts in different jurisdictions to go beyond the requirements of the STCW Convention. In a recent survey of global training practices[3], many respondents were of the view that the STCW was not optimally aligned with the evolving and anticipated needs of the maritime industry. It is also obvious that the Convention and the standards in the associated Code are the minimum standards to which all parties agree and are mainly focused on the "training" part of "maritime education and training". This international minimum in no way precludes the comprehensive development of further educational outcomes for maritime education and training programmes and the further development of mariners to ensure sustainable career paths beyond seafaring. Indeed, many jurisdictions have gone well beyond these as manifested by the MET curricula of member universities of the International Association of Maritime Universities (IAMU). Many of these curricula, while including all the elements of the STCW, go beyond it to address curriculum elements supporting the award of academic degrees at the Bachelors, Masters and PhD levels and which emphasise the "education" part of "maritime education and training".
It is noteworthy that the IAMU Haiphong Statement of 2016 recommends that in the context of IAMU, "degrees for seafaring officers should include educational outcomes well above and beyond the minimum requirements of the STCW in order to prepare future seafarers for a rapidly changing industry … and should also provide a preparation for those seafarers who wish to transition to shore-based careers beyond their service at sea".

1.4. Change drivers and trends

There are a number of drivers that are influencing the ongoing interrogation of the nature of MET curricula. A primary survey that informed this Body of Knowledge[4] unearthed a number of these. They include:

- Technology – both macro level (e.g. digitalization, artificial intelligence/machine learning, blockchain, 3D printing) and industry level (e.g. autonomous ships and increasing technological sophistication on board and in ports)
- Global natural risks including climate change and the associated environmental protection and energy challenges
- Geopolitical risks including trade wars and protectionism and their effects on the shipping industry
- Legislative and administrative requirements
- Financial possibilities and challenges
- Increased challenges with safety and security (including cyber-security) in a volatile, uncertain, complex and ambiguous world
- Disruptions to the supply and demand of labour from technology

[3] The Maritime Training Insights Database (MarTID). See www.martid.org
[4] See Appendix III

1.5. A vision for the GMP in the short-, medium- to long-terms

In light of the fundamental goals of the IAMU as articulated in its basic agreement and in subsequent statements (Tasmanian Statement of 2014 and Haiphong Statement of 2016), status quo and the trends indicated in sections 1.3 and 1.4, the membership of IAMU through its International Executive Board (IEB) and with the support of the Nippon Foundation, has sought to formulate a vision for a Global Maritime Professional (GMP) to meet the envisaged needs of industry and a rapidly evolving educational and career context while catering for the professional development aspirations of individual seafarers.

1.6. Description of GMP

In support of this vision and for the purposes of this Body of Knowledge, the Global Maritime Professional is described as:

> An individual who is a professional in the maritime industry and who is equipped with all the relevant technical competencies relevant to their specific operational role in the industry and as required by international requirements with high level academic skills including logical and critical thinking and who – in addition to their technical competency – exhibits a high level of professionalism and ethical behaviour, human relations skills, emotional intelligence and multicultural/diversity awareness and sensitivity. Such an individual exhibits significant leadership skill and is able to optimally work with teams and also take personal initiative. They additionally exhibit a high sense of environmental consciousness and the need for sustainable practices and have an excellent grasp of contemporary issues affecting the maritime industry.

Chapter 2. Approach and methodology for the BOK

2.1. Application scope and underpinning philosophy for the BoK

The scope of application of this Body of Knowledge (BoK) is the education and training regime of maritime students enrolled in the programmes of the Universities which form the membership of the IAMU.

As an underlying philosophy, the BoK considers the knowledge, skills and attitudes (KSA) necessary for, primarily, a career at sea. However, it does not limit the range of KSAs to this, but additionally considers other relevant career paths that education and training in a maritime institution can lead to, and which may be well above and beyond the minimum requirements of the STCW '78, as amended. The scope of the document excludes non-degree qualifications as it is targeted at the IAMU membership which requires the offering of academic maritime programmes for "Bachelors degrees or equivalent undergraduate MET programs and post-graduate Masters and/or Ph.D. programs related to maritime affairs"[5].

The BoK further highlights KSAs that relate not only to human operations on the seas, but importantly also KSAs for the sustainable use and protection of the oceans. In the words of Dr. Yohei Sasakawa, "in order to cope with such crises [the threatened state of the ocean], we need to do more than just use the sea. We need to move toward protecting it. We need to adapt ourselves to its changes. Since the maritime community's activities are such a large part of the human use of the sea, it is crucial for us to review our own behaviour, and make appropriate changes in the way we treat the sea"[6].

The BoK draws from two basis philosophical approaches:

Outcomes-based education

In keeping with the spirit of the IAMU Haiphong Statement of 2016 and modern educational delivery, the BoK uses an "outcome-based education" approach as the first of the two basic philosophical underpinnings of the work. To quote William G. Spady "outcomes-based education means clearly focusing and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences" and requires "…starting with a clear picture of what is important for students to be able to do, then organizing curriculum, instruction, and assessment to make sure this learning ultimately happens"[7]. Accordingly, reference is made in the BoK to "learning outcomes" and not "learning objectives". The latter term is more teacher-centric, the former more learner-centric. The BoK sets out the learning outcomes for a GMP. Further action on the determination of curricula (syllabi, learning activities, assessment methods) to achieve these learning outcomes, rests with the different member Universities.

[5] See IAMU Basic Agreement Article V on Membership

[6] Keynote speech at the 7th General Assembly of the International Association of Maritime Universities, 16 October 2006, Dalian, China

[7] Spady, W.G. (1994). *Outcome-Based Education: Critical Issues and Answers*. American Association of School Administrators, 1801 North Moore Street, Arlington, VA 22209

Internationalization versus globalization

Globalization has been a common approach to addressing issues at a macro worldwide level. It relates to the extension of factors of production and the affected stakeholders and entities that impact an industry, from a national/regional setting to a global one and the standardization that is often associated with this extension[8]. Very popular in the 1980s and 90s, it focused on a view of the world as one village with common trade, and transport/logistic links. This essentially economic approach evolved to include educational, cultural and social considerations as well. The maritime industry is considered as the epitome of a globalized industry. In the 21st century, however, a new notion of "internationalization" has gained prominence[9]. It has been defined as "the variety of policies and programs that universities and governments implement to respond to globalization[10]. Internationalization is the approach of having nearly the same standards while respecting the cultural and other differences between nations and the contrasts that sometimes exist between different parts of the world. This is fully recognized by this BoK and, together with the "outcome-based education" approach discussed earlier gives the chance for Universities to organize their own curricula, syllabi, learning activities and assessment forms to achieve the mutually agreed learning outcomes.

It is very important that the BoK be seen for what it is, a guide with agreed learning outcomes, which the member universities will uniquely achieve through their own syllabi and learning activities, in the spirit of internationalisation of maritime higher education.

2.2. IEB steps and committee process for BoK development

2.2.1. IEB Steps

In 2005, Dr. Sasakawa, the patron and primary benefactor of the IAMU, gave a special lecture at IMO on "Maritime Human Resources Development and its Future", in which he highlighted the need for maritime universities around the world to establish common educational goals and objectives that help reduce the competency discrepancies between seafarers from different maritime education and training systems.

Subsequently, during the International Association of Maritime Universities' 7th Annual General Assembly hosted by Dalian Maritime University in 2006, Dr. Sasakawa gave a key note speech in which he reiterated the need for commonality in respect of IAMU members' goals and objectives for maritime education and training for the human resource of a global industry.

[8] Manuel, M. E. (2011). *Maritime risk and organizational learning*. London: Ashgate.

[9] De Wit, H. (2011). Globalisation and internationalisation of higher education. *Revista de Universidad y Sociedad del Conocimiento (RUSC), 8*(2), 241-248.

[10] Altbach, P. G., Reisberg, L., & Rumbley, L. E. (2009). *Trends in global higher education: Tracking an academic revolution*. Paris: UNESCO.

Recognizing the significant need for such commonality, the IEB and subsequently the Presidents' Forum (in Vietnam in 2016) agreed as a first step, to establish a working group to address this issue. However, given the underpinning philosophy of higher education, the diversity of national goals and sovereignty issues related to the determination of educational outcomes, curricula and processes, it was decided that the process would begin (via the working group) with the identification of learning outcomes that could be deemed common for the optimization of human resource competency for the maritime industry across all national boundaries. With the establishment of such learning outcomes, the IAMU members would be in a position to align their curricula (at the national/regional level) with the result that all maritime professionals (irrespective of where they had been educated/trained within the context of IAMU) would exhibit the agreed outcomes. This would support the vision of the "Global Maritime Professional" (GMP) whose professional performance would be based on the agreed learning outcomes while leaving the determination of specific curricula, syllabi, and learning activities to individual Higher Education systems in sovereign States[11].

The Working Group gave its final report to the IEB in Varna, Bulgaria, in October 2017. The report has been considered in detail in the preparation of this Body of Knowledge and essentially included in its content.

To develop the BoK the International Executive Board of the IAMU took the following steps:

- Step 1: Set up an IEB member-only task force to formulate a description of the attributes, qualities and competencies required of the future Global Maritime Professional.
- Step 2: Upon approval of the draft competencies by the IEB, set up a Committee of Experts to begin drafting a Body of Knowledge document
- Step 3: IEB member-only task force reviews first draft of document from the [Committee of Experts].
- Step 4: [Committee of Experts] refines document in light of review comments from step 3 and delivers second draft document to the full IEB for review.
- Step 5: Board members review and provide feedback to [Committee of Experts].
- Step 6: Based upon IEB feedback, document is further refined by [Committee of Experts] and third draft prepared for distribution by Executive Director for presentation to IAMU President's Forum.
- Step 7: IAMU member institutions review third draft of document. Feedback provided to Committee and Executive Director.

[11] This principle of higher education – the academic freedom expressed in the determination of curricula - is non-negotiable for higher education systems in most jurisdictions and is linked to the notion of internationalization discussed earlier.

- Step 8: [Committee of Experts] refines document and submits final draft to Secretariat for final draft presentation to IEB.
- Step 9: IEB member-only task force reviews and approves final draft.
- Step 10: Executive Director tables final draft for approval at IEB meeting. Final draft of Body of Knowledge document approved by IEB for publication and distribution throughout IAMU.

2.2.2. Preliminary survey

To inform the Body of Knowledge, and to fulfil step 1 as indicated above, the task force designed and disseminated a survey as a primary input for the KSAs required for seafarers in the short-, medium-, and long-term. The survey was completed by 214 stakeholders in the maritime industry from 31 countries and with a gender representation of 18.4% female and 81.6% male and a mean age of 42.2. The respondents also had a mean time spent in the maritime industry of 18.7 years (standard deviation 12.5); 52.2% were ex-seafarers involved in other sectors of the maritime industry, 9.2% were active seafarers and 38.6% were maritime stakeholders with no seafaring experience. Among other things, respondents were asked to identify what they thought to be the most important attributes, qualities and competencies a seafarer needs to have today, in the next 5-10 years and in the next 10-30 years.
Furthermore, respondents identified the most significant drivers that would influence (1) the nature of the maritime industry, and (2) the requirements for seafarer knowledge, skills and attitudes for maritime operations in the next 20 years.
The full survey report to the IEB is attached to this BoK as Appendix III.

2.2.3. Coding of survey responses and link to Bloom's taxonomy

The responses from the survey regarding seafarers' knowledge, skills and attitudes (KSA) for maritime operations (raw data), were coded to derive an initial code set of 78 different KSAs. With reference to previous research, strategic global discourses in industry and IMO[12] and in consultation with global labour and maritime experts, the initial list of seventy-eight (78) was aggregated and refined to arrive at twenty-eight (28) KSAs categorized into four (4) sets of skills as follows:

[12] For examples see Gardner, B. Naim, M. Obando-Rojas, B. & Pettit, S. (2001). Maintaining the maritime skills base: does the Government have a realistic strategy?, *Maritime Policy & Management*, *28*(4), 347-360; "Human factor competencies for the future mariner" by P. Chawla (http://www.he-alert.org/filemanager/root/site_assets/standalone_article_pdfs_1220-/he01345.pdf); the EU Project on skills and competencies development of future transportation professionals at all levels (http://skillfulproject.eu); UNCTAD Technology and Innovation Report 2018: Harnessing Frontier Technologies for Sustainable Development (http://unctad.org/en/PublicationsLibrary/tir2018_en.pdf); IMO strategic plan (IMO Resolution A.1110 (30)); Deloitte and Touche's report on "The Fourth Industrial Revolution" (https://www2.deloitte.com/content/dam/Deloitte/tr/Documents/manufacturing/Industry4-0_Are-you-ready_Report.pdf) and PwC Global's report on "Workforce of the future: Competing forces shaping 2030" (https://www.pwc.com/gx/en/services/people-organisation/workforce-of-the-future/workforce-of-the-future-the-competing-forces-shaping-2030-pwc.pdf).

I. Foundational knowledge and skills:

This first category relates to knowledge and skills derived from subjects of a fundamental arts and scientific nature that are deemed relevant to a long-term maritime career. The KSAs placed under this category relate to:

1. Mathematics
2. Natural (physical) sciences
3. General humanities and social sciences
4. English language and maritime communication
5. Computing and informatics
6. Physical and mental fitness

II. Academic skills

This category of knowledge, skills and attitudes relates to research and discovery skills, critical quantitative and qualitative thinking and academic integrity. The KSAs placed under this category relate to:

7. Problem recognition/solving
8. Critical thinking
9. Academic research
10. Contemporary global issues

III. Professional – Technical skills

The technical skills category relates to the specific technical competencies required to carry out professional competences/tasks. Requirements may be those captured by international law e.g. the technical standards required by STCW 1978, as amended, for specific competences/tasks. The KSAs placed under this category relate to:

11. Technical competencies as per international requirements (STCW)
12. Risk assessment and management
13. Situational awareness, preparedness and response
14. Technological awareness (job-specific)
15. Maritime law, policy and governance
16. Logistics and supply chain
17. Maritime business

IV. Professional – Soft skills[13]

The soft skills category relates to the skills that are required to complement technical skills, particularly where those technical skills will be expressed in a social context such as in teams. They are mainly knowledge, skills and attitudes required

[13] It has been suggested that the term "soft skills" may appear to connote weakness or easiness of attainment. The Committee does not share this view and uses the term here, in broad agreement with terminology used during IEB discussions, to mean what has been referred to elsewhere as "people skills", "inter-personal skills", "relationship skills", "managerial or leadership skills".

for optimum socio-technical, human-human and human-organizational interactions. The KSAs placed under this category relate to:

18. Technological awareness (global)
19. Leadership, teamwork and discipline
20. Effective (interpersonal) communication
21. Sustainable development
22. Human resource management
23. Cultural/diversity awareness and sensitivity
24. Progressive mindset and lifelong learning
25. Environmental awareness, sustainability and stewardship
26. Decision-making and proactivity
27. Mentorship
28. Professionalism and ethical responsibility

These KSAs were then interrogated/analysed for their relevance at different levels of mastery for the GMP using Bloom's and Simpson's taxonomies.

2.3. Taxonomy of learning outcomes

2.3.1. Learning outcome taxonomies used in the Body of Knowledge

2.3.1.1. Bloom's taxonomy for the cognitive, affective and psychomotor domains

The original Bloom's Taxonomy was created by a group spearheaded by Benjamin S. Bloom in 1948 out of a conference of the American Psychological Association (APA). The group's intention was to generate a classification method for the thinking behaviours associated with increased learning so that commensurate learning outcomes, activities and assessments could in turn, be generated. After eight years, their work resulted in the creation of taxonomies for three domains: the cognitive, affective and psychomotor domains. The cognitive domain remains the most prominent and widely used. The work resulted in the publication of the seminal work "Bloom's Taxonomy" in 1956[14].

In 2001, Lorin Anderson, a former student of Bloom, and others revised the original taxonomy[15]. Major revisions included changing the original taxonomy level indicators from noun to verb (e.g. evaluation to evaluating), using different words in some cases (e.g. comprehension to understanding), rearranging them in a number of instances (e.g. synthesis – renamed creating – and positioned higher than evaluating).

[14] Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., & Krathwohl, D. R. (1956). *Taxonomy of educational objectives: The Classification of educational goals. Handbook I: Cognitive domain*. New York: David McKay.

[15] Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., . . . Wittrock, M. C. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives.* New York: Longman.

See also Krathwohl, D. R. (2002). A revision of Bloom's Taxonomy: An overview. *Theory into practice, 41*(4), 212-218.

There are other frameworks, models and taxonomies for determining learning levels[16]. For its succinctness, comprehensiveness, pervasiveness of use and universal decades-long acceptance, this BOK uses the Bloom's taxonomy (in its revised form).

2.3.1.2. Simpson's taxonomy for the psychomotor domain

From 1964, Dr. Elizabeth Simpson led a group at the University of Illinois in a project to formulate and refine a taxonomy that would address the psychomotor domain. The project report – submitted to the US Office of Education in 1966 - shows Simpson's levels of objectives in the psychomotor domain[17]. These are deemed more appropriate to the maritime context as they are more andragogical, relating to the development of skills in adults who may be taken out of their comfort zones.

2.3.2. The cognitive domain and its levels of achievement

The cognitive domain describes the development of mental/intellectual skills ranging from the simple recollection of specific facts to the analysis, evaluation and creation of complex ideas and concepts. It essentially applies to knowledge-based professional elements.

2.3.3. The affective domain and its levels of achievement

The affective domain describes the development of emotional traits such as feelings, degree of acceptance or rejection, values, appreciation, enthusiasm, motivation and attitudes. It relates to all the learning objectives/outcomes covering those issues that relate to, arise from or influence feelings or emotions or an individual's inclination to act or refrain from acting in a certain manner due to personal convictions, quality of character and of conscience[18].

2.3.4. The psychomotor domain and its levels of achievement

The psychomotor domain relates to motor and physical skills and to "objectives which emphasize some muscular or motor skill, some manipulation of material and objects, or some act which requires a neuromuscular co-ordination" [19]. Bloom's levels for the psychomotor domain range from imitation/mimicking to automatization/naturalization of physical skills. Simpson's level (used in this BoK) include perception, set, guided response, mechanism, complex overt response, adaptation and origination in that order.

It is impossible, in reality to completely isolate the domains. Almost all learning will evidence substantial overlaps. Indeed, Bloom and his colleagues, as well as Simpson and her colleagues,

[16] Anderson et al. (footnote 7) list 19 of them.
[17] Simpson, E. (1972). *The classification of educational objectives in the psychomotor domain*. Washington, DC: Gryphon House.
[18] Manuel, M. E. (2005). Beyond rules, knowledge and skill. In D. Nielsen (Ed.), *Maritime security and MET. Proceedings of the International Association of Maritime Universities (IAMU) 6th Annual General Assembly and Conference* (pp. 257-266). Southampton: WIT Press.
[19] Krathwohl, D. R., Bloom, B. S., & Masia, B. B. (1964). *Taxonomy of educational objectives: The classification of educational goals. Handbook II: Affective Domain*. London: Longman Group.

agree that all objectives – irrespective of how obviously they fall into one domain – will have components of the other two. The taxonomies simply serve to categorize the domains and levels for the purpose of determining specific learning outcomes, while recognizing the overlaps inherent in them.

2.4. GMP tiers/levels

The BOK categorizes the GMP learning outcome requirments at four levels or tiers: A, B, C, and D

2.4.1. GMP Tier A

GMP Tier A addresses the requirements of operational level competency in the maritime industry together with a first academic degree. For example, in the context of the STCW Convention 1978, as amended, this translates to operational level certificate of competency together with a Bachelor of Science Degree.

2.4.2. GMP Tier B

GMP Tier B addresses the requirements of management level competency in the maritime industry together with the academic degree requirements of Tier A. For example, in the context of the STCW Convention 1978, as amended, this translates to management level certificate of competency together with a Bachelor of Science Degree. Achievement at tier B presupposes completion of tier A components.

2.4.3. GMP Tier C

The GMP Tier C addresses the requirements of management level competency together with a postgraduate academic degree. For example, in the context of the STCW Convention 1978, as amended, this translates to management level certificate of competency together with a Master of Science Degree. Achievement at tier C presupposes completion of tier B components.

2.4.4. GMP Tier D

The GMP Tier D addresses the requirements of management level competency together with an advanced postgraduate academic degree. For example, in the context of the STCW Convention 1978, as amended, this translates to management level certificate of competency together with a Doctoral Degree. Achievement at tier D presupposes completion of tier C components.

Chapter 3. The Body of Knowledge

3.1. Introduction

This chapter forms the core content of the Body of Knowledge. It sets out tables which show the different GMP tiers as they relate to the levels of the relevant taxonomies and in respect of the specific KSAs.

3.2. Skills related to Bloom's taxonomy

3.2.1. KSAs related to cognitive domain and levels of achievement

Table 1 shows the achievement required for the different GMP tiers in respect of the 6 levels of the revised Bloom's taxonomy in the cognitive domain and as they relate to the KSAs in the 4 categories – foundational, academic, professional (technical) and professional (soft).

The indicated GMP tier is the minimum required for the respective level of achievement of the cognitive domain. For example, D (GMP tier D) in the level 6 column will indicate that a tier D GMP should have at least that competence. GMP tiers A-C, in this example, can still attain level 6.

Table 1: Levels of achievement in the cognitive domain for focus areas[20]

... Principles and practices related to ...	***Levels of achievement in the Cognitive Domain***					
	1 Remembering	2 Understanding	3 Applying	4 Analysing	5 Evaluating	6 Creating
Foundational elements						
1. Mathematics	A	A	A			
2. Natural (physical) sciences	A	A	A			
3. General humanities and social sciences	A	A	A			
4. English language and maritime communication	A	A	A			
5. Computing and informatics	A	A	A			
6. Physical and mental fitness	A	A	A			
Academic elements						
7. Problem recognition/solving	B	B	B	B	C	D
8. Critical thinking	A	A	B	B	C	D
9. Academic research	A	A	A	B	C	D
10. Contemporary global issues	A	A	B	B	C	D
Professional – Technical elements						
11. Technical competencies as per international requirements (STCW)	A	A	A	B	C	D

[20] For each focus area and level, the table may be read as follows: "[*Bloom's verb associated with level*] principles and practices related to [*focus area*]", for example, "*Remembering* principles and practices related to *mathematics*".

... Principles and practices related to ...	***Levels of achievement in the Cognitive Domain***					
	1 Remembering	2 Understanding	3 Applying	4 Analysing	5 Evaluating	6 Creating
12. Risk assessment and management	A	A	A	B	C	D
13. Situational awareness, preparedness and response	A	A	A	B	C	D
14. Technological awareness (job-specific)	A	A	A	B	C	D
15. Maritime law, policy and governance	A	A	B	C	C	D
16. Logistics and supply chain	A	A	B	C	C	D
17. Maritime business	A	A	B	C	C	D
Professional – Soft elements						
18. Technological awareness (global)	A	A	A	B	C	D
19. Leadership, teamwork and discipline	A	A	A	B	C	D
20. Effective (interpersonal) communication	A	A	A	B	C	D
21. Sustainable development	A	A	B	C	C	D
22. Human resource management	A	A	B	B	C	D
23. Cultural/diversity awareness and sensitivity	A	A	A			
24. Progressive mindset and lifelong learning	A	A				
25. Environmental awareness, sustainability and stewardship	A	A	A			
26. Decision-making and proactivity	A	A	B	B	C	D
27. Mentorship	A	A	B	B	C	D
28. Professionalism and ethical responsibility	A	A	A	B	C	D

3.2.2. KSAs related to affective domain and levels of achievement

Table 2 shows the achievement required for the different GMP tiers in respect of the 5 levels of Bloom's taxonomy in the affective domain and as they relate to the KSAs in the 4 categories – foundational, academic, professional (technical) and professional (soft). The indicated GMP tier is the minimum required for the respective level of achievement of the affective domain. For example, C (GMP tier C) in the level 5 column will indicate that a tier C GMP should have at least that competence. GMP tiers A and B, in this example, can still attain level 5.

Table 2: Levels of achievement in the affective domain for focus areas

... Principles and practices related to ...	***Levels of achievement in the Affective Domain***				
	1 Receive (Awareness)	2 Respond (React)	3 Value (Understand and act)	4 Organize personal value system	5 Internalize value system (Adopt behaviour)
Foundational elements					
1. Mathematics					
2. Natural (physical) sciences					
3. General humanities and social sciences	A	A	A	B	B
4. English language and maritime communication					
5. Computing and informatics					
6. Physical and mental fitness	A	A	A	A	A
Academic elements					
7. Problem recognition/solving	A	A	A	B	B
8. Critical thinking	A	A	A	B	B
9. Academic research	A	A	A	B	B
10. Contemporary global issues	A	A	A		
Professional – Technical elements					
11. Technical competencies as per international requirements (STCW)	A	A	A	B	B
12. Risk assessment and management	A	A	A	B	B
13. Situational awareness, preparedness and response	A	A	A	B	B
14. Technological awareness (job-specific)	A	A	A	B	B
15. Maritime law, policy and governance					
16. Logistics and supply chain					
17. Maritime business					

... Principles and practices related to ...	***Levels of achievement in the Affective Domain***				
	1 Receive (Awareness)	2 Respond (React)	3 Value (Understand and act)	4 Organize personal value system	5 Internalize value system (Adopt behaviour)
Professional – Soft elements					
18. Technological awareness (global)	A	A	A	B	B
19. Leadership, teamwork and discipline	A	A	A	B	B
20. Effective (interpersonal) communication	A	A	A	B	B
21. Sustainable development	A	A	B	B	B
22. Human resource management	A	A	A	B	B
23. Cultural/diversity awareness and sensitivity	A	A	A	B	B
24. Progressive mindset and lifelong learning	A	A	A	B	B
25. Environmental awareness, sustainability and stewardship	A	A	A	A	B
26. Decision-making and proactivity	A	B	B	B	C
27. Mentorship	A	A	B	B	B
28. Professionalism and ethical responsibility	A	A	A	B	B

3.2.3. KSAs related to psychomotor domain and levels of achievement

Table 3 shows the achievement required for the different GMP tiers in respect of the 7 levels of Simpson's taxonomy in the psychomotor domain and as they relate to the KSAs in the 4 categories – foundational, academic, professional (technical) and professional (soft).

The indicated GMP tier is the minimum required for the respective level of achievement of the psychomotor domain. For example, B (GMP tier B) in the level 6 column will indicate that a tier B GMP should have at least that competence. GMP tier A, in this example, can still attain level 6.

Table 3: Levels of achievement in the psychomotor domain for focus areas

... Principles and practices related to ...	***Levels of achievement in the Psychomotor Domain***						
	1 Perception (Awareness)	2 Set	3 Guided response	4 Mechanism (Basic proficiency)	5 Complex overt response (Expert)	6 Adaptation	7 Origination
Foundational elements							
1. Mathematics	***No levels of achievement in the psychomotor domain for these elements***						
2. Natural (physical) sciences							
3. General humanities and social sciences							
4. English language and maritime communication							
5. Computing and informatics							
6. Physical and mental fitness							
Academic elements							
7. Problem recognition/solving							
8. Critical thinking							
9. Academic research							
10. Contemporary global issues							
Professional – Technical elements							
11. Technical competencies as per international requirements (STCW)	A	A	A	B	B	B	
12. Risk assessment and management							
13. Situational awareness, preparedness and response	A	A	A	B	B	B	
14. Technological awareness (job-specific)							
15. Maritime law, policy and governance							
16. Logistics and supply chain							

... Principles and practices related to ...	***Levels of achievement in the Psychomotor Domain***						
	1 Perception (Awareness)	2 Set	3 Guided response	4 Mechanism (Basic proficiency)	5 Complex overt response (Expert)	6 Adaptation	7 Origination
17. Maritime business							
Professional – Soft elements							
18. Technological awareness (global)	***No levels of achievement in the psychomotor domain for these elements***						
19. Leadership, teamwork and discipline							
20. Effective (interpersonal) communication							
21. Sustainable development							
22. Human resource management							
23. Cultural/diversity awareness and sensitivity							
24. Progressive mindset and lifelong learning							
25. Environmental awareness, sustainability and stewardship							
26. Decision-making and proactivity							
27. Mentorship							
28. Professionalism and ethical responsibility							

3.3. Learning outcomes related to skills

As indicated in Chapter 2, the BoK focuses on learning outcomes related to the subject areas of relevance to the GMP. It does not directly address the contents of curricula and syllabi which may help to achieve the intended learning outcomes. Cognizance is taken of the existence, among IAMU members, of different jurisdictional approaches and paradigms that support different learning activities to arrive at the same learning outcomes. The specific curricula, syllabi content, learning activities and materials remain unique to each higher education institution and under the jurisdictional control of the relevant nation or region.

3.3.1. ILOs for Cognitive Domain

In this sub-section, Table 4 sets out the intended learning outcomes for the different levels of the revised Bloom's taxonomy in the cognitive domain with details of the descriptions for each level and for each focus area.

Table 4: Intended learning outcomes in the cognitive domain

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
Foundational elements						
1. Mathematics	**Identify** key mathematics information and **recall** equations related to academic and professional skills.	**Explain** relevant mathematical principles.	**Demonstrate** the application of mathematical principles to the solution of relevant problems.	**Analyze** complex problems to determine relevant mathematical principles and **examine** solutions in light of this analysis.	**Evaluate** the merits of using different mathematical approaches to solve problems.	**Create** new knowledge/approaches in mathematics.
2. Natural (physical) sciences	**Recall** key factual information relating to physics and chemistry for academic and professional skills.	**Explain** relevant concepts in physics and chemistry.	**Demonstrate** the application of principles of the physical sciences for solving problems and performing relevant tasks.	**Analyze** complex problems to determine relevant concepts and principles related to the physical sciences and **examine** solutions in light of this analysis.	**Evaluate** the merits of using different physical science approaches to solve problems.	**Create** new knowledge/approaches in the physical sciences.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
3. General humanities & social sciences	**Identify** key factual information from different areas of the humanities/social sciences and **recognize** how they relate to maritime professional practice.	**Explain** relevant concepts from the humanities/social sciences.	**Employ** humanities/social science concepts in maritime professional practice.	**Compare and contrast** different humanities/social science concepts and **examine** how they relate to maritime professional practice.	**Evaluate** the merits of applying humanities/social science concepts and approaches to maritime professional situations.	**Create** new knowledge/approaches in the humanities/social sciences.
4. English language & maritime communication	**Recognize** features of the English language and **recall** maritime phrases relevant to professional maritime communication.	**Explain** key concepts and structuring of the English language and the use of suitable maritime communication phrases.	**Make use of** relevant and appropriate language and communication in professional maritime practice. **Communicate** effectively in written and spoken English in a cross-cultural context both for social and professional purposes.	**Analyze** different texts & reports in various academic & maritime contexts related to academic & professional maritime skills.	**Evaluate** the merits of using different communication phrases and the suitability of various language forms in different maritime contexts.	**Create** new knowledge in language use and communication related to the maritime industry.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
5. Computing & informatics	**Identify** key computing & informatics knowledge related to maritime academic and professional skills.	**Explain** key concepts of computing & informatics and their relevance to the maritime industry.	**Employ** relevant computing & informatics concepts and techniques to maritime academic and professional tasks.	**Categorize** different computing & informatics solutions in the maritime industry and **compare / contrast** their suitability in different maritime contexts.	**Evaluate** the merits of different computing and informatics solutions in accomplishing different maritime tasks.	**Create** new computing & informatics solutions with applications in the maritime industry.
6. Physical & mental fitness	**Recall** key factual knowledge about physical & mental fitness as it relates to maritime professional practice.	**Explain** key facts and concepts about sustaining physical and mental health/fitness and the specific international requirements for the maritime industry.	**Develop and maintain** physical and mental fitness and health.	**Examine** different methods for developing and maintaining physical and mental fitness.	**Evaluate** the effects and merits of different strategies and approaches for developing and maintaining physical and mental fitness and health.	**Improve** existing strategies and **create** new approaches for physical and mental fitness development.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
			Academic elements			
7. Problem recognition/solving	**Identify** constituent parts of a situation that evidence a problem and **describe** problem-solving techniques.	**Explain** the requirements for diagnostic thinking.	**Demonstrate** problem recognition and solving skills in the context of specific maritime tasks.	**Analyze** different problem recognition and solving approaches.	**Assess** the comprehensiveness of particular approaches to problem identification and recognition and **evaluate** the merits of alternative solutions.	**Develop** new approaches to problem identification, recognition and solving.
8. Critical thinking	**Define** critical thinking and **describe** its component concepts.	**Explain** the scope & content of critical thinking and **outline** areas of maritime professional practice that require critical thinking.	**Demonstrate** the use of critical thinking techniques in specific maritime professional contexts.	**Analyze** the outcomes of critical thinking processes and techniques as they relate in particular to maritime professional tasks.	**Appraise** the effectiveness and value of different critical thinking techniques and **assess** their impact.	**Develop** new insights into critical thinking techniques and processes in the maritime industry.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
9. Academic research	**Identify** different methodologies and methods and **describe** the processes required for the conduct of academic research.	**Explain** the rationale, procedures and practical applications of academic research.	**Prepare** clear and feasible research hypotheses. **Conduct** a coherent and relevant literature review and **use** and **cite** sources appropriately and correctly. **Employ** appropriate research methods and tools (both qualitative and quantitative) to **conduct** academic research related to various technical areas of maritime affairs & report the results.	**Analyze** the outcomes of academic research. **Synthesize** and **present** research outcomes in a suitable format.	**Assess** different research approaches and their feasibility / suitability for specific research questions and **evaluate** the outcomes of the application of various research approaches to these questions.	**Develop** new approaches for the conduct and analysis of academic research.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
10. Contemporary global issues	**Identify** topical global issues.	**Explain** how current global issues impact the maritime industry and professional practice.	**Build** links between contemporary issues and actions required in maritime practice.	**Discover and examine global** developments in diverse sectors and **analyze** their impacts on the maritime industry and professional practice.	**Assess** the consequences of different responses to global issues and **evaluate** the merits of specific courses of action in respect to these issues.	**Generate** new insights that contribute to the global discourse on contemporary issues.
Professional – Technical elements						
11. Technical competencies as per international requirements (STCW)	**Identify** the principles of and requirements for maritime competencies as per international requirements.	**Explain** the principles & concepts underpinning the international requirements for maritime competencies.	**Apply** relevant knowledge and skills to specific maritime tasks and fulfil all the requirements of the international standards.	**Analyze** specific maritime tasks and the competencies required to carry them out by international standards and maritime industry practice.	**Appraise** the effectiveness of maritime operational and management actions and assess systems and procedures in the maritime industry.	**Develop** new approaches, systems and procedures for effective performance in the maritime industry.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
12. Risk assessment and management	**Define** risk and **identify** the principles of risk assessment and management.	**Illustrate** principles and concepts of risk assessment and management using specific maritime examples.	**Apply** different risk assessment and management techniques / approaches to various maritime scenarios.	**Compare** and **contrast** the underlying assumptions and world views that both inform and address risk perception and analysis.	**Appraise** maritime actions, techniques or procedures in risk assessment and management.	**Develop** new approaches, techniques and procedures for effective risk assessment and management.
13. Situational awareness, preparedness and response.	**Recall** elements / components of situational awareness and identify factors that impact situational awareness, preparedness and response.	**Explain** the components of situational awareness and the inter-relations between them and how these affect preparedness and response.	**Demonstrate** situational awareness and preparedness and **implement** suitable response procedures.	**Critique** the assumptions, approaches and analysis of situational awareness / preparedness techniques with a view to enhancing response procedures.	**Evaluate** maritime actions/techniques for enhancing situational awareness and response effectiveness.	**Improve** existing maritime scenarios relating to situational awareness and a state of preparedness and **model** appropriate states of preparedness and response for new scenarios.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
14. Technological awareness (job-specific)	**Show** the importance of job-specific technological awareness for maritime professional practice and **identify** optimum technologies in relevant areas.	**Illustrate** how existing and prospective technologies relate to specific maritime tasks and **explain** how they influence such tasks.	**Select** optimum technologies to be applied in specific maritime operations based on an awareness of state-of-the-art technology.	**Analyze** the operational readiness and suitability of technological applications in maritime practice.	**Evaluate** the performance standards of different technological application and **appraise** their suitability for maritime tasks.	**Develop** optimum technological awareness techniques and technological solutions for the maritime industry.
15. Maritime law, policy and governance	**Identify** the legal, policy and governance frameworks that influence and regulate the maritime industry at national, regional and international levels.	**Explain** the different structures, principles and mechanisms for the development and implementation of law, policy and governance of the maritime industry.	**Apply** legal, policy and governance principles in maritime professional practice.	**Analyze** the effect of law, policy and governance implementation mechanisms on the maritime industry and on professional practice.	**Evaluate** maritime stakeholders' response and contribution to law, policy and governance at the national, regional and international levels.	**Integrate** principles of law, policy and governance in the development of new approaches to regulating the maritime industry.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
16. Logistics and supply chain	**Describe** the global supply chain and **identify** the underpinning principles of logistics.	**Explain** the principles and concepts of logistics and supply chain and **outline** their importance and role in the maritime industry.	**Apply** logistics and supply chain concepts in maritime professional practice.	**Compare** and **contrast** different logistics and supply chain theoretical approaches and **analyze** their effect on practical maritime operations.	**Evaluate** contemporary and potential logistics and supply chain optimization tools and processes.	**Develop** new maritime supply chain optimization tools and processes.
17. Maritime business	**Describe** the constituent parts of and issues relating to maritime business including maritime economics and economic geography.	**Explain** the principles and concepts relating to maritime business and **outline** the factors that influence it.	**Apply** management and business concepts, and project management in maritime professional practice. **Apply** legal, regulatory and financial knowledge related to business processes.	**Compare** and **contrast** different maritime business and economics approaches and **analyze** their effect on practical maritime operations. **Perform** cost analysis.	**Evaluate** business decisions utilizing a validated set of methods and the economic parameters that lead to informed business decisions. **Evaluate** contemporary maritime business issues and assess their impact – both present and in the future - on the maritime industry and professional practice.	**Improve** current maritime business approaches and **create** new maritime business models.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
Professional – Soft elements						
18. Technological awareness (global)	**Show** an awareness of global technologies and their evolution and **identify** optimum technologies in relevant areas.	**Illustrate** how existing and prospective technologies relate to various maritime tasks and **explain** how they influence such tasks **exhibiting** an appreciation of the dynamics of socio-technical systems.	**Use** relevant global technologies in various maritime operations based on an awareness of state-of-the-art technology. **Apply** a system approach to understanding complex socio-technical system behaviour.	**Analyze** the impact of modern global technologies on various technological applications in maritime practice.	**Evaluate** the performance standards of different technological application and **appraise** their suitability for maritime tasks.	**Develop** optimum global technological awareness techniques and technological solutions for the maritime industry.
19. Leadership, teamwork and discipline	**Define** leadership, teamwork and discipline and **describe** the effect of each on the general performance of the GMP.	**Compare and contrast** different leadership theories/principles. **Explain** the place of leadership and teamwork in maritime professional practice.	**Apply** leadership, teamwork & discipline principles to direct the efforts of a small, homogenous group on board ships.	**Analyze** the effect of the application of different leadership and teamwork theories and **infer** possible consequences from the application of such theories in maritime professional practice.	**Evaluate** own and other's discipline, style of leadership and contribution to teamwork and related outcomes.	**Create/develop** leadership, teamwork & discipline in a maritime entity to accomplish complex tasks.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
20. Effective (interpersonal) communication	**Name** the components of a successful interpersonal communication cycle with particular reference to maritime operations.	**Explain** the principles and factors that influence optimum interpersonal communication in a maritime professional context.	**Demonstrate** the use of good interpersonal communications for productive maritime operational outcomes.	**Distinguish** between different communication styles/approaches and **analyze** their applicability to different scenarios in maritime operational contexts.	**Evaluate** and **recommend** appropriate processes/approaches for communication between different organizational levels and individuals / teams characterized by significant diversity.	**Devise** mechanisms for improving interpersonal communications in maritime professional practice.
21. Sustainable development	**Define** sustainable development as a concept and **describe** its underpinning values and areas of relevance in the maritime domain.	**Explain** the evolution of the concept of sustainable development including any areas of contention and **discuss** the importance of the concept.	**Execute** sustainable development plans in a controlled/closed maritime environment.	**Identify** areas in the maritime industry for which sustainable development is critical and **analyze** contemporary mechanisms to integrate sustainable development in the maritime industry.	**Assess** the current status of sustainable development in own operational and organizational context, **highlight** areas that need development and **recommend** optimization mechanisms.	**Develop** long-term plans for the application of the concept of sustainable development in the maritime domain.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
22. Human resource management	**Define** "human resource management" and **describe** the development of the concept from the earlier concept of "personnel management".	**Explain** the principles underpinning human resource management and **distinguish** between different techniques, activities and approaches and their relevance to a multicultural environment.	**Apply** relevant human resource management theories and techniques to **achieve** goals related to own maritime professional practice.	**Diagnose** the causes of ineffective human resource management and **prioritize** the actions to be taken to address problems that may arise due to poor human resource management practices.	**Judge** the effectiveness of different human resource management approaches and techniques in different contexts of maritime professional practice and highlight areas that need further attention.	**Develop** new human resource management techniques when conventional techniques are not suitable or not applicable.
23. Cultural/diversity awareness and sensitivity	**Describe** cultural/diversity awareness & sensitivity. **State** the relevance of such awareness and sensitivity for GMP performance.	**Distinguish** between different factors that influence diversity awareness and sensitivity and **explain** how they may affect maritime operations using specific cases.	**Demonstrate** the ability to work in a multicultural environment and show optimum awareness and sensitivity to diversity in specific contexts.	**Diagnose** the causes of a lack of awareness and insensitivity to diversity and **prioritize** the actions to be taken to address this positively.	**Judge** the effectiveness of current cultural/diversity awareness & sensitivity techniques & highlight the areas that need further attention. **Appraise** different cultural variables, preferences, norms, biases and expectations to achieve a common understanding.	**Facilitate** increased insights into human interaction and how such interaction may be optimised beyond conventional techniques and approaches.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
24. Progressive mindset and lifelong learning	**Describe** what is meant by a progressive mindset and lifelong learning principle. **Outline** their importance for the continuous development of both individuals and maritime organizations. **Describe** change management approaches and the role of "change agents" in maritime organizational settings.	**Compare** and **contrast** different mechanisms and theories on the development and maintaining of a progressive mindset and lifelong learning. **Explain** the impact diversity may have on change leadership and management and the concepts, frameworks and theories that guide organizational change.	**Apply** progressive mindset & lifelong learning principles techniques and **investigate/predict** the barriers that may face the GMP in this regard in specific maritime contexts (e.g. on-board ship).	**Analyze** own performance and that of others (in particular subordinates) regarding the development of a progressive mindset, change-capability & lifelong learning skills. **Analyze** the dynamics of a learning organization.	**Evaluate** own performance and that of subordinates regarding the development of a progressive mindset & lifelong learning skills. **Appraise** organizational learning and change-capability in own organization.	**Construct** tailored programs to encourage the application of progressive mindset & lifelong learning principles among a group of GMPs. **Model** the overcoming of difficulties and barriers in specific maritime contexts (e.g. on-board ship) and improvements in organizational learning.
25. Environmental awareness, sustainability and stewardship	**Describe** the notion of environmental awareness, sustainability and stewardship.	**Clarify** the responsibility of the GMP in respect of environment sustainability and stewardship and **explain** global efforts/activities for environmental stewardship in particular in the maritime industry.	**Demonstrate** environmental awareness and stewardship in simulated or real scenarios and **use** relevant equipment for environment preservation in compliance with all relevant legal instruments.	**Analyze** the effectiveness of own and others' actions in preserving the environment.	**Assess** own performance and that of the organization regarding environment preservation and **evaluate** the merits of different actions/approaches to environmental preservation.	**Develop/amend** environmental awareness, sustainability & stewardship policies in maritime entities in keeping with new insights into human behaviour, environmental science and technology.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
26. Decision making and proactivity	**Outline** the importance of proper and proactive decision-making in maritime operations and **describe** how this is linked to the success of a GMP.	**Explain** the bases and principles of good decision-making and proactivity as they apply to maritime professional practice.	**Demonstrate** optimum decision-making skills in diverse operational contexts and take proactive steps to address developing situations and challenges.	Critically **examine** different decision-making processes and options.	**Appraise** the outcomes of various decisions and **evaluate** the merits of the processes that informed them and of different proactive actions in diverse situations.	**Construct** training scenarios for the development of individual decision-making skills and **generate** models for increasing proactivity-based resilience in maritime organizations.
27. Mentorship	**Define** mentorship and **describe** its relevance for the GMP and the maritime industry as a whole.	**Distinguish** between training and mentoring and **explain** the necessity for and effect of each one on maritime professional practice. **Discuss** the characteristics required in both a mentor and mentee for optimum mentorship results.	**Demonstrate** skills as both mentee and mentor.	**Explore** possible outcomes of different approaches to mentoring and their outcome in different situations. **Analyze** the factors that may negatively influence mentoring outcomes.	**Evaluate** mentoring techniques and actions for their relevance, effectiveness and sustainability.	**Develop** fit-for-purpose mentoring strategies and programmes for mentees.

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	**2** Understanding	**3** Applying	**4** Analyzing	**5** Evaluating	**6** Creating
28. Professionalism and ethical responsibility	**List** the professional & ethical responsibilities of a GMP.	**Explain** the basis for professional & ethical standards especially as they relate to maritime professional practices.	**Apply** standards of professional & ethical responsibility to determine an appropriate course of action in diverse operational contexts.	**Analyze** a situation involving multiple conflicting professional & ethical interests to determine an appropriate course of action.	**Justify** a solution to a job-related problem based on professional ethical standards and **assess** own personal professional & ethical development.	**Generate** items related to ethical codes of conduct and **create** research-based opportunities and experiences to foster professional and ethical conduct in maritime professional practice.

3.3.2. ILOs for Affective Domain

In this sub-section, table 5 sets out the intended learning outcomes for the different levels of Bloom's taxonomy in the affective domain with details of the descriptions for each level and for each focus area. A blank field indicates an area where the level of the domain is deemed not to have relevance to the focus area.

Table 5: Intended learning outcomes in the affective domain

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
			Foundational elements		
1. Mathematics					
2. Natural (physical) sciences					
3. General humanities & social sciences	**Choose** key relevant information from the general humanities and social sciences and **relate** such information to maritime professional practice.	**Discuss** theories and principles from the humanities and social sciences as they relate to specific scenarios in maritime professional practice.	**Demonstrate** commitment to appropriate values derived from an understanding of key factual information from the humanities and social sciences in a maritime context.	**Formulate** a value system based on a comparison of principles inherent in the humanities and social sciences. **Defend** the application of specific value sets in different scenarios.	**Display** optimum values related to critiqued principles inherent in the humanities and social sciences in new and challenging situations.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
4. English language & maritime communication					
5. Computing & informatics					
6. Physical & mental fitness	**Listen** to orders in respect of the development and maintaining of physical and mental fitness.	**Comply** with orders to develop physical and mental fitness and **select** suitable actions for such development.	**Initiate** own actions to develop/maintain physical and mental fitness and **justify** the choice of these actions.	**Integrate** optimum methods/approaches for developing / maintaining physical and mental fitness into own routine and **organize** relevant activities accordingly.	**Revise** methods/approaches used for developing / maintaining physical and mental fitness to suit different circumstances and contexts.
Academic elements					
7. Problem recognition/solving	**Acknowledge** the importance of problem recognition/solving in maritime professional practice.	**Select** and **discuss** situational elements that facilitate or hinder problem recognition/solving.	**Prioritize** problem recognition/solving in challenging and complex maritime operational scenarios.	**Integrate** a commitment to use advanced problem-solving techniques to achieve a holistic approach to maritime-related practices.	**Act** independently or in a team to identify and solve problems and **display** a professional commitment to a diagnostic and solution-oriented mindset.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
8. Critical thinking	**Acknowledge** the importance of critical thinking in maritime transport-related problems.	**Question** ideas, methods, and approaches following optimum critical thinking techniques.	**Value** critical thinking and **adhere to** critical thinking techniques when faced with complex situations in maritime professional practice.	**Integrate** a commitment to use advanced critical thinking techniques to achieve a solutions-oriented approach to maritime-related problems.	**Advocate** for effective critical thinking techniques from a holistic perspective in the maritime domain.
9. Academic research	**Acknowledge** the importance of ethical academic research for the long-term sustainability of the maritime industry.	**Comply** with the research methodological principles in own research.	**Value** the use of correct research practices, in particular those related to research ethics.	**Adhere** to appropriate behaviour in accordance with research methods and codes of ethics as well as statutory requirements.	**Support** and **urge** the use of proper research methods and **ethical** behaviour in to advance knowledge in the maritime industry.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
10. Contemporary global issues	**Follow** relevant contemporary global issues and their effect on the maritime industry.	**Participate in** and **contribute** to the global discourse on relevant contemporary global issues and their effect on maritime professional practice.	**Demonstrate** belief in the need to have all stakeholders aware of and contributing to the discourse of global issues of relevance to the maritime industry.	**Form judgments** about different perspectives on contemporary global issues and their impacts on the maritime industry.	**Propose** and **substantiate** own viewpoints related to contemporary global issues and their effect on maritime professional practice.
Professional - Technical elements					
11. Technical competencies as per international requirements (STCW)	**Acknowledge** the importance of supporting the basic value system that leads to the establishment of technical standards in international law and the need for a commitment by all to upholding them.	**Comply** with the main principles and values informing technical competencies as required by international law.	**Demonstrate** a value system in support of own technical competency and **differentiate** between positive and negative application of technical competencies.	**Integrate** proper values, levels of commitment and accountability in application of own technical competency.	**Act** consistently in manifesting technical competency and **influence** others to be technically competent with an optimum value-base.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
12. Risk assessment and management	**Identify** the proper behaviour in case of risk, and **describe** values underpinning risk assessment and management in maritime professional practice.	**Comply** with relevant directives/orders for risk assessment and management.	**Demonstrate** an appreciation of the need for risk assessment and management.	**Synthesize** and **integrate safety** values and **display** a risk awareness, assessment and management outlook in daily routines.	Consistently **display** risk consciousness and a value-system that supports continuing risk assessment and management in operational routines.
13. Situational awareness, preparedness and response.	**Identify** the proper dispositions to maintain in order to have situational awareness and maintain a state of preparedness in diverse maritime operational contexts.	**Select** appropriate actions to take to maintain a state of situational awareness and preparedness.	**Propose** individual and team actions that promote situational awareness, a common team operating picture and an optimum state of preparedness.	**Balance** competing work/task demands for self, considering work/task load on others and **organize/plan** tasks to maintain a situational awareness and preparedness.	**Display and Perform** ethical commitments, values and principles of situational awareness, preparedness and response.
14. Technological awareness (job-specific)					
15. Maritime law, policy and governance					

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
16. Logistics and supply chain					
17. Maritime business					
Professional - Soft elements					
18. Technological awareness (global)	**Follow** global technological trends and their impact on the maritime industry.	**Present** different technologies, their evolution and impact on the maritime industry.	**Differentiate** between beneficial uses of technology and the negative impacts they may have on humans and society and **share** own insights in this regard.	**Synthesize** a rational basis for the introduction and use of evolving global technologies in own work context and **balance** their effectiveness against their limitations.	**Display** an objective and discriminatory approach to the selection and use of new technologies and **maintain** ethical usage of such technologies.
19. Leadership, teamwork and discipline	**Follow** concepts of leadership, teamwork and discipline and **acknowledge** their importance in a maritime context.	**Practice** leadership and teamwork skills in a disciplined manner to achieve the organization goals.	**Demonstrate** the importance of teamwork and commitment to leadership as indispensable for maritime professional practice.	**Formulate** own leadership strategies contingent on the specific scenario and **organize** task group for efficient and effective teamwork.	**Influence** workgroup in a disciplined manner and **cooperate** in group activities to strengthen teamwork values.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
20. Effective (interpersonal) communication	**Identify** various interpersonal communication principles.	**Discuss** advanced communication techniques and **practice** them in a professional manner.	**Demonstrate** belief in multi-directional communication and the importance of listening and **assist** in eliminating interference and barriers in communications.	**Initiate** effective communication strategies and **invite** optimum and reciprocal strategies from others.	**Propose** plans to optimize interpersonal communication in a maritime context and **act** to embed professional communication techniques in own and others' everyday routines and in all situations.
21. Sustainable development	**Name** the UN's Sustainable Development Goals (SDGs) and **point to** the maritime sector's responsibility to participate in achieving them.	**Conform** own actions to the achievement of the sustainable development goals and **volunteer** for initiatives for their achievement in the maritime context.	**Justify** the adoption of sustainable practices in the maritime field.	**Identify** unsustainable practices and values in self and others and **modify** own behaviour for more sustainable outcomes.	**Discriminate** between different motives for sustainable development and **influence** a professional commitment to sustainable development values in others.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
22. Human resource management	**Identify** the value system inherent in a "human resource management" approach as opposed to a "personnel management" approach. **Accept** the uniqueness and value of human beings.	**Discuss** the importance of human resources and their effective management for the development of the maritime industry.	**Demonstrate** good people management skills for the efficient operation of maritime organizations.	**Formulate** strategies for administering the human element underpinned by the valuing of issues such as respect, motivation, development, goal compatibility of individuals and the organization.	Professionally **manage** onboard human resources by practicing HRM methods and **influence** others positively.
23. Cultural/diversity awareness and sensitivity	**Recognise** the existence of diversity in the maritime industry.	**Discuss the** importance of cultural awareness and diversity in the maritime field.	**Demonstrate** cultural awareness and **show** sensitivity and respect towards individual and cultural differences while **valuing** diversity.	**Identify** the challenges associated with a multicultural atmosphere and the advantages of workspace diversity.	**Balance** respect of societal culture with the professional culture required in the maritime industry and **influence** the continuing development of this professional culture while maintaining respect for diversity.
24. Progressive mindset and lifelong learning	**Acknowledge** the importance of a progressive mindset and lifelong learning in the maritime field.	**Discuss** methods for continuous learning and for achieving a progressive mindset in the maritime field.	**Initiate** own learning and **complete** long-term developmental plan.	**Adhere to** a continuous learning plan and **modify** plan appropriately based on new and emergent information.	**Display** a professional commitment to workspace development and continuous learning and **advocate** for such learning.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
25. Environmental awareness, sustainability and stewardship	**Recognise** the importance of environmental awareness, sustainability and stewardship as related to the maritime industry.	**Conform** to established environmental and sustainability standards/procedures in the maritime industry.	**Demonstrate** a genuine appreciation for the environment and sustainable development with relation to the maritime industry.	**Prioritize** environmental management and sustainable development.	**Display** a professional commitment to environmental management and sustainable development and influence others.
26. Decision making and proactivity	**Acknowledge** the importance of prompt well informed decision-making and proactivity within the maritime workspace.	**Practice** simple decision-making within the maritime workspace.	**Initiate** actions that demonstrate a proactive attitude in maritime professional practice.	**Adhere to** optimum decision-making approaches and techniques in order to achieve best possible results.	**Influence** others to become proactive in maritime professional practice.
27. Mentorship	**Recognise** the role and importance of mentorship in the development of human resources and sustainable operations in the maritime industry.	**Respond** positively as a mentee to mentoring by superiors and **help** in the mentoring of others.	**Initiate** mentoring relationships in personal workspace.	**Formulate** optimum mentoring strategies for a diverse group of mentees incorporating essential knowledge and attitudinal elements.	**Influence** others to become active mentors.

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	**2** Respond (react)	**3** Value (understand and act)	**4** Organize personal value system	**5** Internalize value system (adopt behaviour)
28. Professionalism and ethical responsibility	**Acknowledge** the need for professionalism and the importance of ethics in the maritime industry.	**Comply** with existing codes of ethics and professionalism.	**Demonstrate** responsibility and professional and ethical behaviour even in the absence of explicit written codes of professional and ethical conduct.	**Organize, prioritise** and **defend** high professional and ethical standards in ambiguous ethical contexts.	Positively **influence** others to **create and maintain** high professional and ethical standards in maritime professional practice.

3.3.3. ILOs for Psychomotor Domain

In this sub-section, Table 6 sets out the intended learning outcomes for the different levels of Simpson's taxonomy in the psychomotor domain with details of the descriptions for each level and for each focus area. Blank fields indicate areas where the level of the domain is deemed not to have relevance to the focus area

Table 6: Intended learning outcomes in the psychomotor domain

Focus Area	*The Psychomotor Domain level of achievement*						
	1 Perception (awareness)	**2** Set	**3** Guided response	**4** Mechanism (basic proficiency)	**5** Complex Overt Response (Expert)	**6** Adaptation	**7** Origination
Foundational elements							
1. Mathematics	*No levels of achievement in the psychomotor domain for these focus areas*						
2. Natural (physical) sciences							
3. General humanities & social sciences							
4. English language & maritime communication							
5. Computing & informatics							

Focus Area	*The Psychomotor Domain level of achievement*						
	1 Perception (awareness)	**2** Set	**3** Guided response	**4** Mechanism (basic proficiency)	**5** Complex Overt Response (Expert)	**6** Adaptation	**7** Origination
6. Physical & mental fitness							
Academic elements							
7. Problem recognition /solving	*No levels of achievement in the psychomotor domain for these focus areas*						
8. Critical thinking							
9. Academic research							
10. Contemporary global issues							

Focus Area	*The Psychomotor Domain level of achievement*						
	1 Perception (awareness)	**2** Set	**3** Guided response	**4** Mechanism (basic proficiency)	**5** Complex Overt Response (Expert)	**6** Adaptation	**7** Origination
Professional - Technical elements							
11. Technical competencies per international requirements (e.g. STCW)	**Identify** maritime actions that involve complex movement patterns and **choose** correct action(s) among various options to meet operational requirements of efficiency and safety as per international requirements.	**Explain** the most professional, efficient and safe way of performing practical motor tasks. **Prepare** optimally for commencing such tasks.	**Respond to** and **follow** instructions regarding specific technical operations that require practical motor-skills.	Under supervision, **perform** relevant physical maritime tasks, **proceeding** in quick, accurate, safe and coordinated sequences of steps.	**Display** dexterity, competency and proficiency in handling relevant maritime tasks without hesitation and in an accurate, safe and efficient manner.	**Respond** effectively to unexpected situations with automatized responses and efficiently **adapt** task steps and instructions to meet the required performance as per international standards.	**Create** new relevant practical and safe motor-skills for routine task completion and **formulate** psycho-motor techniques to allow others to develop such new skills.
12. Risk assessment and management							

Focus Area	*The Psychomotor Domain level of achievement*						
	1 Perception (awareness)	**2** Set	**3** Guided response	**4** Mechanism (basic proficiency)	**5** Complex Overt Response (Expert)	**6** Adaptation	**7** Origination
13. Situational awareness, preparedness and response.	**Identify** and **describe** motor activities that underpin required performance in respect of maintaining a state of preparedness and for emergency response e.g. for fire prevention and fighting.	**Explain** specific steps required in carrying out practical maritime tasks with motor skills and **prepare** to take those steps.	**Follow** practical instructions to perform motor-skill-based task to maintain a state of preparedness for and response to emergency maritime situations.	**Fix and integrate** relevant physical maritime situations in high level of preparedness and performance and quick response.	**Display** dexterity, competency and proficiency in handling and carrying out tasks requiring motor-skills in relevant maritime emergency situations.	**Respond** effectively to unexpected experiences in diverse maritime emergency situations and **adapt** task steps and instructions to maintain an optimum state of preparedness and response.	**Create** new relevant practical and safe motor-skills for desired response to emergency situations and **formulate** psycho-motor techniques to allow others to develop such new skills.
14. Technological awareness (job-specific)	*No levels of achievement in the psychomotor domain for these focus areas*						
15. Maritime law, policy and governance							
16. Logistics and supply chain							
17. Maritime business							

Focus Area	*The Psychomotor Domain level of achievement*						
	1 Perception (awareness)	**2** Set	**3** Guided response	**4** Mechanism (basic proficiency)	**5** Complex Overt Response (Expert)	**6** Adaptation	**7** Origination
Professional - Soft elements							
18. Technological awareness (global)	*No levels of achievement in the psychomotor domain for these focus areas*						
19. Leadership, teamwork and discipline							
20. Effective (interpersonal) communication							
21. Sustainable development							
22. Human resource management							
23. Cultural/diversity awareness and sensitivity							

Focus Area	*The Psychomotor Domain level of achievement*						
	1 Perception (awareness)	**2** Set	**3** Guided response	**4** Mechanism (basic proficiency)	**5** Complex Overt Response (Expert)	**6** Adaptation	**7** Origination
24. Progressive mindset and lifelong learning	*No levels of achievement in the psychomotor domain for these focus areas*						
25. Environmental awareness, sustainability and stewardship							
26. Decision making and proactivity							
27. Mentorship							
28. Professionalism and ethical responsibility							

3.3.4. Proposed method for using the tables in chapter 3

In this subsection, a brief description of how the BoK may be employed by MET institutions[21] and other maritime stakeholders[22] to achieve, assess or check for GMP learning outcomes is provided. In the case of MET institutions this will be targeted at the development of curricula (syllabi, learning activities and assessment approaches).
The tables illustrated in chapter 3 should guide programme administrators[23] to extract the required Focus Areas (FA) for each domain, and the corresponding ILOs for integration into programmes, courses and learning activities.

Figure 1: Bok implementation framework

The proposed procedure may be summarized by the following four steps:

I. Ascertain appropriate Tier/s:

Initially, the programme administrator should ascertain the appropriate GMP tier/s as explained in section 2.4 according to the programme's mission and objectives.
As an example, in the case of an institution that delivers programmes designed to offer the degree of Bachelor of Science in Maritime Transportation Technology (GMP Tier-A)[24]; and Management Level Certificate of Competency (GMP Tier-B)[25], the programme should aim to achieve the requirements/learning outcomes of both Tiers A and B in order to fulfil the relevant GMP required skills.

[21] The word institution is used here to refer to any MET institution be it a university, academy, college, faculty etc. as referenced to the membership of the IAMU.
[22] Including maritime industry employers, prospective GMPs and continuing students
[23] The term "programme administrators" is used here to refer more generally to all those who develop curriculum within this context, including faculty and other stakeholders.
[24&25] See Section 2.4

II. Extraction of related Focus Areas (FA):

The programme administrator should then move on to Table 1, section 3.2. Based on the desired scope of the program to be delivered, he/she will extract the related FA from the left-most column. As mentioned in section 2.2.3, there are 28 aggregated focus areas segregated into four element groups. From each element group, the administrator should choose the FAs which are in-line with the objectives of the programme to be delivered.
Following the above example, the mentioned institution whilst focusing on tiers A and B, with regard to academic research will extract FA 9, Academic research, from the second element group "Academic elements" as shown in the Figure 2 (an excerpt from Table 1).

... Principles and practices related to ...	Levels of achievement in the Cognitive Domain					
	1 Remembering	2 Understanding	3 Applying	4 Analysing	5 Evaluating	6 Creating
Foundational elements						
1. Mathematics	A	A	A			
2. Natural (physical) sciences	A	A	A			
3. General humanities and social sciences	A	A	A			
4. English language and maritime communication	A	A	A			
5. Computing and informatics	A	A	A			
6. Physical and mental fitness	A	A	A			
Academic elements						
7. Problem recognition/solving	B	B	B	B	C	D
8. Critical thinking	A	A	B	B	C	D
9. Academic research	A	A	A	B	C	D
10. Contemporary global issues	A	A	B	B	C	D

Figure 2: Excerpt from Table 1.

III. Determining Levels of Achievement (LOA) for each Focus Areas under each of the three domains:

For each extracted FA, the program administrator shall use the remaining columns of tables 1, 2 and 3 of section 3.2 for the cognitive, affective and psychomotor domains respectively to determine the required levels of achievement for each FA according to the previously determined tiers.

Proceeding with the above example, it will be clear that the required level of achievement for the extracted FA (*9. Academic research*) under the cognitive domain extends to *level 4 Analyzing* (see Figure 2). Following the same procedure using Table 2, the respective level of achievement for the affective domain will be *level 5 Internalize value system* (see Figure 3).

... Principles and practices related to ...	Levels of achievement in the Affective Domain				
	1 Receive (Awareness)	2 Respond (React)	3 Value (Understand and act)	4 Organize personal value system	5 Internalize value system (Adopt behavior)
Foundational elements					
1. Mathematics	x				
2. Natural (physical) sciences					
3. General humanities and social sciences	A	A	A	B	B
4. English language and maritime communication					
5. Computing and informatics					
6. Physical and mental fitness	A	A	A	A	A
Academic elements					
7. Problem recognition/solving	A	A	A	B	B
8. Critical thinking	A	A	A	B	B
9. Academic research	A	A	A	B	B
10. Contemporary global issues	A	A	A		

Figure 3: Excerpt from Table 2.

When entering Table 3, it will be observed that no level of achievement under the psychomotor domain is associated with *Academic research* (Figure 4). The programme administrator, before proceeding further, should note the levels of achievement for each domain.

... Principles and practices related to ...	Levels of achievement in the Psychomotor Domain						
	1 Perception (Awareness)	2 Set	3 Guided response	4 Mechanism (Basic proficiency)	5 Complex overt response (Expert)	6 Adaptation	7 Origination
Foundational elements							
1. Mathematics							
2. Natural (physical) sciences							
3. General humanities and social sciences							
4. English language and maritime communication							
5. Computing and informatics							
6. Physical and mental fitness							
Academic elements							
7. Problem recognition/solving							
8. Critical thinking							
9. Academic research							
10. Contemporary global issues							

Figure 4: Excerpt from Table 3.

IV. Defining *Intended Learning Outcomes (ILOs)* for each Focus Area:

Finally, having extracted the FAs (step II) and the having determined the LOAs (step III) and having taken note of them, the programme administrator should move on to the tables under section 3.3. He/she should proceed to Tables 4, 5 and 6, as needed, to define the required intended learning outcomes.

Using Table 4, the following ILOs are defined under the cognitive domain for Tier A (LOAs 1 to 3):

- ***Identify*** *different methodologies and methods and* ***describe*** *the processes required for the conduct of academic research.*

- ***Explain*** *the rationale, procedures and practical applications of academic*

research.

- ***Prepare*** *clear and feasible research hypotheses.* ***Conduct*** *a coherent and relevant literature review and* ***use*** *and* ***cite*** *sources appropriately and correctly.* ***Employ*** *appropriate research methods and tools (both qualitative and quantitative) to* ***conduct*** *academic research related to various technical areas of maritime affairs & report the results.*

Focus Area	*The Cognitive Domain level of achievement*					
	1 Remembering	2 Understanding	3 Applying	4 Analyzing	5 Evaluating	6 Creating
9. Academic research	**Identify** different methodologies and methods and **describe** the processes required for the conduct of academic research.	**Explain** the rationale, procedures and practical applications of academic research.	**Prepare** clear and feasible research hypotheses. **Conduct** a coherent and relevant literature review and **use** and **cite** sources appropriately and correctly. **Employ** appropriate research methods and tools (both qualitative and quantitative) to **conduct** academic research related to various technical areas of maritime affairs & report the results.	**Analyze** the outcomes of academic research. **Synthesize** and **present** research outcomes in a suitable format.	**Assess** different research approaches and their feasibility / suitability for specific research questions and **evaluate** the outcomes of the application of various research approaches to these questions.	**Develop** new approaches for the conduct and analysis of academic research.

Figure 5: Excerpt from Table 4.

Additionally, the following ILO is defined for Tier B (LOA 4) under the cognitive domain (see Figure 5):

- ***Analyze*** *the outcomes of academic research.* ***Synthesize*** *and* ***present*** *research outcomes in a suitable format.*

In a similar fashion, the respective ILOs under the affective domain for Tier A (LOAs 1 to 3) may be found using Table 5 and are as follows:

- ***Acknowledge*** *the importance of ethical academic research for the long-term sustainability of the maritime industry.*
- ***Comply*** *with the research methodological principles in own research.*
- ***Value*** *the use of correct research practices, in particular those related to research ethics.*

Focus Area	*The Affective Domain level of achievement*				
	1 Receive (awareness)	2 Respond (react)	3 Value (understand and act)	4 Organize personal value system	5 Internalize value system (adopt behaviour)
8. **Critical thinking**	**Acknowledge** the importance of critical thinking in maritime transport-related problems.	**Question** ideas, methods, approaches following optimum critical thinking techniques.	**Value** critical thinking and **adher to** ciritcal thinking techniques when faced with complex in maritime professional practice.	**Integrate** a commitment to use advanced critical thinking techniques to achieve a solutions-oriented approach to maritime-related problems.	**Advocate** for effective critical thinking echniques from a holistic perspective in the maritime domain.
9. **Academic research**	**Acknowledge** the importance of ethical academic research for the long-term sustainability of the maritime industry.	**Comply** with the research methodological principles in own research.	**Value** the use of correct research practices, in particular those related to research ethics.	**Adhere** to appropriate behavior in accordance with research methods and codes of ethics as well as statutory requirements.	**Support** and **urge** the use of proper research methods and **ethical** behavior in to advance knowledge in the maritime industry.

Figure 6: Excerpt from Table 5.

Additionally, the following ILOs are defined for Tier B (LOA 4 & 5) under the affective domain (see Figure 6):

- ***Adhere*** *to appropriate behaviour in accordance with research methods and codes of ethics as well as statutory requirements.*
- ***Support*** *and* ***urge*** *the use of proper research methods and* ***ethical*** *behaviour in to advance knowledge in the maritime industry.*

As regards the psychomotor domain, for this specific example, there is no need to look up ILOs under Table 6 as no *Levels of Achievement* under this domain are associated with FA *9. Academic research*. However, the programme administrator should note that this may not always be the case. Depending on the extracted FAs, it may be necessary to enter one, two or all three tables (Tables 4, 5 and 6).

3.3.5. Using the specific tier tables in Appendix I

Extra tables are presented in Appendix I to provide an alternative approach to extracting the required ILOs according to the desired Tier/s. The tables are aggregated according to Tier and domain. In other words, the person using the BoK need only determine which tier/s are of interest to his/her institution. He/she can then directly employ the tables in Appendix I to define the required ILOs within each domain.
Appendix II contains guidance on how to use the specific tier tables in Appendix I.

Chapter 4. The future

4.1. Previous relevant studies

A number of studies have sought to address the nature of maritime education and training and its appropriateness for an evolving social and industrial context. Three such studies are presented below:

1. The Harmonization of European Maritime Education and Training Schemes (METHAR)
2. The Thematic Network on Maritime Education, Training and Mobility of Seafarers (METNET) and
3. The Skills and Competences Development of Future Transportation Professionals at All Levels (SKILLFUL) Research Projects:

The METHAR research project was carried from 1996 to 1999. It was funded by the European Commission under its 4th Framework Programme with the World Maritime University as coordinator[26]. The project's specific aim was the harmonization of European MET Schemes. The following were its objectives:

- Contribute to the development of harmonised syllabuses and their implementation, taking into account the use of modern teaching technologies;
- Identify needs for the adaptation of MET programmes to the requirements of the maritime industry, such as the growing use of advanced technology;
- Provide better understanding of the [then] new STCW 95 (Standards of Training, Certification and Watch-keeping) Convention, and suggest a harmonised approach to better meet its requirements;
- Enhance the employability and facilitate the professional mobility of MET graduates within the maritime industry and European countries.

This project then dovetailed into the METNET project. METNET was a research project also funded by the European Commission under its 5th Framework Programme for research, technological development and demonstration in the field of "competitive and sustainable growth. METNET was carried out between 2000 and 2003, under the coordination of the World Maritime University. Its main objective, as indicated in the final report, was to:

> Find and exploit ways and means to use maritime education and training of ship officers (MET) as much as possible for halting and eventually reversing the trend toward the European seafarer becoming an "endangered species". The core of this objective is the sustainability of competent and competitive maritime services and of the necessary maritime skills based in the EU, especially as education, training and shipboard experience of ship officers are also need in the maritime sector ashore.[27]

[26] See https://trimis.ec.europa.eu/project/harmonisation-european-maritime-education-and-training-schemes

[27] The Thematic Network on Maritime Education, Training and Mobility of Seafarers (METNET) Final Report, page 3.

The research sought, within a European context, to find ways to 1) improve MET quality, 2) harmonize MET contents, and 3) extend the applicability of MET. The report concluded by advocating the improvement of the quality of the four main elements of national MET systems i.e. students, staff, programmes and facilities. Importantly, it developed and used a new 4E Concept to address the escalation of seafarer education and training as indicated in Figure 7. The four Es are, Essential, Extension, Enrichment and lastly, Elevation.
The following is a direct quote and an illustrative figure from a paper presenting the work to the 4th IAMU General Assembly in 2003 in Alexandria, Egypt[28]:

> *The **Essentials** of MET have to cover the STCW subjects according to the stipulated requirements to be fulfilled prior to the issuance of the relevant certificate of competency. **Extension** means MET comprising more detailed and more comprehensive STCW subjects. In other words, STCW is not specifying in detail requirements for all subjects, such as marine environmental protection. Other subjects that are not mentioned in STCW but relevant for shipboard operations belong to extension as well, such as ship-shore information technology, freight contract, charter parties, insurance, average, salvage, safety of labour etc. **Enrichment** means MET including subjects more relevant to occupations ashore. This considers the fact that more and more young MET graduates understand the shipboard career as a part of a longer career within the maritime industry where shipboard experience is desired. MET institutions can develop their own enrichment profile, such as maritime economics, maritime law or maritime technology. **Elevation** means the upgrading of MET (postgraduate studies). This is necessary in order to foster the maritime knowledge base in Europe. Certain occupations in the industry, administration and education, require specialist skills and expertise that can only be obtained in postgraduate studies. Therefore, it should be possible for a limited number of candidates to attend postgraduate courses once they have spent sufficient time on board.*

[28] Schröder, J-U., Pourzanjani, M., Zade, G., & Kaps, H. (2003). Thematic Network on Maritime Education, Training and Mobility of Seafarers (METNET): The Final Report Outcomes. Paper presented at the 4th Annual General Assembly of the International Association of Maritime Universities (IAMU), 2003, Alexandria, Egypt.

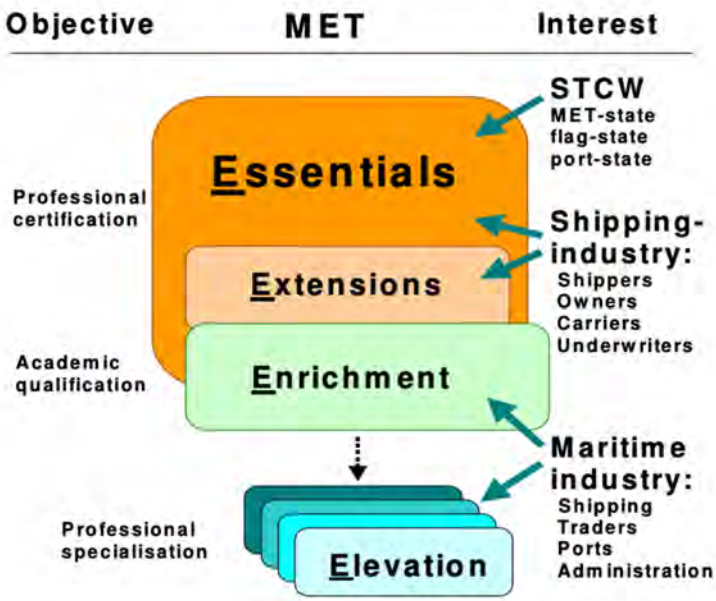


Figure 7: The METNET 4E concept
Source: Schröder, J-U., Pourzanjani, M., Zade, G., & Kaps, H. (2003)

Despite the Eurocentric nature of the METHAR and METNET research projects at the time, a similar situation confronts the IAMU at a global level. The rapid evolution of technology and other drivers of change threaten to endanger the sustainability of traditional maritime education and training and require an examination of the challenges and opportunities that current and forecast trends offer maritime education and training beneficiaries and providers.

The 36-month European Union Research Project on "Skills and Competences Development of Future Transportation Professionals at All Levels" (SKILLFUL) commenced in 2016[29]. It received funding from the EU's Horizon 2020 Research and Innovation Programme.
The project's aims were:

1. To critically review the existing, emerging and future knowledge and skills requirements of workers at all levels in the transportation sector, with emphasis on competences required by important game changers and paradigm shifters (such as electrification and greening of transport, automation, MaaS[30]);
2. To structure the key specifications and components of the curricula and training courses that will be needed to meet these competence requirements optimally, with emphasis on multidisciplinary education and training programmes;
3. To identify and propose new business roles in the education and training chain, in particular those of "knowledge aggregator", "training certifier" and "training

[29] http://skillfulproject.eu
[30] Mobility as a Service

promoter", in order to achieve European wide competence development and take-up in a sustainable way.

One deliverable of the project (D1.1) which sets out the results of a stakeholder survey, addresses "future scenarios on skills and competences required by the Transport sector in the short, mid and long-term". As indicated in this Bok, this deliverable was considered in the methodology and survey that informed the determination of skills specifically for the maritime industry.

4.2. Generic future considerations

The period from the mid to latter part of the 20th century and the beginning of the 21st century has seen significant technological disruption in all industries. This disruption has been primarily driven by digitalization arising from advancements in information and communication technology. The world has been gripped by a rather rapid transition into a fourth industrial revolution (4IR) or industry 4.0, as it has been called[31]. Manifestations of this revolution include so-called smart technology, the internet of things (IoT) and of services (IoS), big data, bio-technical systems, autonomous robotics including as applied to Maritime Autonomous Surface Ships (MASS), cloud computing, virtual and augmented reality, artificial intelligence (AI), block chain technology and the use of crypto-currencies in transactions, drone technology, 3D printing and others like these.

These phenomena are changing the landscape of every sector of both global and national economies and are often not subject to traditional approaches to regulation, social norms and educational paradigms whether in national or international contexts, hence their ability to significantly disrupt these sectors.

The maritime industry has not been left out of this disruption. The effects of the disruptive phenomena (including negative ones) have been discussed in-depth [32, 33] and remain a highlight of contemporary academic, industry and popular culture discourse. The reality of their disruption is not disputed and the challenges and opportunities they present remain obvious. In the maritime industry the notions of fully-autonomous ships, transactions and contractual arrangements via blockchain technology, and educational technology are predicted to be mainstream in a relatively short time horizon.

However, it is not generally expected that seafaring skills – as we know them today – will disappear completely in the next 20-30 years. There are still significant investments being made in traditional shipping. Ships being built today are not, in most cases, highly automated. Given the investments, the life-span of the average ship, and the significant costs associated with retrofitting, it is difficult to see those ships, which require many of the more traditional skills, out of service in the next 20-30 years. Simulations undertaken at the World Maritime

[31] The two terms, "industry 4.0" and "the fourth industrial revolution" of often used interchangeably.
[32] Jacques Ellul, *The technological society* (Vintage Books 1964)
[33] Martin Ford, *The rise of the robots: Technology and the threat of a jobless future* (Basic Books 2015)

University on the future of work in the transport sector[34]actually show that demand for seafarers will increase (albeit at a slowing rate) but that "the requirements and skills needed for individual jobs will change". Such a shift requires a proactive response from education providers, particularly given the time lag between educational planning and the actual turning out of a competent labour force. It is perhaps obvious that even on "traditional" ships there will be an increasing trend toward automated functions, and despite the high costs mentioned earlier, it is foreseeable that a number of existing ships may require retrofitting, depending on social and legal developments.

This all implies a need for new skills and changes in educational paradigms, both in consideration of the skills needed for a changing industry and the impact of technological disruption on education itself. Undoubtedly maritime education and training institutions have to commence a strategic direction of adaptation and in some cases a fundamental paradigm shift of how they view their services to the international community as well as the educational goals, objectives and curricula that underpin the offering of those services. It has been predicted that half of traditional Universities (mainly in the United States) will be bankrupt in 10 to 15 years due to disruptive educational technologies[35]. This may well be true for maritime universities as well, if there is no adaptation. The current state of affairs can be compared to the era that saw a transition from sail ships to steam-powered ships. In that case, there was a sudden need for trained human resources to work on and crew the then new and technologically advanced ships. The paradigm of maritime education and training changed fundamentally. Whereas the earlier mode/approach was to a large extent and for most ranks limited to apprenticeship on board and focused on training, the new form of education required shore-based experts from other industries to teach new entrants and sometimes operate these new ships. Shore-based schooling was subsequently entrenched and the old non-school apprenticeship model became obsolete. Similarly, maritime education and training in the 21st century may require substantial interventions from experts outside the current definition of the "maritime industry" and the curricula for specific operations (whether performed on board or ashore/remotely) may require significant review to meet the needs of a new kind of "seafarer".

With at least two tests carried out successfully[36,37], the feasibility of both remotely controlled and fully autonomous [38] maritime vessels (in particular in short-sea and near-coastal passages) is now – generally speaking - unquestioned. The exigencies of long cross-ocean

[34] Schröder-Hinrichs, J.-U., Dong-Wook, S., Fonseca, T., Lagdami, K., Shi, X., & Loer, K. (2019). *Transport 2040: Automation, technology and employment - The future of work*. Malmö: World Maritime University.

[35] Views of the Harvard Professor and prominent author of a series of publications on disruptive innovation, Clayton Christensen. See https://www.cnbc.com/2017/11/15/hbs-professor-half-of-us-colleges-will-be-bankrupt-in-10-to-15-years.html

[36] See https://www.rolls-royce.com/media/press-releases/2017/20-06-2017-rr-demonstrates-worlds-first-remotely-operated-commercial-vessel.aspx

[37] See https://www.rolls-royce.com/media/press-releases/2018/03-12-2018-rr-and-finferries-demonstrate-worlds-first-fully-autonomous-ferry.aspx

[38] The word "autonomy" (and its variants like "autonomous) has historically been used to refer to human individuals´ capacity for self-determination or self-governance (see https://www.iep.utm.edu/autonomy/). In contemporary discourse in the industry and in technological fields, the term has been appropriated to refer to machines and their action independent of human intervention.

passages – particularly with respect to machinery – challenge full autonomy much more, but a clear trend is visible for which all maritime education and training institutions should be well prepared. As with other disruptive innovations, this trend offers both challenges and opportunities.

The future GMP should have the skills to thrive in a changing maritime industry. It is for this reason that the BoK has considered the continuing need for foundational elements of maritime education and training, but has included in the skills set the broad category of technical competence. The definition of this "technical competence" and the resulting curriculum scope will have to be determined for every specific area of operation and in accordance with the changing technology.

This implies that the IAMU (as an association) and its members (acting as individual institutions) must generate interactive mechanisms with both industry and governments. It is important that interaction with industry is not seen to mean interaction with the maritime industry exclusively. The forces of change are not necessarily originating from the maritime industry and it is imperative that the IAMU membership consider relationships and interactions with many outside industries which, while not traditionally linked to the maritime industry, will, nevertheless, have significant influence on it in the future. Such industries include those in the technological world in general, and, in particular, those related to digitalization.

A triple-helix approach to curriculum development has never been more important. The approach refers to the optimization of interactions between academia, industry and government in a knowledge society to enhance innovation and social development. Pioneered by Etzkowitz and Leydesdoff[39], the approach puts forward a trilateral model of innovation which captures the different stages of the capitalisation of a knowledge infrastructure affecting the co-evolution of new technologies and institutional environments. To cite Deming (the so-called father of quality) "education, industry, and government should interact as a system, with cooperation – win, win"[40]

In the future the IAMU membership must consider structuring their curricula to be more determining than it has been. Figure 8 shows the difference between a determined and determining curriculum.

[39] See Etzkowitz, H., & Leydesdorff, L. (1998). The endless transition: A "triple helix" of university-industry-government relations. *Minerva*, 36(3), 203-208.

[40] Deming, W. E. (2000). *The new economics: for industry, government, education* (2 ed.). Cambridge, MA: MIT Press.

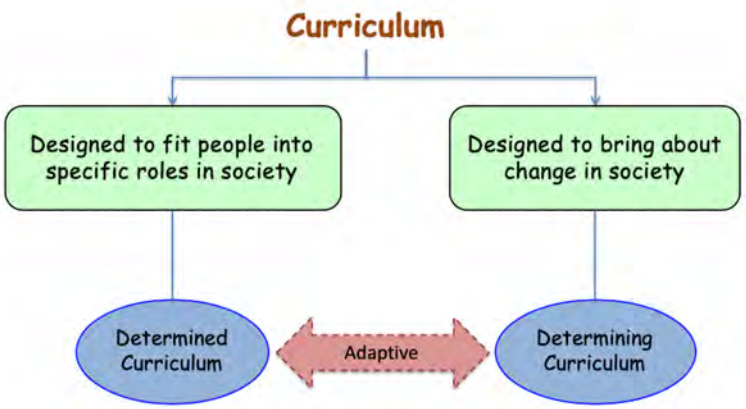


Figure 8: Determined versus determining curriculum

Currently, MET curriculum is mainly determined by changes and progressively advances, mainly as driven by forces outside the MET world (resulting in a determined curriculum). The IAMU is in a good position to undertake research with relevant non-maritime sectors/institutions to generate interventions that will proactively determine the nature of transitions in the industry and the resulting curricula (a determining and proactive approach) rather than waiting in a reactive manner for outside drivers to determine their curricula.

This Body of Knowledge is structured to represent skills that all "seafarers" will need irrespective of the technological state of the maritime industry. It is the informed view of the Committee that worked on this Body of Knowledge, that regardless of the status of ship operators vis-à-vis automation, the skills, knowledge and attitudes addressed in this BoK will be relevant well into the future as educational outcomes. The specific technical competences (for example, for each possible level of future vessel autonomy) are to be determined on a case by case basis as the industry evolves and can be further clarified by subsequent in-depth discourse in IAMU. In principle, the BoK aims to achieve a paradigm in which it is ensured that students educated and trained in the IAMU member universities have the broad skill sets that will allow them to optimally engage in the evolving maritime industry and the many other industries that will impact it, and that this broad skill set is underpinned by the framework/approach contained in this text. Furthermore, in recognition of the accelerated changes and the volatility, uncertainty, complexity and ambiguity of the future, a key set of skills included in the list in this BoK is that which relates to a global mindset conscious of changing trends, the ability to adapt and a capacity for life-long learning. Ultimately, this, more than anything else, will help to achieve the goal of this BoK, that students of the member universities will become global maritime professionals prepared to deal with changes in the future and with the necessary value systems (in terms of ethics, attitudes and behaviours) to do this optimally with input from other relevant industries. At a macro level, this BoK addresses the broad learning outcomes that are herein recommended to the membership.

Future IAMU work, particularly through research, should consider the generation of detailed scenarios for the future of shipping and the discussion of the various educational needs for

very specific ship-related tasks whether on board or ashore. In this context, it is expected that the member universities will develop and undertake best-practice-sharing, with specific curricula (incorporating syllabi, learning activities, instructor qualifications, facilities and equipment, liaison with industries outside the maritime industry) to address the requirements of specific industry-related tasks and continue to do this as the industry evolves. Another area to be engaged in is related to the qualifications of instructors, supervisors and assessors.

The STCW Convention, 1978 as amended, requires in Regulation I/6 that

> *Each Party shall ensure that those responsible for the training and assessment of competence of seafarers, as required under the Convention, are appropriately qualified in accordance with the provisions of Section A-I/6 of the STCW Code for the type and level of training and assessment involved.*

Section A-I/6 as referenced in the quote above states that:

> *Each Party shall ensure that instructors supervisors and assessors are appropriately qualified for the particular types and levels of training or assessment of competence of seafarers either on board or ashore, as required under the Convention, in accordance with the provisions of this section*.

While the KSAs in this text are not restricted to the STCW (the Convention being viewed here as the minimum that can be agreed in an international legal framework), in the spirit of the Convention's requirements, member universities should endeavour to use the IAMU forum to explore best practice as to what constitutes appropriate qualifications for instructors, assessors and supervisors in the evolving scenarios presented by the disruption under consideration. Other areas to which attention should be given through research and development and the sharing of best practice include:

- GMP requirements relating to mental and physical fitness
- Assessment and evaluation criteria for the learning outcomes indicated in this BoK
- The nature and provision of training facilities and resources
- Curriculum review processes and
- The tracking of career shifts in the maritime industry (particularly in a national context) and the alignment of specific technical competencies with industry needs

Apart from the technological trends and their impacts as discussed earlier in this chapter, another trend to be considered relates to the issue of sustainability. Irrespective of the position taken in respect to the changing environment, the issue of sustainable stewardship of the earth and its resources remains pertinent and should be addressed by all – individuals and social entities, be they supranational bodies, nations, the international community, broadly speaking, or associations such as IAMU. The membership of the IAMU should prioritise this as a matter of high urgency.

4.3. The future of the BoK

4.3.1. Periodic review of the BoK

While this inaugural version of the BoK marks the end of the Committee's effort to assemble and curate input from a variety of stakeholders to create a Body of Knowledge for developing Global Maritime Professionals, it also marks the beginning of a broader effort to continuously improve how the IAMU ensures that its students, as Global Maritime Professionals, are ready for a rapidly changing future. This Body of Knowledge is not intended to be a singular, static document, but rather a living resource that adapts and evolves so as to be a key resource for all stakeholders involved in training, developing, educating, employing, and overseeing Global Maritime Professionals.

The BoK will be subject to periodic review. These reviews will be undertaken following a broad-based global survey to inform its further development and to make it relevant to changing times and needs. The rationale for the use of such surveys is to base any revisions on objective analyses and on the quality assurance notion of continuous improvement.

4.3.2. Expansion of BoK scope

This inaugural version of the BoK is targeted at ship operators (onboard or remote). This is in line with the criteria for membership of the IAMU. However, it is recognised that many of the member universities do not exclusively educate and train seafarers and their educational offerings include a range of competences in the maritime industry defined in wider terms than technical ship operation. It is envisaged that future versions of the BoK will include and specifically address this wider scope.

4.3.3. Relationship with other aspects of IAMU work

The BoK focuses on preparing maritime students to become tomorrow's global maritime professionals by focusing on the knowledge, skills, and abilities necessary for today and the changes of the future. The approach, contents and philosophy of the BoK can and should be linked to IAMU's ongoing and future work in this regard. A number of such potential links are presented below:

4.3.3.1. Link to IAMU organizational development projects

The IAMU organizational development projects serve the purpose of strengthening IAMU as an organization and granting beneficial outcomes for IAMU member Universities. The concept is derived from the Association's Basic Agreement and Tasmanian Statement. It is anticipated that a number of such organizational development projects will be targeted at the focus of this BoK and will help the Association to fund and share best practice with a view to increasing capacity to achieve the GMP learning outcomes across the Association's membership.

One such project that already has the potential to do so is the Performance Indicators for Maritime Education and Training (PIMET) development project. PIMET has the objective of

providing data to the membership that will help increase knowledge of the sector and support the Association's objectives of providing leadership in maritime education, training and research. It provides a mechanism for all IAMU member universities to measure their performance relative that of best practice in individual performance areas. Such measuring is not intended to lead to a ranking system but to allow for the sharing of experiences and best practice. In the specific context of the BoK, PIMET can be used as a mechanism to exchange and share such "best practices" as they relate to the learning activities, syllabi, staff qualification, and educational policies that lead optimally to the achievement of the GMP learning outcomes at the different tier levels. In that context, an incentivised approach for the adoption of the GMP and BoK tenets is recommended.

4.3.3.2. Link to research projects

The determination of trends, drivers, challenges and opportunities in a volatile global context is a rich source for research. The successful, relevant and continued evolution of the BoK will depend to a large extent on the research that informs the Association's understanding and appreciation of pertinent issues and trends. It is anticipated, therefore, that this BoK and its continued growth will be linked inexorably to IAMU funded research. Such research-input will help base the further development of the BoK on an evidence-based approach that limits harmful subjectivity.

Appendix I - Specific tier tables

GMP TIER A

GMP Tier A addresses the requirements of operational level competency in the maritime industry together with a first academic degree. For example, in the context of the STCW Convention 1978, as amended, this translates to an operational level certificate of competency together with a Bachelor of Science Degree.

Table 7: Tier A – Cognitive Domain

Tier A – Cognitive Domain

Tier A–Cognitive Domain							
	Focus area	***Level of achievement***					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Foundational Elements	**1. Mathematics**	**Identify** key mathematics information and **recall** equations related to academic and professional skills.	**Explain** relevant mathematical principles.	**Demonstrate** the application of mathematical principles to the solution of relevant problems.			
	2. Natural (Physical) sciences	**Recall** key factual information relating to physics and chemistry for academic and professional skills.	**Explain** relevant concepts in physics and chemistry.	**Demonstrate** the application of principles of the physical sciences for solving problems and performing relevant tasks.			
	3. General humanities & Social sciences	**Identify** key factual information from different areas of the humanities / social sciences and **recognize** how they relate to maritime professional practice.	**Explain** relevant concepts from the humanities/social sciences.	**Employ** humanities/social science concepts in maritime professional practice.			

Tier A–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Foundational Elements	**4. English language and maritime communication**	**Recognize** the features of the English language and **recall** maritime phrases relevant to professional maritime communication.	**Explain** key concepts and structuring of the English language and the use of suitable maritime communication phrases.	**Make use of** relevant and appropriate language and communication in professional maritime practice. **Communicate** effectively in written and spoken English in a cross-cultural context both for social and professional purposes.			
	5. Computing and informatics	**Identify** key computing & informatics knowledge related to maritime academic and professional skills.	**Explain** key concepts of computing & informatics and their relevance to the maritime industry.	**Employ** relevant computing & informatics concepts and techniques to maritime academic and professional tasks.			
	6. Physical and mental fitness	**Recall** key factual knowledge about physical & mental fitness as it relates to maritime professional practice.	**Explain** key facts and concepts about sustaining physical and mental health/fitness and the specific international requirements for the maritime industry.	**Develop and maintain** physical and mental fitness and health.			
Academic Elements	**7. Problem recognition/solving**						
	8. Critical thinking	**Define** critical thinking and **describe** its component concepts.	**Explain** the scope & content of critical thinking and **outline** areas of maritime professional practice that require critical thinking.				

Tier A–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Academic Elements	**9. Academic research**	**Identify** different methodologies and methods and **describe** the processes required for the conduct of academic research.	**Explain** the rationale, procedures and practical applications of academic research.	**Prepare** clear and feasible research hypotheses. **Conduct** a coherent and relevant literature review and **use** and **cite** sources appropriately and correctly. **Employ** appropriate research methods and tools (both qualitative and quantitative) to **conduct** academic research related to various technical areas of maritime affairs & report the results.			
	10. Contemporary global issues	**Identify** topical global issues.	**Explain** how current global issues impact the maritime industry and professional practice.				
Professional (Technical)	**11. Technical competencies as per international requirements (STCW)**	**Identify** the principles of and requirements for maritime competencies as per international requirements.	**Explain** the principles & concepts underpinning the international requirements for maritime competencies.	**Apply** relevant knowledge and skills to specific maritime tasks and fulfill all the requirements of the international standards.			
	12. Risk assessment and management	**Define** risk and **identify** the principles of risk assessment and management.	**Illustrate** principles and concepts of risk assessment and management using specific maritime examples.	**Apply** different risk assessment and management techniques/approaches to various maritime scenarios.			

Tier A–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Technical) Elements	**13. Situational awareness, preparedness and response**	**Recall** elements/components of situational awareness and identify factors that impact situational awareness, preparedness and response.	**Explain** the components of situational awareness and the inter-relations between them and how these affect preparedness and response.	**Demonstrate** situational awareness and preparedness and **implement** suitable response procedures.			
	14. Technological awareness (job-specific)	**Show** the importance of job-specific technological awareness for maritime professional practice and **identify** optimum technologies in relevant areas.	**Illustrate** how existing and prospective technologies relate to specific maritime tasks and **explain** how they influence such tasks.	**Select** optimum technologies to be applied in specific maritime operations based on an awareness of state-of-the-art technology.			
	15. Maritime law, policy and governance	**Identify** the legal, policy and governance frameworks that influence and regulate the maritime industry at the national, regional and international levels.	**Explain** the different structures, principles, and mechanisms for the development and implementation of law, policy, and governance of the maritime industry.				
	16. Logistics and supply chain	**Describe** the global supply chain and **identify** the underpinning principles of logistics.	**Explain** the principles and concepts of logistics and supply chain and **outline** their importance and role in the maritime industry.				

Tier A–Cognitive Domain	Level of achievement					
Focus area	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Professional (Technical) Elements						
17. Maritime business	**Describe** the constituent parts of and issues relating to maritime business including maritime economics and economic geography.	**Explain** the principles and concepts relating to maritime business and **outline** the factors that influence it.				
Professional (Soft) Elements						
18. Technological awareness (global)	**Show** an awareness of global technologies and their evolution and **identify** optimum technologies in relevant areas.	**Illustrate** how existing and prospective technologies relate to various maritime tasks and **explain** how they influence such tasks **exhibiting** an appreciation of the dynamics of socio-technical systems.	**Use** relevant global technologies in various maritime operations based on an awareness of state-of-the-art technology. **Apply** a systematic approach to understanding complex socio-technical system behaviour.			
19. Leadership, teamwork and discipline	**Define** leadership, teamwork and discipline and **describe** the effect of each on the general performance of the GMP.	**Compare and contrast** different leadership theories/principles. **Explain** the place of leadership and teamwork in maritime professional practice.	**Apply** leadership, teamwork & discipline principles to direct the efforts of a small, homogenous group on board ships.			

Tier A–Cognitive Domain							
	Focus area	***Level of achievement***					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft) Elements	**20. Effective (interpersonal) communication**	**Name** the components of a successful interpersonal communication cycle with particular reference to maritime operations.	**Explain** the principles and factors that influence optimum interpersonal communication in a maritime professional context.	**Demonstrate** the use of good interpersonal communications for productive maritime operational outcomes.			
	21. Sustainable development	**Define** sustainable development as a concept and **describe** its underpinning values and areas of relevance in the maritime domain.	**Explain** the evolution of the concept of sustainable development including any areas of contention and **discuss** the importance of the concept.				
	22. Human resource management	**Define** "human resource management" and **describe** the development of the concept from the earlier concept of "personnel management".	**Explain** the principles underpinning human resource management and **distinguish** between different techniques, activities and approaches and their relevance to a multicultural environment.				
	23. Cultural/diversity awareness and sensitivity	**Describe** cultural/diversity awareness & sensitivity. **State** the relevance of such awareness and sensitivity for GMP performance.	**Distinguish** between different factors that influence diversity awareness and sensitivity and **explain** how they may affect maritime operations using specific cases.	**Demonstrate** the ability to work in a multicultural environment and show optimum awareness and sensitivity to diversity in specific contexts.			

Tier A–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft) Elements	**24. Progressive mindset and lifelong learning**	**Describe** what is meant by a progressive mindset and lifelong learning principle. **Outline** their importance for the continuous development of both individuals and maritime organizations. **Describe** change management approaches and the role of "change agents" in maritime organizational settings.	**Compare** and **contrast** different mechanisms and theories on the development and maintaining of a progressive mindset and lifelong learning. **Explain** the impact diversity may have on change leadership and management and the concepts, frameworks, and theories that guide organizational change.				
	25. Environmental awareness, sustainability and stewardship	**Describe** the notion of environmental awareness, sustainability, and stewardship.	**Clarify** the responsibility of the GMP with respect to environmental sustainability and stewardship and **explain** global efforts/activities for environmental stewardship in particular in the maritime industry.	**Demonstrate** environmental awareness and stewardship in simulated or real scenarios and **use** relevant equipment for environment preservation in compliance with all relevant legal instruments.			
	26. Decision-making and proactivity	**Outline** the importance of proper and proactive decision-making in maritime operations and **describe** how this is linked to the success of a GMP.	**Explain** the bases and principles of good decision-making and proactivity as they apply to maritime professional practice.				

Tier A–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft) Elements	**27. Mentorship**	**Define** mentorship and **describe** its relevance for the GMP and the maritime industry as a whole.	**Distinguish** between training and mentoring and **explain** the necessity for the effect of each one on maritime professional practice. **Discuss** the characteristics required in both a mentor and mentee for optimum mentorship results.				
	28. Professionalism and ethical responsibility	**List** the professional & ethical responsibilities of a GMP.	**Explain** the basis for professional & ethical standards especially as they relate to maritime professional practices.	**Apply** standards of professional & ethical responsibility to determine an appropriate course of action in diverse operational contexts.			

Table 8: Tier A – Affective Domain

Tier A–Affective Domain		*Level of achievement*				
	Focus area	**Receiving** (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Foundational Elements	**1. Mathematics**					
	2. Natural (Physical) sciences					
	3. General humanities & Social sciences	**Choose** key relevant information from the general humanities and social sciences and **relate** such information to maritime professional practice.	**Discuss** theories and principles from the humanities and social sciences as they relate to specific scenarios in maritime professional practice.	**Demonstrate** commitment to appropriate values derived from an understanding of key factual information from the humanities and social sciences in a maritime context.		
	4. English language and maritime communication					
	5. Computing and informatics					
	6. Physical and mental fitness	**Listen** to orders in respect of the development and maintaining of physical and mental fitness.	**Comply** with orders to develop physical and mental fitness and **select** suitable actions for such development.	**Initiate** own actions to develop/maintain physical and mental fitness and **justify** the choice of these actions.	**Integrate** optimum methods/approaches for developing/ maintaining physical and mental fitness into own routine and **organize** relevant activities accordingly.	**Revise** methods/approaches used for developing/ maintaining physical and mental fitness to suit different circumstances and contexts.

Tier A–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Academic Elements	**7. Problem recognition/solving**	**Acknowledge** the importance of problem recognition/solving in maritime professional practice.	**Select** and **discuss** situational elements that facilitate or hinder problem recognition/solving.	**Prioritize** problem recognition/solving in challenging and complex maritime operational scenarios.		
	8. Critical thinking	**Acknowledge** the importance of critical thinking in maritime transport-related problems.	**Question** ideas, methods, and approaches following optimum critical thinking techniques.	**Value** critical thinking and **adhere to** critical thinking techniques when faced with complex situations in maritime professional practice.		
	9. Academic research	**Acknowledge** the importance of ethical academic research for the long-term sustainability of the maritime industry.	**Comply** with the research methodological principles in own research.	**Value** the use of correct research practices, in particular, those related to research ethics.		
	10. Contemporary global issues	**Follow** relevant contemporary global issues and their effect on the maritime industry.	**Participate in** and **contribute** to the global discourse on relevant contemporary global issues and their effect on the maritime professional practice.	**Demonstrate** belief in the need to have all stakeholders aware of and contributing to the discourse of global issues of relevance to the maritime industry.		

Tier A–Affective Domain						
	Focus area	*Level of achievement*				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**	**Acknowledge** the importance of supporting the basic value system that leads to the establishment of technical standards in international law and the need for a commitment by all to upholding them.	**Comply** with the main principles and values informing technical competencies as required by international law.	**Demonstrate** a value system in support of own technical competency and **differentiate** between positive and negative application of technical competencies.		
	12. Risk assessment and management	**Identify** the proper behaviour in case of risk, and **describe** values underpinning risk assessment and management in maritime professional practice.	**Comply** with relevant directives/orders for risk assessment and management.	**Demonstrate** an appreciation of the need for risk assessment and management.		
	13. Situational awareness, preparedness and response	**Identify** the proper dispositions to maintain in order to have situational awareness and maintain a state of preparedness in diverse maritime operational contexts.	**Select** appropriate actions to take to maintain a state of situational awareness and preparedness.	**Propose** individual and team actions that promote situational awareness, a common team operating picture and an optimum state of preparedness.		

Tier A–Affective Domain						
Focus area		***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Technical)	**14. Technological awareness (job-specific)**	**Follow job-specific** technological advancements and their potential impact on mission achievement.	**Present** available technologies, their evolution and impact on mission achievement.	**Differentiate** between beneficial uses of technology and the possible associated externalities and **share** own insights in this regard.		
	15. Maritime law, policy and governance					
	16. Logistics and supply chain					
	17. Maritime business					
Professional (Soft) Elements	**18. Technological awareness (global)**	**Follow** global technological trends and their impact on the maritime industry.	**Present** different technologies, their evolution, and impact on the maritime industry.	**Differentiate** between beneficial uses of technology and the negative impacts they may have on humans and society and **share** own insights in this regard.		
	19. Leadership, teamwork and discipline	**Follow** concepts of leadership, teamwork, and discipline and **acknowledge** their importance in a maritime context.	**Practice** leadership and teamwork skills in a disciplined manner to achieve the organization goals.	**Demonstrate** the importance of teamwork and commitment to leadership as indispensable for maritime professional practice.		

Tier A–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**20. Effective (interpersonal) communication**	**Identify** various interpersonal communication principles.	**Discuss** advanced communication techniques and **practice** them in a professional manner.	**Demonstrate** belief in multi-directional communication and the importance of listening and **assist** in eliminating interference and barriers in communications.		
	21. Sustainable development	**Name** the UN's Sustainable. Development Goals (SDGs) and **point to** the maritime sector's responsibility to participate in achieving them.	**Conform** own actions to the achievement of the sustainable development goals and **volunteer** for initiatives for their achievement in the maritime context.			
	22. Human resource management	**Identify** the value system inherent in a "human resource management" approach as opposed to a "personnel management" approach. **Accept** the uniqueness and value of human beings.	**Discuss** the importance of human resources and their effective management for the development of the maritime industry.	**Demonstrate** good people management skills for the efficient operation of maritime organizations.		
	23. Cultural/diversity awareness and sensitivity	**Recognize** the existence of diversity in the maritime industry.	**Discuss** the importance of cultural awareness and diversity in the maritime field.	**Demonstrate** cultural awareness and **show** sensitivity and respect towards individual and cultural differences while **valuing** diversity.		

Tier A–Affective Domain		*Level of achievement*				
	Focus area	**Receiving** (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**24. Progressive mindset and lifelong learning**	**Acknowledge** the importance of a progressive mindset and lifelong learning in the maritime field.	**Discuss** methods for continuous learning and for achieving a progressive mindset in the maritime field.	**Initiate** own learning and **complete** long-term developmental plan.		
	25. Environmental awareness, sustainability and stewardship	**Recognize** the importance of environmental awareness, sustainability, and stewardship as related to the maritime industry.	**Conform** to established environmental and sustainability standards/procedures in the maritime industry.	**Demonstrate** a genuine appreciation for the environment and sustainable development in relation to the maritime industry.	**Prioritize** environmental management and sustainable development.	
	26. Decision-making and proactivity	**Acknowledge** the importance of prompt well-informed decision-making and proactivity within the maritime workspace.				
	27. Mentorship	**Recognize** the role and importance of mentorship in the development of human resources and sustainable operations in the maritime industry.	**Respond** positively as a mentee to mentoring by superiors and **help** in the mentoring of others.			

Tier A–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**28. Professionalism and ethical responsibility**	**Acknowledge** the need for professionalism and the importance of ethics in the maritime industry.	**Comply** with existing codes of ethics and professionalism.	**Demonstrate** responsibility and professional and ethical behaviour even in the absence of explicitly written codes of professional and ethical conduct.		

Table 9: Tier A – Psychomotor

Tier A–Psychomotor Domain		*Level of achievement*						
Focus area		**Perception** (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Foundational Elements	1. Mathematics							
	2. Natural (Physical) sciences							
	3. General humanities & Social sciences							
	4. English language and maritime communication							
	5. Computing and informatics							
	6. Physical and mental fitness							
Academic Elements	7. Problem recognition/solving							
	8. Critical thinking							
	9. Academic research							
	10. Contemporary global issues							

Tier A–Psychomotor Domain								
	Focus area	***Level of achievement***						
		Perception (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**	**Identify** maritime actions that involve complex movement patterns and **choose** correct action(s) among various options to meet the operational requirements of efficiency and safety as per international requirements.	**Explain** the most professional, efficient and safe way of performing practical motor tasks. **Prepare** optimally for commencing such tasks.	**Respond to** and **follow** instructions regarding specific technical operations that require practical motor-skills.				
	12. Risk assessment and management							
	13. Situational awareness, preparedness and response	**Identify** and **describe** motor activities that underpin required performance in respect to maintaining a state of preparedness and for emergency response e.g. for fire prevention and fighting.	**Explain** specific steps required in carrying out **practical** maritime tasks with motor skills and **prepare** to take those steps.	**Follow** practical instructions to perform a motor-skill-based task to maintain a state of preparedness for and response to emergency maritime situations.				

Tier A–Psychomotor Domain		Level of achievement						
	Focus area	Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Professional (Technical)	14. Technological awareness (job-specific)							
	15. Maritime law, policy and governance							
	16. Logistics and supply chain							
	17. Maritime business							
Professional (Soft) Elements	18. Technological awareness (global)							
	19. Leadership, teamwork and discipline							
	20. Effective (interpersonal) communication							
	21. Sustainable development							
	22. Human resource management							
	23. Cultural/diversity awareness and sensitivity							

Tier A–Psychomotor Domain								
	Focus area	***Level of achievement***						
		Perception (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Professional (Soft) Elements	**24. Progressive mindset and lifelong learning**							
	25. Environmental awareness, sustainability and stewardship							
	26. Decision-making and proactivity							
	27. Mentorship							
	28. Professionalism and ethical responsibility							

GMP TIER B

GMP Tier B addresses the requirements of management level competency in the maritime industry together with the academic degree requirements of Tier A. For example, in the context of the STCW Convention 1978, as amended, this translates to a management level certificate of competency together with a Bachelor of Science Degree. Achievement at tier B presupposes completion of tier A components.

Table 10: Tier B – Cognitive Domain

Tier B–Cognitive Domain							
	Focus area	***Level of achievement***					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Foundational Elements	**1. Mathematics**						
	2. Natural (Physical) sciences						
	3. General humanities & Social sciences						
	4. English language and maritime communication						
	5. Computing and informatics						
	6. Physical and mental fitness						
Academic Elements	**7. Problem recognition/solving**	**Identify** constituent parts of a situation that evidence a problem and **describe** problem-solving techniques.	**Explain** the requirements for diagnostic thinking.	**Demonstrate** problem recognition and solving skills in the context of specific maritime tasks.	**Analyze** different problem recognition and solving approaches.		
	8. Critical thinking			**Demonstrate** the use of critical thinking techniques in specific maritime professional contexts.	**Analyze** the outcomes of critical thinking processes and techniques as they relate in particular to maritime professional tasks.		

Tier B–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Academic Elements	**9. Academic research**				**Analyze** the outcomes of academic research. **Synthesize** and **present** research outcomes in a suitable format.		
	10. Contemporary global issues			**Build** links between contemporary issues and actions required in maritime practice.	**Discover and examine global** developments in diverse sectors and **analyze** their impacts on the maritime industry and professional practice.		
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**				**Analyze** specific maritime tasks and the competencies required to carry them out by international standards and maritime industry practice.		
	12. Risk assessment and management				**Compare** and **contrast** the underlying assumptions and worldviews that both inform and address risk perception and analysis.		
	13. Situational awareness, preparedness and response				**Critique** the assumptions, approaches, and analysis of situational awareness/preparedness techniques with a view to enhancing response procedures.		

Tier B–Cognitive Domain		*Level of achievement*					
	Focus area	**Remembering**	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Technical) Elements	**14. Technological awareness (job-specific)**				**Analyze** the operational readiness and suitability of technological applications in maritime practice.		
	15. Maritime law, policy and governance			**Apply** legal, policy and governance principles in maritime professional practice.			
	16. Logistics and supply chain			**Apply** logistics and supply chain concepts in maritime professional practice.			
	17. Maritime business			**Apply** management and business concepts, and project management in maritime professional practice. **Apply** legal, regulatory and financial knowledge related to business processes.			

Tier B–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft) Elements	**18. Technological awareness (global)**				**Analyze** the impact of modern global technologies on various technological applications in maritime practice.		
	19. Leadership, teamwork and discipline				**Analyze** the effect of the application of different leadership and teamwork theories and **infer** possible consequences from the application of such theories in maritime professional practice.		
	20. Effective (interpersonal) communication				**Distinguish** between different communication styles/approaches and **analyze** their applicability to different scenarios in maritime operational contexts.		
	21. Sustainable development			**Execute** sustainable development plans in a controlled/closed maritime environment.			

Tier B–Cognitive Domain							
	Focus area	***Level of achievement***					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft) Elements	**22. Human resource management**			**Apply** relevant human resource management theories and techniques to **achieve** goals related to own maritime professional practice.	**Diagnose** the causes of ineffective human resource management and **prioritize** the actions to be taken to address problems that may arise due to poor human resource management practices.		
	23. Cultural/diversity awareness and sensitivity						
	24. Progressive mindset and lifelong learning						
	25. Environmental awareness, sustainability and stewardship						
	26. Decision-making and proactivity			**Demonstrate** optimum decision-making skills in diverse operational contexts and take proactive steps to address developing situations and challenges.	Critically **examine** different decision-making processes and options.		
	27. Mentorship			**Demonstrate** skills as both mentee and mentor.	**Explore** possible outcomes of different approaches to mentoring and their outcome in different situations. **Analyze** the factors that may negatively influence mentoring outcomes.		

Tier B–Cognitive Domain	*Level of achievement*					
Focus area	**Remembering**	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft)						
28. Professionalism and ethical responsibility				**Analyze** a situation involving multiple conflicting professional & ethical interests to determine an appropriate course of action.		

Table 11: Tier B – Affective Domain

Tier B–Affective Domain		*Level of achievement*				
Focus area		**Receiving** (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Foundational Elements	**1. Mathematics**					
	2. Natural (Physical) sciences					
	3. General humanities & Social sciences				**Formulate** a value system based on a comparison of principles inherent in the humanities and social sciences. **Defend** the application of specific value sets in different scenarios.	**Display** optimum values related to critiqued principles inherent in the humanities and social sciences in new and challenging situations.
	4. English language and maritime communication					
	5. Computing and informatics					
	6. Physical and mental fitness					

Tier B–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Academic Elements	**7. Problem recognition/solving**				**Integrate** a commitment to use advanced problem-solving techniques to achieve a holistic approach to maritime-related practices.	**Act** independently or in a team to identify and solve problems and **display** a professional commitment to a diagnostic and solution-oriented mindset.
	8. Critical thinking				**Integrate** a commitment to use advanced critical thinking techniques to achieve a solutions-oriented approach to maritime-related problems.	**Advocate** for effective critical thinking techniques from a holistic perspective in the maritime domain.
	9. Academic research				**Adhere** to appropriate behaviour in accordance with research methods and codes of ethics as well as statutory requirements.	**Support** and **urge** the use of proper research methods and **ethical** behaviour to advance knowledge in the maritime industry.
	10. Contemporary global issues					

Tier B–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**				**Integrate** proper values, levels of commitment and accountability in the application of own technical competency.	**Act** consistently in manifesting technical competency and **influence** others to be technically competent with an optimum value-base.
	12. Risk assessment and management				**Synthesize** and **integrate safety** values and **display** a risk awareness, assessment, and management outlook in daily routines.	Consistently **display** risk consciousness and a value-system that supports continuing risk assessment and management in operational routines.
	13. Situational awareness, preparedness and response				**Balance** competing work/task demands for self, considering work/task load on others and **organize/plan** tasks to maintain situational awareness and preparedness.	**Display and Perform** ethical commitments, values, and principles of situational awareness, preparedness and response.
	14. Technological awareness (job-specific)				**Synthesize** a rational basis for the introduction and use of evolving global technologies in own work context and **balance** their effectiveness against their limitations.	**Display** an objective and discriminatory approach to the selection and use of new technologies and **maintain** ethical usage of such technologies.

Tier B–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Technical)	**15. Maritime law, policy and governance**					
	16. Logistics and supply chain					
	17. Maritime business					
Professional (Soft) Elements	**18. Technological awareness (global)**				**Synthesize** a rational basis for the introduction and use of evolving global technologies in own work context and **balance** their effectiveness against their limitations.	**Display** an objective and discriminatory approach to the selection and use of new technologies and **maintain** ethical usage of such technologies.
	19. Leadership, teamwork and discipline				**Formulate** own leadership strategies contingent on the specific scenario and **organize** task group for efficient and effective teamwork.	**Influence** workgroup in a disciplined manner and **cooperate** in group activities to strengthen teamwork values.

Tier B–Affective Domain		*Level of achievement*				
	Focus area	**Receiving** (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**20. Effective (interpersonal) communication**				**Initiate** effective communication strategies and **invite** optimum and reciprocal strategies from others.	**Propose** plans to optimize interpersonal communication in a maritime context and **act** to embed professional communication techniques in own and others' everyday routines and in all situations.
	21. Sustainable development			**Justify** the adoption of sustainable practices in the maritime field.	**Identify** unsustainable practices and values in self and others and **modify** own behaviour for more sustainable outcomes.	**Discriminate** between different motives for sustainable development and **influence** a professional commitment to sustainable development values in others.
	22. Human resource management				**Formulate** strategies for administering the human element underpinned by the valuing of issues such as respect, motivation, development, goal compatibility of individuals and the organization.	Professionally **manage** onboard human resources by practicing HRM methods and **influence** others positively.

Tier B–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**23. Cultural/diversity awareness and sensitivity**				**Identify** the challenges associated with a multicultural atmosphere and the advantages of workspace diversity.	**Balance** respect of societal culture with the professional culture required in the maritime industry and **influence** the continuing development of this professional culture while maintaining respect for diversity.
	24. Progressive mindset and lifelong learning				**Adhere to** a continuous learning plan and **modify** plan appropriately based on new and emergent information.	**Display** a professional commitment to workspace development and continuous learning and **advocate** for such learning.
	25. Environmental awareness, sustainability and stewardship					**Display** a professional commitment to environmental management and sustainable development and influence others.
	26. Decision-making and proactivity		**Practice** simple decision-making within the maritime workspace.	**Initiate** actions that demonstrate a proactive attitude in maritime professional practice.	**Adhere to** optimum decision-making approaches and techniques in order to achieve the best possible results.	

Tier B–Affective Domain	Level of achievement				
Focus area	Receiving (awareness)	Responding (reacting)	Valuing (understanding & acting)	Organizing personal value system	Internalizing value system (adopting behaviour)
Professional (Soft) Elements					
27. Mentorship			**Initiate** mentoring relationships in the personal workspace.	**Formulate** optimum mentoring strategies for a diverse group of mentees incorporating essential knowledge and attitudinal elements.	**Influence** others to become active mentors.
28. Professionalism and ethical responsibility				**Organize, prioritise** and **defend** high professional and ethical standards in ambiguous ethical contexts.	Positively **influence** others to **create and maintain** high professional and ethical standards in maritime professional practice.

Table 12: Tier B – Psychomotor Domain

Tier B–Psychomotor Domain		*Level of achievement*						
Focus area		**Perception** (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Foundational Elements	1. Mathematics							
	2. Natural (Physical) sciences							
	3. General humanities & Social sciences							
	4. English language and maritime communication							
	5. Computing and informatics							
	6. Physical and mental fitness							
Academic Elements	7. Problem recognition/solving							
	8. Critical thinking							
	9. Academic research							
	10. Contemporary global issues							

Tier B–Psychomotor Domain		Level of achievement						
	Focus area	Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Professional (Technical) Elements	11. Technical competencies as per international requirements (STCW)				Under supervision, **perform** relevant physical maritime tasks, **proceeding** in quick, accurate, safe and coordinated sequences of steps.	**Display** dexterity, competency, and proficiency in handling relevant maritime tasks without hesitation and in an accurate, safe and efficient manner.	**Respond** effectively to unexpected situations with automatized responses and efficiently **adapt** task steps and instructions to meet the required performance as per international standards.	
	12. Risk assessment and management							
	13. Situational awareness, preparedness and response				**Fix and integrate** relevant physical maritime situations at a high level of preparedness and performance and quick response.	**Display** dexterity, competency and proficiency in handling and carrying out tasks requiring motor-skills in relevant maritime emergency situations.	**Respond** effectively to unexpected experiences in diverse maritime emergency situations and **adapt** task steps and instructions to maintain an optimum state of preparedness and response.	

Tier B–Psychomotor Domain		Level of achievement						
	Focus area	Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Professional (Technical)	14. Technological awareness (job-specific)							
	15. Maritime law, policy and governance							
	16. Logistics and supply chain							
	17. Maritime business							
Professional (Soft) Elements	18. Technological awareness (global)							
	19. Leadership, teamwork and discipline							
	20. Effective (interpersonal) communication							
	21. Sustainable development							
	22. Human resource management							
	23. Cultural/diversity awareness and sensitivity							

Tier B–Psychomotor Domain	*Level of achievement*						
Focus area	**Perception** (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Professional (Soft) Elements							
24. Progressive mindset and lifelong learning							
25. Environmental awareness, sustainability and stewardship							
26. Decision-making and proactivity							
27. Mentorship							
28. Professionalism and ethical responsibility							

GMP TIER C

The GMP Tier C addresses the requirements of management level competency together with a postgraduate academic degree. For example, in the context of the STCW Convention 1978, as amended, this translates to a management level certificate of competency together with a Master of Science Degree. Achievement at tier C presupposes completion of tier B components.

Table 13: Tier C – Cognitive Domain

Tier C–Cognitive Domain							
	Focus area	***Level of achievement***					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Foundational Elements	**1. Mathematics**						
	2. Natural (Physical) sciences						
	3. General humanities & Social sciences						
	4. English language and maritime communication						
	5. Computing and informatics						
	6. Physical and mental fitness						

Tier C–Cognitive Domain	Level of achievement					
Focus area	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Academic Elements						
7. Problem recognition/solving					**Assess** the comprehensiveness of particular approaches to problem identification and recognition and **evaluate** the merits of alternative solutions.	
8. Critical thinking					**Appraise** the effectiveness and value of different critical thinking techniques and **assess** their impact.	
9. Academic research					**Assess** different research approaches and their feasibility/suitability for specific research questions and **evaluate** the outcomes of the application of various research approaches to these questions.	

Tier C–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Academic Elements	**10. Contemporary global issues**					**Assess** the consequences of different responses to global issues and **evaluate** the merits of specific courses of action in respect to these issues.	
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**					**Appraise** the effectiveness of maritime operational and management actions and assess systems and procedures in the maritime industry.	
	12. Risk assessment and management					**Appraise** maritime actions, techniques or procedures in risk assessment and management.	
	13. Situational awareness, preparedness and response					**Evaluate** maritime actions/techniques for enhancing situational awareness and response effectiveness.	

Tier C–Cognitive Domain							
	Focus area	Level of achievement					
		Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Professional (Technical) Elements	**14. Technological awareness (job-specific)**					**Evaluate** the performance standards of different technological application and **appraise** their suitability for maritime tasks.	
	15. Maritime law, policy and governance				**Analyze** the effect of law, policy and governance implementation mechanisms on the maritime industry and on professional practice.	**Evaluate** maritime stakeholders' response and contribution to law, policy, and governance at the national, regional and international levels.	
	16. Logistics and supply chain				**Compare** and **contrast** different logistics and supply chain theoretical approaches and **analyze** their effect on practical maritime operations.	**Evaluate** contemporary and potential logistics and supply chain optimization tools and processes.	

Tier C–Cognitive Domain							
	Focus area	Level of achievement					
		Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Professional (Technical) Elements	17. Maritime business				**Compare** and **contrast** different maritime business and economics approaches and **analyze** their effect on practical maritime operations. **Perform** cost analysis.	**Evaluate** business decisions utilizing a validated set of methods and the economic parameters that lead to informed business decisions. **Evaluate** contemporary maritime business issues and assess their impact – both present and in the future - on the maritime industry and professional practice.	
Professional (Soft) Elements	18. Technological awareness (global)					**Evaluate** the performance standards of different technological application and **appraise** their suitability for maritime tasks.	
	19. Leadership, teamwork and discipline					**Evaluate** own and other's discipline, style of leadership and contribution to teamwork and related outcomes.	

Tier C–Cognitive Domain							
	Focus area	Level of achievement					
		Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
Professional (Soft) Elements	**20. Effective (interpersonal) communication**					**Evaluate** and **recommend** appropriate processes/approaches for communication between different organizational levels and individuals/teams characterized by significant diversity.	
	21. Sustainable development				**Identify** areas in the maritime industry for which sustainable development is critical and **analyze** contemporary mechanisms to integrate sustainable development in the maritime industry.	**Assess** the current status of sustainable development in own operational and organizational context, **highlight** areas that need development and **recommend** optimization mechanisms.	
	22. Human resource management					**Judge** the effectiveness of different human resource management approaches and techniques in different contexts of maritime professional practice and highlight areas that need further attention.	
	23. Cultural/diversity awareness and sensitivity						

Tier C–Cognitive Domain	Focus area	Level of achievement					
		Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
	24. Progressive mindset and lifelong learning						
Professional (Soft) Elements	25. Environmental awareness, sustainability and stewardship						
	26. Decision-making and proactivity					**Appraise** the outcomes of various decisions and **evaluate** the merits of the processes that informed them and of different proactive actions in diverse situations.	
	27. Mentorship					**Evaluate** mentoring techniques and actions for their relevance, effectiveness, and sustainability.	
	28. Professionalism and ethical responsibility					**Justify** a solution to a job-related problem based on professional ethical standards and **assess** own personal professional & ethical development.	

Table 14: Tier C – Affective Domain

Tier C–Affective Domain		*Level of achievement*				
Focus area		**Receiving** (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Foundational Elements	1. Mathematics					
	2. Natural (Physical) sciences					
	3. General humanities & Social sciences					
	4. English language and maritime communication					
	5. Computing and informatics					
	6. Physical and mental fitness					
Academic Elements	7. Problem recognition/solving					
	8. Critical thinking					
	9. Academic research					
	10. Contemporary global issues					

Tier C–Affective Domain

Focus area		*Level of achievement*				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**					
	12. Risk assessment and management					
	13. Situational awareness, preparedness and response					
	14. Technological awareness (job-specific)					
	15. Maritime law, policy and governance					
	16. Logistics and supply chain					
	17. Maritime business					
Professional (Soft) Elements	**18. Technological awareness (global)**					
	19. Leadership, teamwork and discipline					
	20. Effective (interpersonal) communication					
	21. Sustainable development					
	22. Human resource management					

Tier C–Affective Domain						
	Focus area	***Level of achievement***				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**23. Cultural/diversity awareness and sensitivity**					
	24. Progressive mindset and lifelong learning					
	25. Environmental awareness, sustainability and stewardship					
	26. Decision-making and proactivity					**Influence** others to become proactive in maritime professional practice.
	27. Mentorship					
	28. Professionalism and ethical responsibility					

Table 15: Tier C – Psychomotor

Tier C–Psychomotor Domain		*Level of achievement*						
Focus area		**Perception** (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Foundational Elements	**1. Mathematics**							
	2. Natural (Physical) sciences							
	3. General humanities & Social sciences							
	4. English language and maritime communication							
	5. Computing and informatics							
	6. Physical and mental fitness							
Academic Elements	**7. Problem recognition/solving**							
	8. Critical thinking							
	9. Academic research							
	10. Contemporary global issues							

Tier C–Psychomotor Domain		*Level of achievement*						
	Focus area	Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Professional (Technical) Elements	11. Technical competencies as per international requirements (STCW)							
	12. Risk assessment and management							
	13. Situational awareness, preparedness and response							
	14. Technological awareness (job-specific)							
	15. Maritime law, policy and governance							
	16. Logistics and supply chain							
	17. Maritime business							
Professional (Soft) Elements	18. Technological awareness (global)							
	19. Leadership, teamwork and discipline							
	20. Effective (interpersonal) communication							
	21. Sustainable development							
	22. Human resource management							
	23. Cultural/diversity awareness and sensitivity							

Tier C–Psychomotor Domain		Level of achievement						
	Focus area	Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Professional (Soft) Elements	24. Progressive mindset and lifelong learning							
	25. Environmental awareness, sustainability and stewardship							
	26. Decision-making and proactivity							
	27. Mentorship							
	28. Professionalism and ethical responsibility							

GMP TIER D

The GMP Tier D addresses the requirements of management level competency together with an advanced postgraduate academic degree. For example, in the context of the STCW Convention 1978, as amended, this translates to a management level certificate of competency together with a Doctoral Degree. Achievement at tier D presupposes completion of tier C components.

Table 16: Tier D – Cognitive Domain

Tier D–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Foundational Elements	**1. Mathematics**						
	2. Natural (Physical) sciences						
	3. General humanities & Social sciences						
	4. English language and maritime communication						
	5. Computing and informatics						
	6. Physical and mental fitness						

Tier D–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Academic Elements	**7. Problem recognition/solving**						**Develop** new approaches to problem identification, recognition and solving.
	8. Critical thinking						**Develop** new insights into critical thinking techniques and processes in the maritime industry.
	9. Academic research						**Develop** new approaches for the conduct and analysis of academic research.
	10. Contemporary global issues						**Generate** new insights that contribute to the global discourse on contemporary issues.
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**						**Develop** new approaches, systems, and procedures for effective performance in the maritime industry.
	12. Risk assessment and management						**Develop** new approaches, techniques and procedures for effective risk assessment and management.
	13. Situational awareness, preparedness and response						**Improve** existing maritime scenarios relating to situational awareness and a state of preparedness and **model** appropriate states of preparedness and response for new scenarios.
	14. Technological awareness (job-specific)						**Develop** optimum technological awareness techniques and technological solutions for the maritime industry.

Tier D–Cognitive Domain							
	Focus area	*Level of achievement*					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Technical)	**15. Maritime law, policy and governance**						**Integrate** principles of law, policy, and governance in the development of new approaches to regulating the maritime industry.
	16. Logistics and supply chain						**Develop** new maritime supply chain optimization tools and processes.
	17. Maritime business						**Improve** current maritime business approaches and **create** new maritime business models.
Professional (Soft) Elements	**18. Technological awareness (global)**						**Develop** optimum global technological awareness techniques and technological solutions for the maritime industry.
	19. Leadership, teamwork and discipline						**Create/develop** leadership, teamwork & discipline in a maritime entity to accomplish complex tasks.
	20. Effective (interpersonal) communication						**Devise** mechanisms for improving interpersonal communications in maritime professional practice.
	21. Sustainable development						**Develop** long-term plans for the application of the concept of sustainable development in the maritime domain.
	22. Human resource management						**Develop** new human resource management techniques when conventional techniques are not suitable or not applicable.

Tier D–Cognitive Domain							
	Focus area	***Level of achievement***					
		Remembering	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creating**
Professional (Soft) Elements	**23. Cultural/diversity awareness and sensitivity**						
	24. Progressive mindset and lifelong learning						
	25. Environmental awareness, sustainability and stewardship						
	26. Decision-making and proactivity						**Construct** training scenarios for the development of individual decision-making skills and **generate** models for increasing proactivity-based resilience in maritime organizations.
	27. Mentorship						**Develop** fit-for-purpose mentoring strategies and programmes for mentees.
	28. Professionalism and ethical responsibility						**Generate** items related to ethical codes of conduct and **create** research-based opportunities and experiences to foster professional and ethical conduct in the maritime professional practice.

Table 17: Tier D – Affective Domain

Tier D–Affective Domain		*Level of achievement*				
Focus area		**Receiving** (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Foundational Elements	**1. Mathematics**					
	2. Natural (Physical) sciences					
	3. General humanities & Social sciences					
	4. English language and maritime communication					
	5. Computing and informatics					
	6. Physical and mental fitness					
Academic Elements	**7. Problem recognition/solving**					
	8. Critical thinking					
	9. Academic research					
	10. Contemporary global issues					

Tier D–Affective Domain						
	Focus area	*Level of achievement*				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**					
	12. Risk assessment and management					
	13. Situational awareness, preparedness and response					
	14. Technological awareness (job-specific)					
	15. Maritime law, policy and governance					
	16. Logistics and supply chain					
	17. Maritime business					
Professional (Soft) Elements	**18. Technological awareness (global)**					
	19. Leadership, teamwork and discipline					
	20. Effective (interpersonal) communication					
	21. Sustainable development					
	22. Human resource management					
	23. Cultural/diversity awareness and sensitivity					
	24. Progressive mindset and lifelong learning					

Tier D–Affective Domain						
	Focus area	*Level of achievement*				
		Receiving (awareness)	**Responding** (reacting)	**Valuing** (understanding & acting)	**Organizing personal value system**	**Internalizing value system** (adopting behaviour)
Professional (Soft) Elements	**25. Environmental awareness, sustainability and stewardship**					
	26. Decision-making and proactivity					
	27. Mentorship					
	28. Professionalism and ethical responsibility					

Table 18: Tier D – Psychomotor

Tier D–Psychomotor Domain		*Level of achievement*						
Focus area		**Perception** (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Foundational Elements	**1. Mathematics**							
	2. Natural (Physical) sciences							
	3. General humanities & Social sciences							
	4. English language and maritime communication							
	5. Computing and informatics							
	6. Physical and mental fitness							
Academic Elements	**7. Problem recognition/solving**							
	8. Critical thinking							
	9. Academic research							
	10. Contemporary global issues							

Tier D–Psychomotor Domain								
Focus area		***Level of achievement***						
		Perception (awareness)	**Setting**	**Guided response**	**Mechanism** (basic proficiency)	**Complex overt response** (expert)	**Adaptation**	**Origination**
Professional (Technical) Elements	**11. Technical competencies as per international requirements (STCW)**							
	12. Risk assessment and management							
	13. Situational awareness, preparedness and response							
	14. Technological awareness (job-specific)							
	15. Maritime law, policy and governance							
	16. Logistics and supply chain							
	17. Maritime business							
Professional (Soft)	**18. Technological awareness (global)**							
	19. Leadership, teamwork and discipline							
	20. Effective (interpersonal) communication							
	21. Sustainable development							

Tier D–Psychomotor Domain	*Level of achievement*						
Focus area	Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Professional (Soft) Elements							
22. Human resource management							
23. Cultural/diversity awareness and sensitivity							
24. Progressive mindset and lifelong learning							
25. Environmental awareness, sustainability and stewardship							
26. Decision-making and proactivity							
27. Mentorship							
28. Professionalism and ethical responsibility							

Appendix II - Using the specific tier tables in Appendix I

The tables in Appendix II are provided as an alternative approach to extracting the required ILOs according to the desired Tier/s. The tables are aggregated according to Tier and domain. In other words, the person using the BoK need only determine which tier/s are of interest to his/her institution. He/she can then directly employ the tables in Appendix II to define the required ILOs within each domain.
The proposed procedure may be summarized in the following two steps.

1. Ascertain appropriate *Tier/s*:

Initially, the programme administrator should ascertain the appropriate GMP tier/s as explained in section 2.4 according to the programme's mission and objectives.

Using the same example as in section 3.3.4, for an institution that delivers programmes designed to offer the following two qualifications:

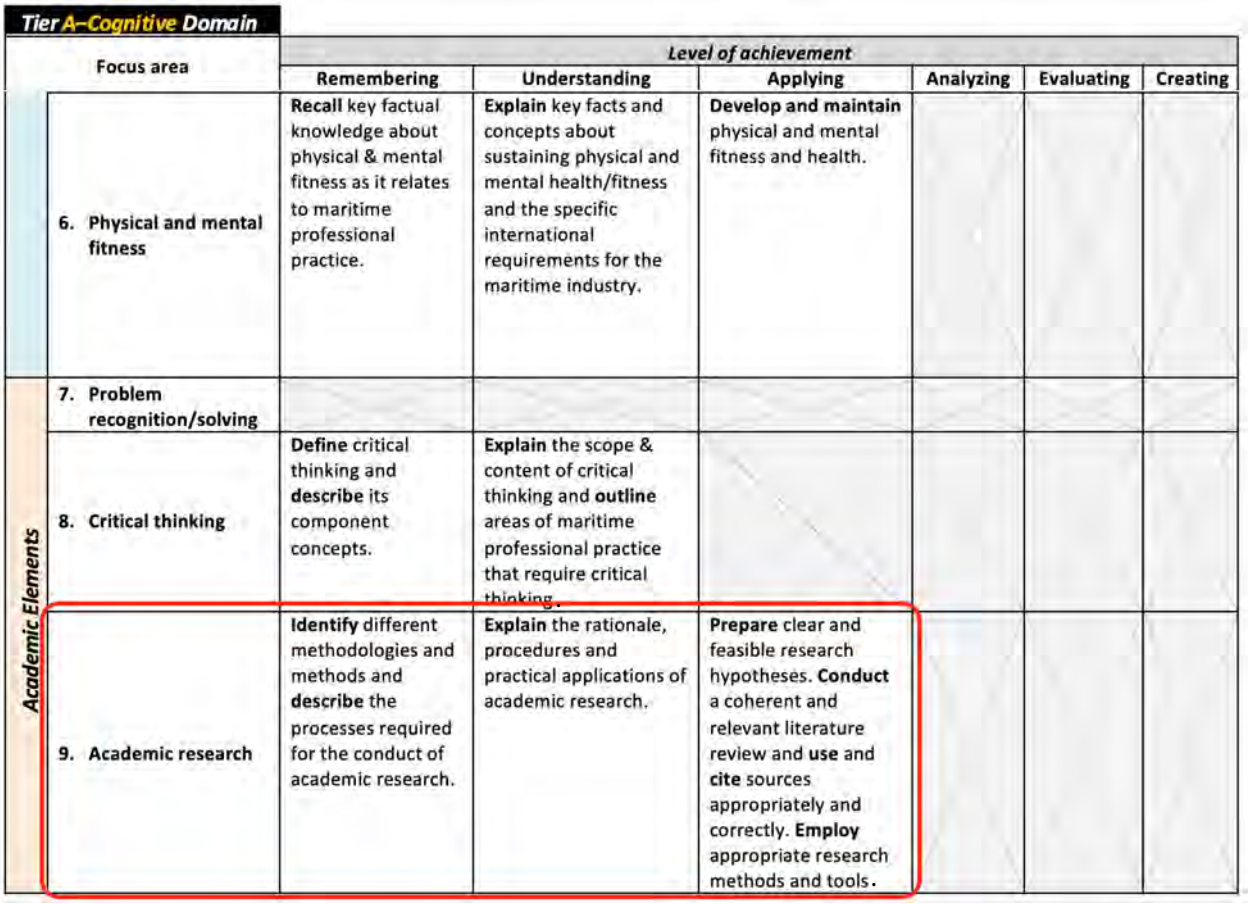
- Bachelor of Science Degree in Maritime Transportation Technology (GMP Tier-A); and
- Management Level Certificate of Competency (GMP Tier-B),

the programme should aim to achieve the requirements of both Tiers A and B in order to fulfil the relevant GMP required skills.

2. Extraction of *Focus Areas (FA), Level of Achievements (LOA) and Intended Learning Outcomes (ILO)*:

The programme administrator should then move on to *Table 7: Tier A*. Based on the desired scope of the programme to be delivered, he/she will extract the related FA from the left-most column. There are 28 aggregated FAs segregated into four element groups. From each element group, the administrator should choose the FAs which are in-line with the objectives of the programme to be delivered.
Following the above example, the institution whilst focusing on tier A with regard to academic research will extract the related LOAs and ILOs to FA *9. Academic research* from all three domain tables; ***Table 7: Tier A – Cognitive Domain, Table 8: Tier A – Affective Domain*** and ***Table 9: Tier A – Psychomotor Domain*** where applicable.

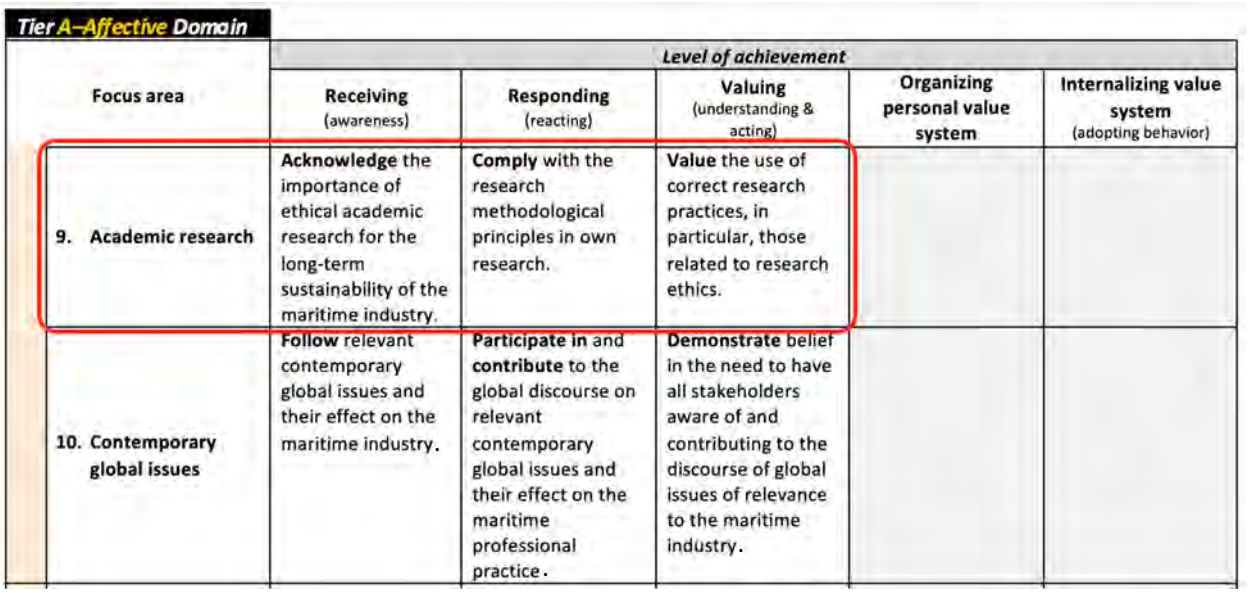
Firstly, use ***Table 7: Tier A – Cognitive Domain*** to extract the LOAs & ILOs for the intended FA under the cognitive domain. Note that only ILOs specific to Tier A are included in this table under the required LOA. The remaining columns, however, may be relevant to other tiers.



Tier A–Cognitive Domain		Level of achievement					
	Focus area	Remembering	Understanding	Applying	Analyzing	Evaluating	Creating
	6. Physical and mental fitness	**Recall** key factual knowledge about physical & mental fitness as it relates to maritime professional practice.	**Explain** key facts and concepts about sustaining physical and mental health/fitness and the specific international requirements for the maritime industry.	**Develop and maintain** physical and mental fitness and health.			
Academic Elements	7. Problem recognition/solving						
	8. Critical thinking	**Define** critical thinking and **describe** its component concepts.	**Explain** the scope & content of critical thinking and **outline** areas of maritime professional practice that require critical thinking.				
	9. Academic research	**Identify** different methodologies and methods and **describe** the processes required for the conduct of academic research.	**Explain** the rationale, procedures and practical applications of academic research.	**Prepare** clear and feasible research hypotheses. **Conduct** a coherent and relevant literature review and **use** and **cite** sources appropriately and correctly. **Employ** appropriate research methods and tools.			

Figure 9*:* Excerpt from Table 7.

Secondly, use ***Table 8: Tier A – Affective Domain*** to extract the LOA & ILOs for the intended FA under the cognitive domain. Similarly, only ILOs specific to Tier A are included.



Tier A–Affective Domain		Level of achievement				
	Focus area	Receiving (awareness)	Responding (reacting)	Valuing (understanding & acting)	Organizing personal value system	Internalizing value system (adopting behavior)
	9. Academic research	**Acknowledge** the importance of ethical academic research for the long-term sustainability of the maritime industry.	**Comply** with the research methodological principles in own research.	**Value** the use of correct research practices, in particular, those related to research ethics.		
	10. Contemporary global issues	**Follow** relevant contemporary global issues and their effect on the maritime industry.	**Participate in** and **contribute** to the global discourse on relevant contemporary global issues and their effect on the maritime professional practice.	**Demonstrate** belief in the need to have all stakeholders aware of and contributing to the discourse of global issues of relevance to the maritime industry.		

Figure 10: Excerpt from Table 8.

Thirdly, use *Table 9: Tier A - Psychomotor* to extract the LOA & ILOs for the intended FA.

Tier A–Psychomotor Domain								
	Focus area	Level of achievement						
		Perception (awareness)	Setting	Guided response	Mechanism (basic proficiency)	Complex overt response (expert)	Adaptation	Origination
Foundational Elements	1. Mathematics							
	2. Natural (Physical sciences							
	3. General humanities & Social sciences							
	4. English language and maritime communication							
	5. Computing and informatics							
	6. Physical and mental fitness							
Academic	7. Problem recognition/solving							
	8. Critical thinking							
	9. Academic research							
	10. Contemporary global issues							

Figure 11: Excerpt from Table 9.

Moving on to *Table 9: Tier A – Psychomotor Domain,* it is noted that no FAs are applicable in the psychomotor domain. The programme administrator should note that, depending on the extracted FAs, this may not always be the case.

Thus far, the programme administrator has extracted the required ILOs for Tier A under all three domains. He/she will need to follow the same process to extract the required ILOs for any subsequent tiers, if pertinent to the programme, from Tables 10 to 18: Tables 10 to 12 for Tier B, Tables 13 to 15 for Tier C and, finally, Tables 16 to 18 for Tier D.

Appendix III – Extracts of report of task force to the IEB with survey approach and results

Methodological approach

To inform the determination of the competencies required of a future seafarer/global maritime professional, a survey was conducted as detailed below:

1. A survey was designed and administered to the membership of IAMU and to other stakeholders in the maritime industry on 18 March 2018. The survey is attached to this report.
2. The survey was closed on 31 March 2018
3. The survey had 214 respondents from all regions of the world and diverse work areas of the maritime industry (see Annex II for demographic description of respondents)
4. The analysis of the substantive survey responses informs this paper (see Annex I for relevant survey outcomes)

Working Description of Global Maritime Professional (GMP)

[An individual who is a professional in the maritime industry and who is equipped with all the relevant technical competences relevant to their specific operational role in the industry and who – in addition to their technical competency – exhibits a high level of professionalism and ethical behaviour, human relations skills, emotional intelligence and multicultural awareness and sensitivity. Such an individual exhibits significant leadership skills and is able to optimally work with teams and also take personal initiative. They additionally display a high sense of environmental awareness and an excellent grasp of contemporary issues affecting the maritime industry]

[A maritime professional fully equipped with the relevant technical competencies that satisfy state of the art maritime education and training requirements meeting and exceeding the STCW requirements with high level academic skills including logical and critical thinking and who shows significant leadership skills and affective characteristics applicable to all maritime sectors globally. Such an individual will additionally exhibit significant environmental consciousness and the need for sustainable practices as well as high degree of professionalism and ethical behaviour]

Required competencies of the GMP

As a result of the survey and taking into account ongoing dialogue on trends impacting the maritime industry and maritime education and training, a number of broad areas of competency were identified. They are categorized and arranged in order of highest aggregation of survey responses as indicated below:

- The CONTEMPORARY competencies deemed to be of most importance are:
  1. Technical competence specific to their operational or management role in maritime industry (e.g. onboard ship)
  2. Teamworking abilities
  3. Awareness of and appropriate response to developments of disruptive technologies affecting the maritime industry
  4. Discipline
  5. Communication skills and language abilities particularly (but not exclusively) in the English language
  6. Leadership
  7. Risk awareness and safety/security consciousness
  8. Multicultural/diversity awareness and sensitivity
  9. Emotional intelligence
  10. Dedication, diligence and commitment

  An extended list is indicated in Figure 12 and a word cloud in Figure 13 in Annex I

- The competencies deemed of most importance in the MEDIUM TERM (5-10 YEARS) are:
  1. Awareness of and appropriate response to developments of disruptive technologies affecting the maritime industry
  2. Technical competence specific to their operational or management role in maritime industry (e.g. onboard ship)
  3. Computing and informatics skills
  4. Adaptability and flexibility
  5. Leadership
  6. Environmental stewardship and sustainability awareness/concern
  7. Communication skills and language abilities particularly (but not exclusively) in the English language
  8. Teamworking abilities
  9. Complexity and critical thinking
  10. Professionalism and ethical behaviour

  An extended list is indicated in Figure 14 and a word cloud in Figure 15 in Annex I

- The competencies deemed of most importance in LONG TERM[41] (20 YEARS) are:
  1. Awareness of and appropriate response to developments of disruptive technologies affecting the maritime industry

[41] A number of respondents were of the opinion that given the rapid changes that have characterized the late 20th century and the early 21st century, the competency requirements 20 years from now are impossible to predict.

2. Technical competence specific to their operational or management role in maritime industry (e.g. onboard ship)
3. Computing and informatics skills
4. Adaptability and flexibility
5. Environmental stewardship and sustainability awareness/concern
6. Learning and self-development skills
7. Leadership
8. Teamwork abilities
9. Communication skills and language abilities particularly (but not exclusively) in the English language
10. Professionalism and ethical behaviour

An extended list is indicated in Figure 16 and a word cloud in Figure 17 in Annex I

A graphical representation of the top 40 competencies, knowledge areas, skills and attitudes are shown in Figure 18 in Annex I and a full ranked list of all the competencies and KSAs identified from the survey, in Table 19 in Annex I.

In general, and as indicated by the survey outcomes as shown in Figure 16, the competences can be broadly categorized as being related to:

- Technical competence related to specific operational and management tasks (developed and maintained within the context of changing and disruptive technologies)
- Human relations including emotional intelligence, multi-cultural sensitivity and respect for diversity including gender and inter-personal and social skills
- Environmental stewardship and sustainability awareness
- Professional and ethical responsibility and behaviour
- Information and communication technology (ICT) literacy
- Leadership and teamwork including appropriate assertiveness
- International and national maritime policy and governance
- Training delivery and assessment (including mentorship)
- Risk and uncertainty and the adaptability/flexibility and change management/leadership necessary to deal with such a paradigm
- Contemporary global issues and their historical perspectives
- Written and oral communication
- Quantitative reasoning and critical thinking

The average respondent scores showed high importance for competencies related to all these areas. **Figure 16 in Annex I,** shows the relative average scores for these areas for the contemporary situation and for the long term.

Annex I – Extracts from survey results informing this report

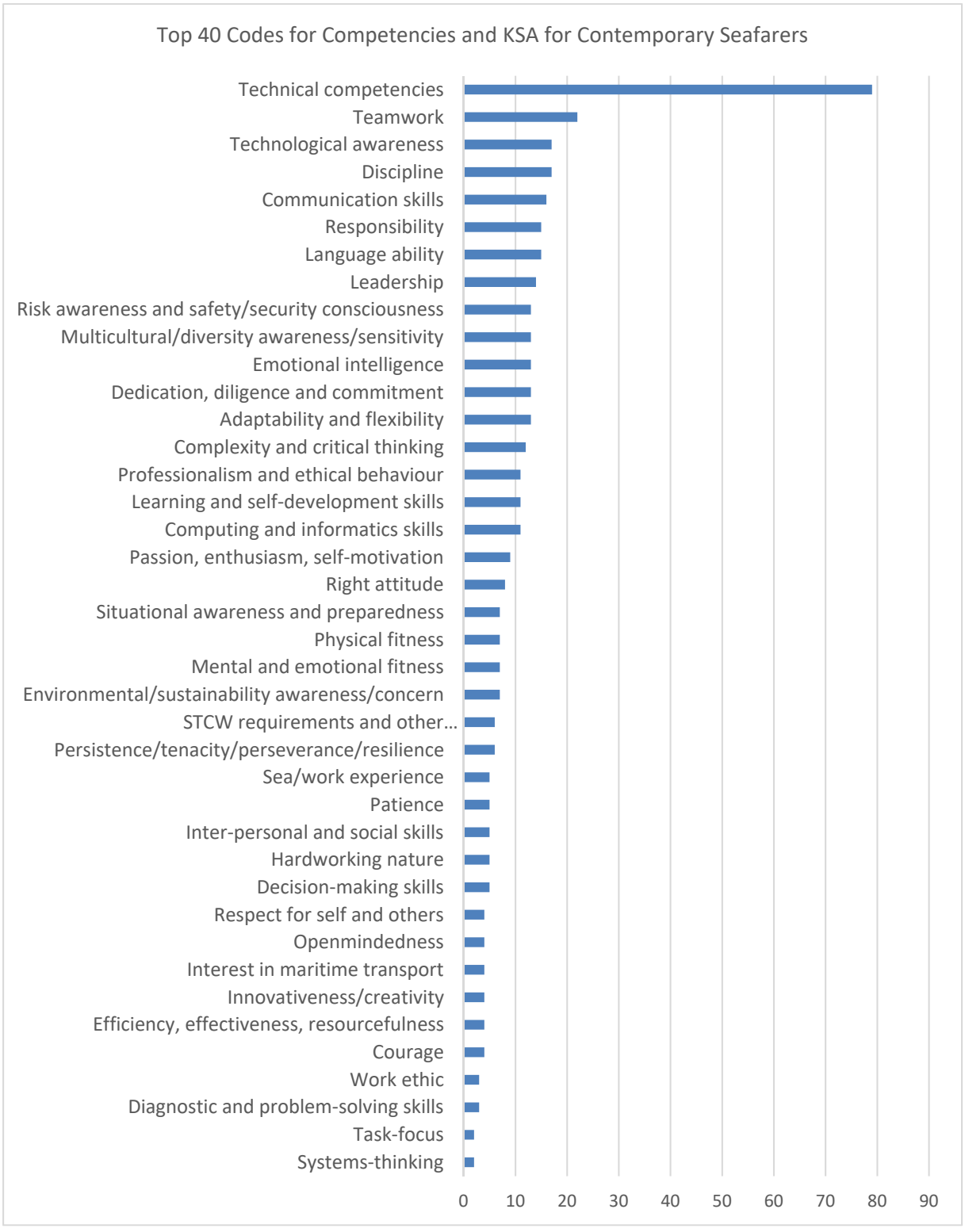


Figure 12: Codes for quotations for KSA for seafarers today

Figure 13: Word cloud - Competencies and KSA for today's seafarer

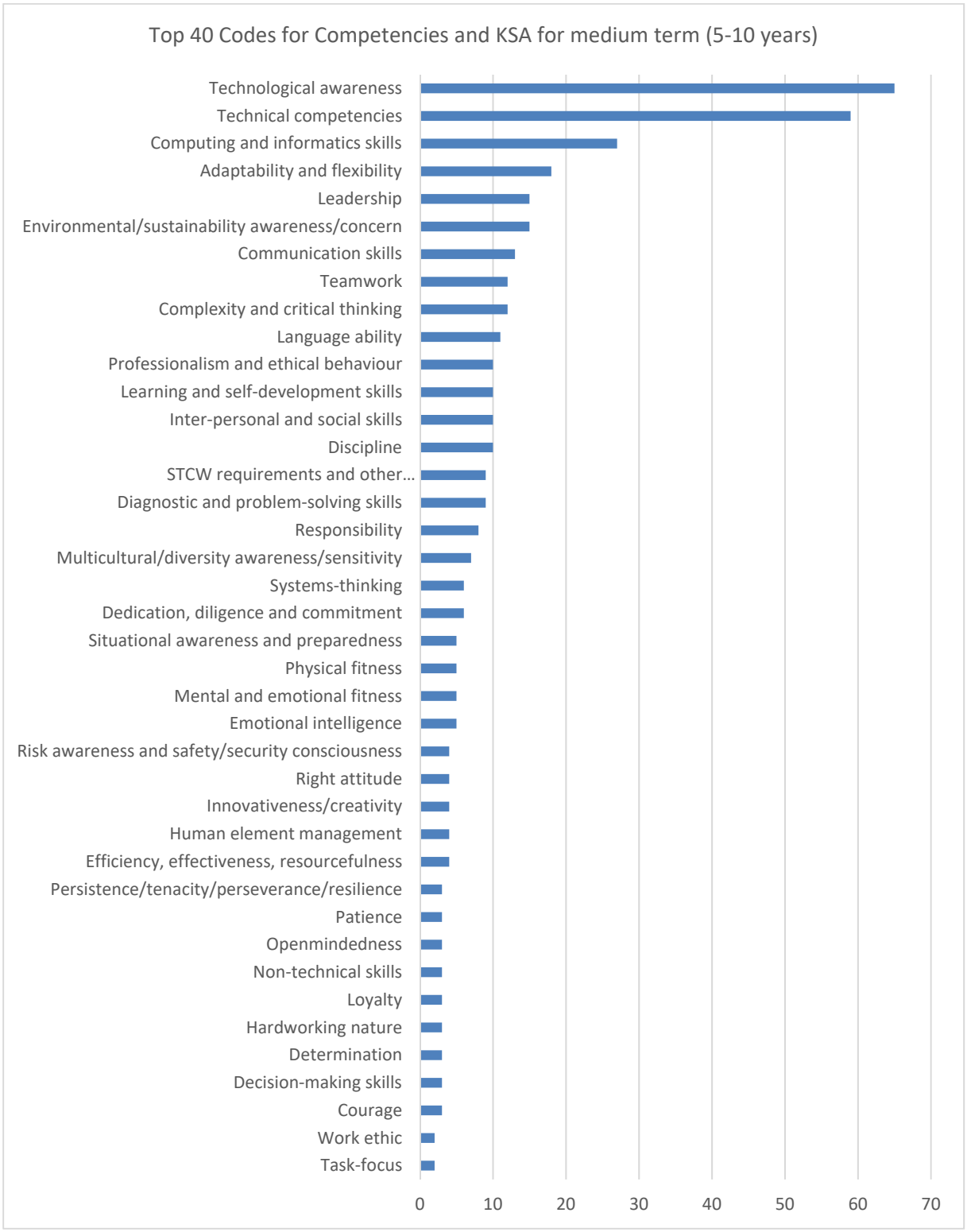


Figure 14: Codes for quotations for KSA for the medium term

Figure 15: Word cloud - Competencies and KSA in 5 years (medium term)

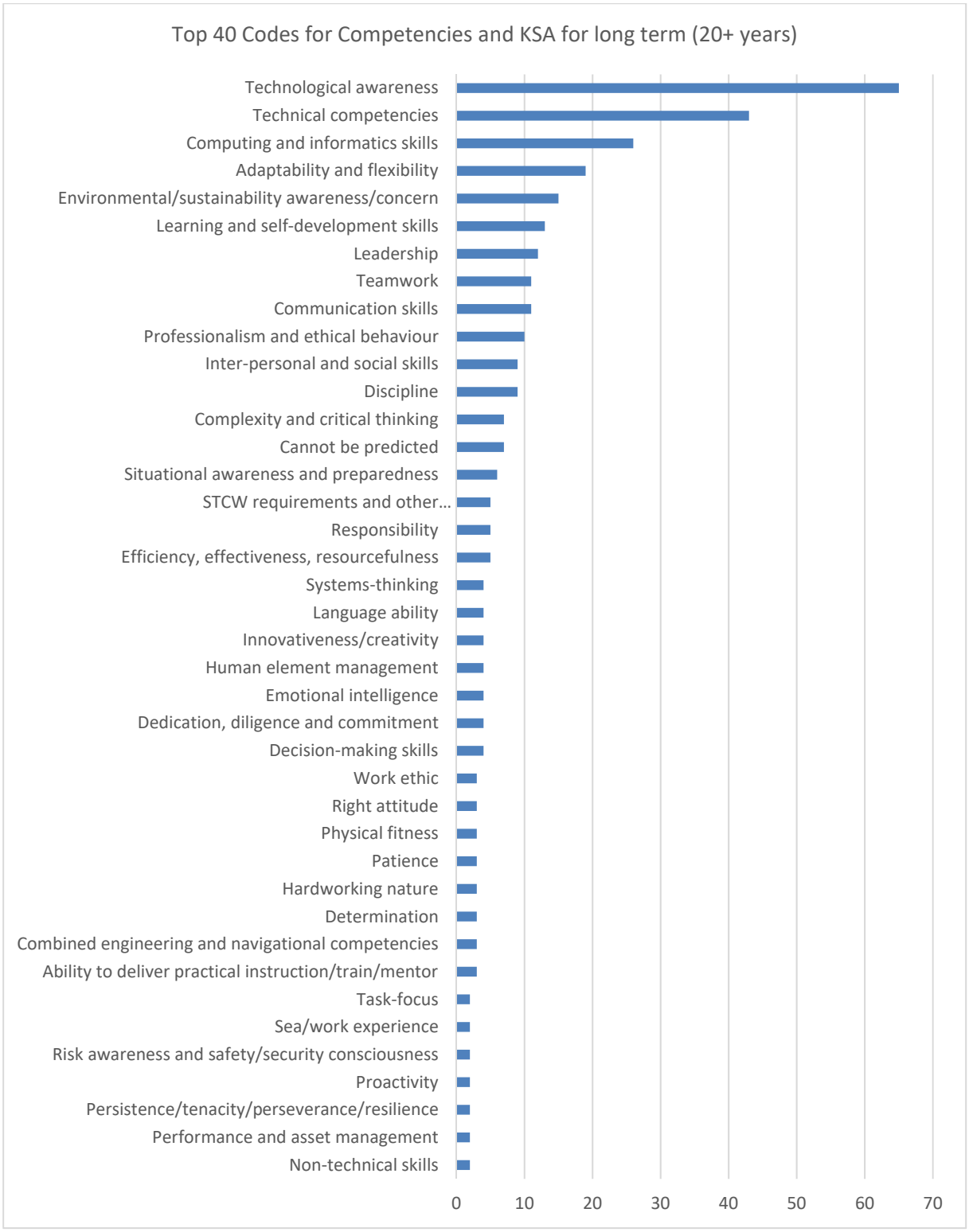


Figure 16: Codes for quotations for KSA for the long term

Figure 17: Word cloud - Competencies and KSA in 20 years (long term)

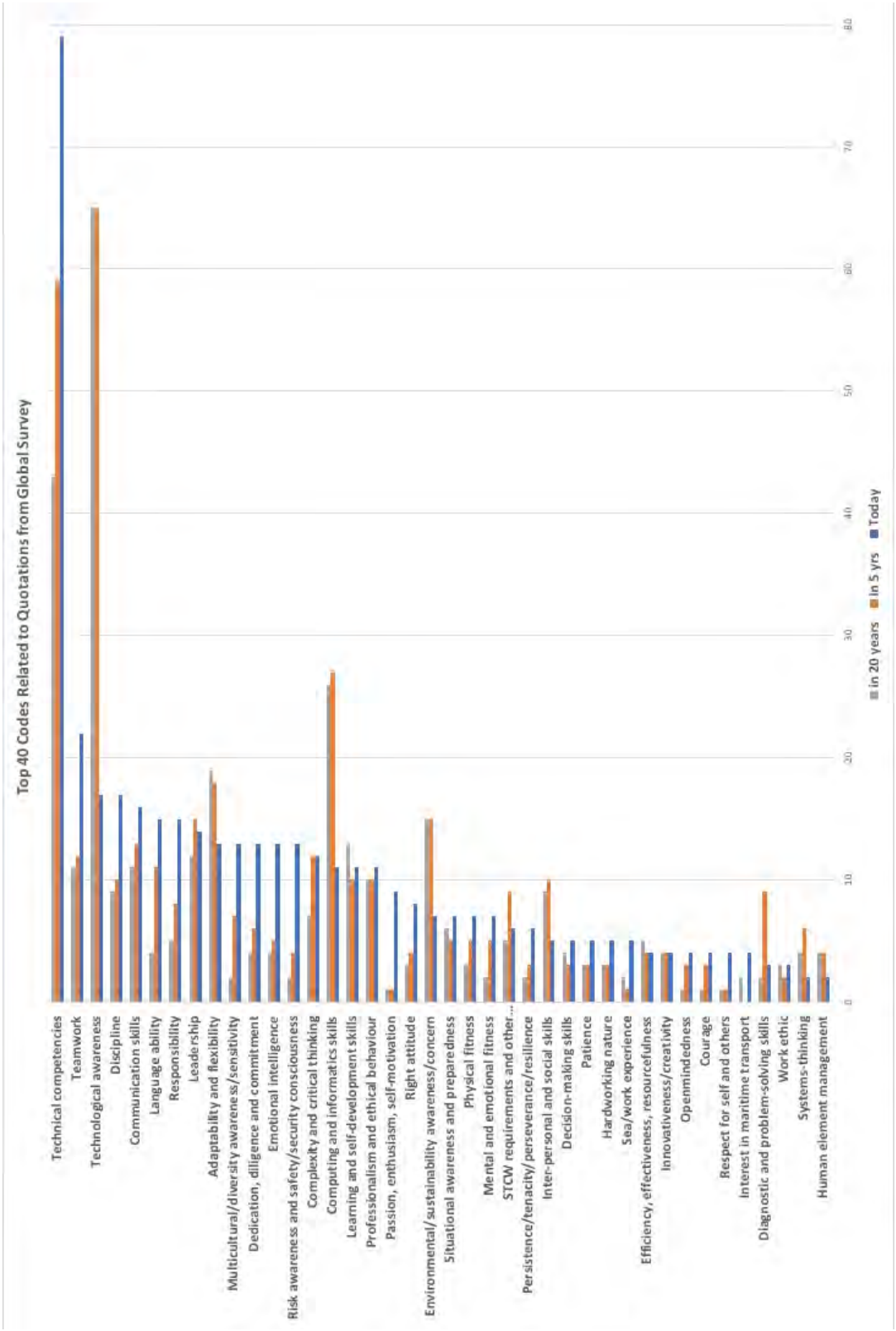


Figure 18: Graphical representation - KSAs for the short, medium and long terms

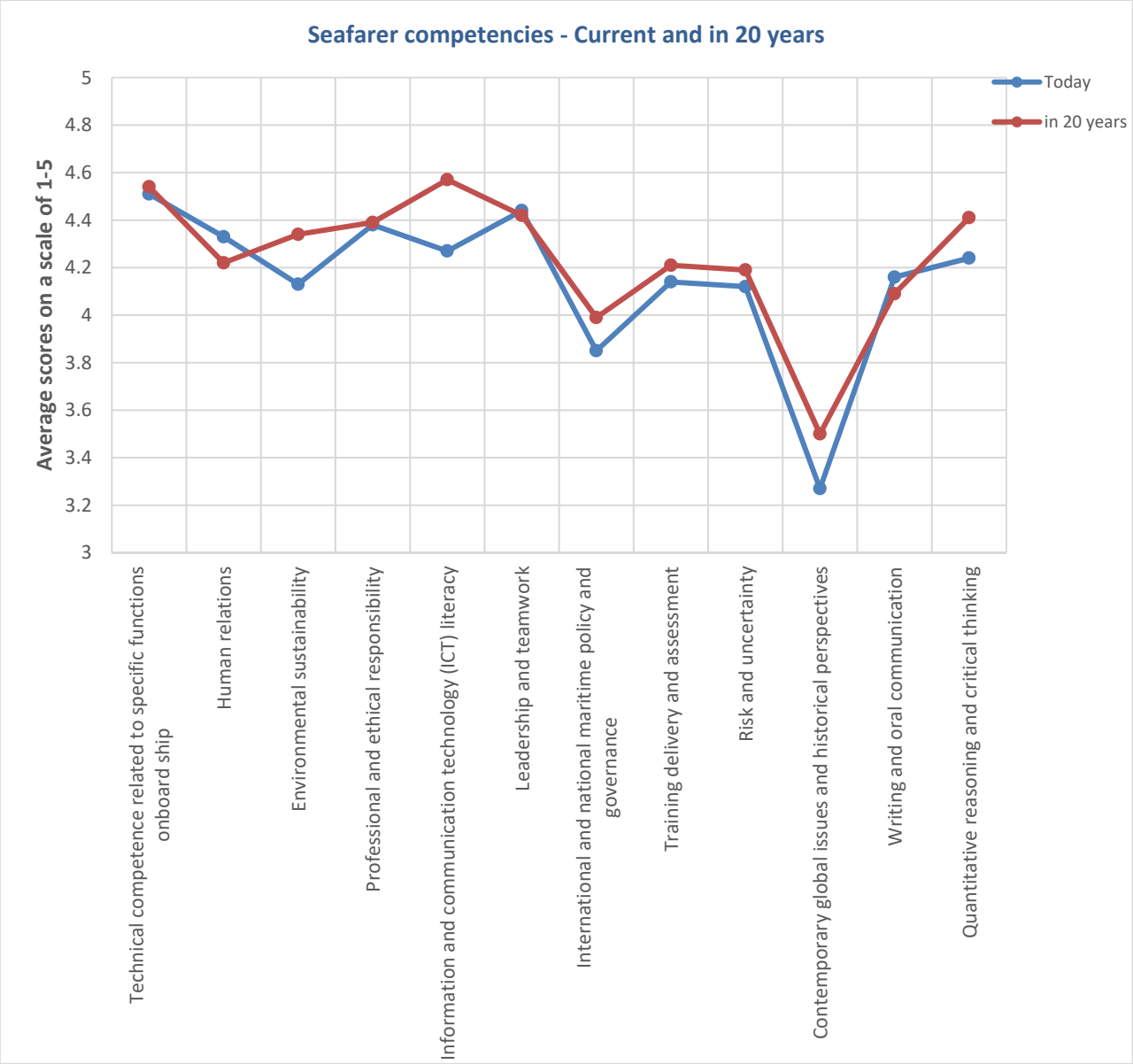


Figure 19: Seafarer competence – Current and in 20 years

Table 19: List of all codes with rankings for different time periods

Code		Ranking[42]		
		Today	Medium term	Long term
1	Ability to deliver practical instruction/train/mentor	n/r[43]	18	15
2	Adaptability and flexibility	7	4	4
3	Adroitness	19	n/r	n/r
4	Alertness	19	n/r	n/r
5	Aptitude	19	n/r	n/r
6	Cannot be predicted	n/r	n/r	11
7	Combined engineering and navigational competencies	n/r	n/r	15
8	Common sense	19	n/r	n/r
9	Communication skills	4	6	8
10	Competitiveness	18	18	n/r
11	Complexity and critical thinking	8	7	11
12	Computing and informatics skills	9	3	3
13	Confidence	18	18	16
14	Courage	15	16	17
15	Decision-making skills	14	16	14
16	Dedication, diligence and commitment	7	13	14
17	Determination	19	16	15
18	Diagnostic and problem-solving skills	16	10	16
19	Diplomacy	19	18	17
20	Discipline	3	9	10
21	Efficiency, effectiveness, resourcefulness	15	15	13
22	Emotional intelligence	7	14	14
23	Environmental/sustainability awareness/concern	12	5	5
24	Financial management	19	18	17
25	Flamboyancy	19	n/r	n/r
26	Hardworking nature	14	16	15
27	Human element management	18	15	14
28	Independence/assertiveness	19	18	n/r
29	Innovativeness/creativity	15	15	14
30	Inter-disciplinary competencies	n/r	n/r	16

[42] Number 1 is the highest rank out of 78 codes, based on the number of quotations associated with each code.
[43] n/r – Not recorded

31	Inter-personal and social skills	14	9	10
32	Interest in maritime transport	15	n/r	16
33	Knowledge of human rights	n/r	18	n/r
34	Language ability	5	8	14
35	Leadership	6	5	7
36	Learning and self-development skills	9	9	6
37	Loyalty	18	16	16
38	Mental and emotional fitness	12	14	16
39	Meticulousness	19	n/r	n/r
40	Multi-tasking abilities	19	n/r	17
41	Multicultural/diversity awareness/sensitivity	7	12	16
42	No seafarer	n/r	n/r	16
43	Non-technical skills	18	16	16
44	Obedience	18	n/r	n/r
45	Open-mindedness	15	16	17
46	Passion, enthusiasm, self-motivation	10	18	17
47	Patience	14	16	15
48	Performance and asset management	n/r	n/r	16
49	Persistence/tenacity/perseverance/resilience	13	16	16
50	Physical fitness	12	14	15
51	Precision	19	n/r	n/r
52	Proactivity	n/r	18	16
53	Professionalism and ethical behaviour	9	9	9
54	Progressiveness	19	n/r	n/r
55	Punctuality	19	18	17
56	Quality management	19	n/r	n/r
57	Reading skills	19	18	n/r
58	Realism	19	n/r	n/r
59	Reliability	19	18	17
60	Research orientation	19	17	n/r
61	Respect for self and others	15	18	17
62	Responsibility	5	11	13
63	Right attitude	11	15	15
64	Risk awareness and safety/security consciousness	7	15	16
65	Sea/work experience	14	18	16
66	Sense of adventure	19	n/r	n/r
67	Seriousness	19	n/r	n/r
68	Situational awareness and preparedness	12	14	12
69	STCW requirements and other conventions/rules/regulations	13	10	13

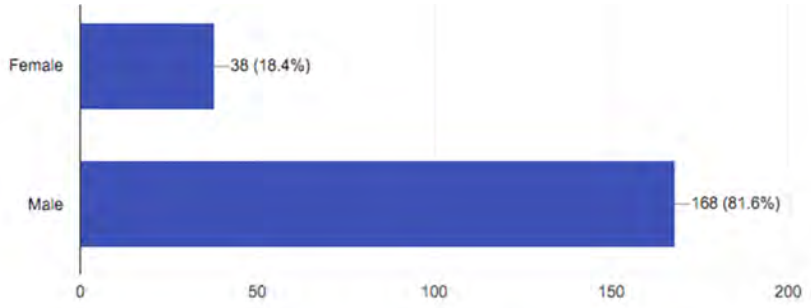
70	Strategic knowledge	n/r	17	n/r
71	Systems-thinking	18	13	14
72	Task-focus	18	17	16
73	Teamwork	2	7	8
74	Technical competencies	1	2	2
75	Technological awareness	3	1	1
76	Trustworthiness	19	n/r	n/r
77	Understanding of whole transport chain	n/r	18	n/r
78	Work ethic	16	17	15

Annex II - Survey respondent demographics

- Total number of respondents = 214
- Age of respondents

  Mean = 42.2 years
  SD = 15.4 years

- Gender representation



- Represented nations (31)

  China, Croatia, Egypt, Finland, France, Germany, Ghana, India, Italy, Japan, Liberia, Malaysia, Myanmar, Namibia, The Netherlands, Panama, Peru, The Philippines, South Korea, Romania, Russia, Serbia, South Africa, Spain, Sweden, Switzerland, Thailand, Ukraine, USA, Vietnam, Yemen.

Survey respondents included staff and students of maritime education and training institutions, maritime administration personnel, individuals working in the maritime industry (ship management and owning companies), software vendors and original equipment manufacturers among others.

52.2% of the respondents had sea-experience but are no longer at sea; 9.2% are still at sea and 38.6% had no sea experience.

- Number of years spent in maritime industry

  Mean = 18.7 years
  SD = 12.5 years

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