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(No. 20160405)

Aligning the Course Learning Outcomes of Maritime Business Degrees with Industry Preferred Skill Sets to Increase Student Employability in the Onshore Maritime Industry

By

Australian Maritime College (AMC)

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Aligning the Course Learning Outcomes of Maritime Business Degrees with Industry Preferred Skill Sets to Increase Student Employability in the Onshore Maritime Industry

Theme Four

(Employability Skills in the Onshore Maritime Industry)

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Abstract This project investigates whether the Course Learning Outcomes (CLOs) of maritime business degree meet the specific employability requirements of the onshore sector of the maritime industry. It firstly identifies common employability skills embedded in the CLOs of maritime business degrees by undertaking a comparison of existing CLOs between universities. Secondly, it interviewed and surveyed senior managers in the onshore maritime sectors in Australia, the US and Canada to investigate current and future industry employability skills required for maritime business graduates. Thirdly, these industry-focused employability skills sets were used for developing a mapping tool to evaluate alignment between the industry preferred employability skills sets and the universities' CLOs and curriculum. Strategies for improvement of the CLOs and curriculum of maritime business degrees are recommended to align with employer-identified future skills to enhance students' employability in the onshore maritime industry.

Keyword: *Employability Skills, Onshore Maritime Industry, Maritime Business Degrees, Course Learning Outcomes (CLOs)*

Executive summary

The maritime industry underpins international business and world trade. As to be expected, business management is critical for the maritime industry, requiring highly trained individuals and teams to lead the development, implementation and control of sound contemporary management practices. Maritime business degrees are developed by universities to meet such demand by providing graduates with sufficient skills for the onshore business-related roles. This project addresses the gap between the employability skills embedded in the Course Learning Outcomes (CLOs) and the specific employability requirements of the onshore sector of the maritime industry. More specifically, the project investigates current and future industry employability skills for maritime business graduates to succeed in the onshore industry. The project also develops strategies for aligning these skills with CLOs and the curriculum of maritime business degrees.

In examining how employability skills are currently embedded in universities' curriculums, this project compared nine CLOs of maritime business undergraduate programmes from seven IAMU and two non-IAMU maritime universities. The CLOs in those maritime business degree programmes describe expectations that maritime business graduates should have broad and coherent general business and maritime business related knowledge and be able to apply this knowledge when undertaking professional work. The knowledge includes cognitive skills such as critical thinking; practical skills such as problem solving, research skills, application of knowledge; and transferable skills including communication, self-management, teamwork, and the use of computer and IT skills in a maritime business and management context. In addition, the CLOs suggest that graduates should be able to demonstrate a global perspective, and conduct themselves in a professional, socially responsible and ethical manner in life and in diverse business environments.

This project undertook a two-stage data collection involving firstly focus groups and individual interviews, and secondly, an online survey. In relation to the focus group and individual interviews, which were undertaken to explore industry perspectives on employability skills, these occurred with 27 senior industry managers in onshore maritime organisations in Australia, the US and Canada. The results of this first stage of the empirical study revealed that communication, adaptability and flexibility, an inquisitive mind, self-management, analytical and problem-solving, interpersonal skills, computer skills, and team work are essential employability skills required by the onshore maritime industry. The senior managers also suggested twenty topics of specific maritime business knowledge that are required to work in the various onshore maritime related organisations. They also identified that the future trend for the maritime industry is the adoption of automation and the utilisation of technology and information systems, therefore, computer skills and technology application are skills of growing importance for maritime business graduates. Regardless of changes in the future, adaptability continues to be an important skill because it is a continually evolving industry that will require graduates to be agile in their approach to the ever-changing environment.

The skills embedded in CLOs and the skills required by the onshore maritime industry commonly harmonise in areas such as knowledge, self-management and computer/IT skills. However, modifying CLOs related to communication and problem solving to give more specific emphasis, depth of study and focus may benefit industry as universities will be providing more comprehensive skill sets for these critical areas. In addition, including adaptability, flexibility and an inquiring mind in CLOs may increase the value of maritime business programmes to the dynamism and complexity that are inherent in the maritime industry.

In terms of the second stage of the empirical study, 117 senior managers in the onshore maritime industry in Australia, the US and Canada responded to the online survey. The senior managers confirmed that communication was the most important employability skill, followed by, problem solving, adaptability, self-management, team work, and digital literacy and technology. Seventeen (17) topics of specific maritime business knowledge skills were deemed by the senior managers to be of moderate to great

importance. The online survey also found that technological change may drive the need to change some skills/knowledge in the future. Demand for digital literacy and technology knowledge and skills have for example already been increasing. However, a skills focus for maritime business graduates will not be creating the technology itself but in the use and management of technology, computer skills, and data management (eg big data) including monitoring, analysis, problem detection and solving.

In relation to the future skills/knowledge required from maritime business degree graduates in 10 years' time, communication and adaptability are still recognised as the most important ones. This includes that maritime business graduates should be able to adopt new technology as a means for communication. Several respondents also expressed that graduates could be equipped with a higher level of computer skills, have strong work ethics and multilingual skills.

As a result of the examination of the universities' CLOs and the two-stage empirical study, this project developed a mapping tool that determines alignment between the curriculum and CLOs of maritime business degrees and the industry required employability skills. The mapping tool identifies in-depth both learning activities and assessment items that will incorporate transferable skills and both specific maritime industry and specialist knowledge. Utilising the mapping tool results is a vital means to inform curriculum development.

Several recommendations are provided for maritime business degree providers to align their curriculum and industry employability skills. These include mapping curriculum regularly; developing transferable skills within the context of the maritime industry; implementing work integrated learning such as being involved with a mock organisation; hosting regular Industry Liaison/Advisory Committee meetings; inviting industry leaders for presentation; promoting student memberships of relevant industry associations; incorporating applied use of technology throughout the course; and considering incorporating non-specialist units into the curriculum.

This research suggests several further studies. These include testing the mapping tool developed in this project by its use in IAMU member universities which offer maritime business degrees; and conducting surveys to maritime business graduates who are working in the maritime industry to receive their perceptions on employability skills. Additionally, this research can be extended further by involving more maritime universities in particular in both Asia and Europe to validate the results of this research.

Acknowledgements

This research project "Aligning the course learning outcomes of maritime business degrees with industry preferred skill sets to increase student employability in the onshore maritime industry" has been funded by the Nippon Foundation as a capacity building project of the International Association of Maritime Universities (IAMU). The research team would like to express our appreciation for the support from the Nippon Foundation and IAMU.
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1. Introduction

1.1 Background and Objectives of This Research

The onshore maritime industry consists of companies, for example shipping companies, ports and terminals, recruiting shore-based employees who support the maritime logistics task. The industry is a crucial contributor to the viability and sustainability of the maritime sector. Within this industry, there are a diverse array of skilled professional occupations and career pathways. Maritime business degrees are a well-recognised qualification to gain entry to employment in this industry, often undertaken by seafarers for example as a pathway to enable the transition from ship-to-shore by building on their experience at sea. Of interest, in seafaring there are professional standards that apply to the skill sets required, determined by international organisations such as IMO and national regulatory Authorities such as the Australian Maritime Safety Authority (AMSA). However, for the onshore business-related roles, in diverse organisations such as ports, shipping companies, maritime freight forwarding companies and ships agents, the key employability skills are unclear. Maritime business degrees, which are likely to be a popular degree for graduates seeking onshore maritime employment, tend to contain learning outcomes that are frequently generic, with little known about the specific employability requirements of the critical onshore sector of the maritime industry.

This research project addresses this gap by identifying current and future employability skills for professional practice. By developing a mapping tool for evaluating alignment between the Course Learning Outcomes (CLOs) of maritime business undergraduate degrees and the identified employability skills, it will enable industry-focused course development to occur in a better informed environment. Course graduates will therefore be better equipped to perform industry-specific business-related roles and thus contribute to the safety, security and sustainability of the maritime industry.

The objectives of this research include:

- Determining current and future employability skills and dimensions required for professional practice;
- Investigating similarities and differences in skill sets inherent in CLOs between international universities providing maritime business degrees;
- Developing a tool to evaluate alignment between industry employability skill sets and CLOs of maritime business degrees; and
- Recommending strategies to align the curriculum of maritime business degrees with employer-identified future skill sets.

1.2 Research Approach

The research project undertook the following steps to achieve the research objectives.

- Explained the concept of employability skills and CLOs of degree programmes, and reviewed literature on key employability skills in the maritime industry.
- Collected and examined CLOs in other IAMU and non-IAMU maritime business undergraduate degrees. In particular, the research examined how employability skills are currently embedded in the curriculum, leading to the achievement of CLOs. A comparison of existing CLOs between the universities was undertaken to determine their similarities and differences.
- Interviewed 27 key senior industry leaders in Australia, the US and Canada via the use of focus groups, face-to-face and telephone interviews. The interviews explored key industry perceptions of the current and future employability skills required for onshore maritime professionals. The outcomes provided the input for the development of an online survey questionnaire that further probed the issues discovered.

- Surveyed 117 employers in the onshore maritime industry in Australia, the US and Canada to identify perceived professional and technical employability skills and the respective skill dimensions. Employers targeted for the online survey were selected from key maritime sectors such as shipping companies, ship agencies, port corporations, port agencies, terminal operators, maritime freight forwarding companies, and exporters and importers in Australia, the US and Canada. The survey findings helped to identify key employability skills and their respective dimensions.
- Developed a mapping tool to evaluate the alignment between industry employability skill sets obtained from surveys and the CLOs and curriculum of existing maritime business degrees.
- Provided recommendations; firstly for changes that could be made to maritime business degrees based on the mapping results and, secondly, how faculties can enable dynamic alignment that capitalise on future changes in required industry skill sets.

1.3 Research Outputs

The research project has produced the following outcomes.

- This final report;
- A conference paper titled 'An investigation of the skills gap between course learning outcomes of maritime business degrees and onshore employment requirements' has been submitted to IAMU AGA 2017 in Varna Bulgaria; and
- A journal paper titled 'Employability skills of maritime business graduates: Industry perspectives' is about to submit to the WMU Journal of Maritime Affairs.

1.4 Structure of the Report

The report consists of seven (7) sections.
Section 1 introduces the background and objectives of this project. It describes the approaches carried out to achieve those objectives, and summarises the output from this project including the research papers submitted for publication.
Section 2 explains the concept of employability skills and the process of how universities translate employability skills into CLOs. It also reviews literature related to employability skills for the onshore maritime industry.
Section 3 compares CLOs of worldwide maritime business degrees and identifies common employability skills embedded in CLOs.
Section 4 presents results and findings from interviews with industry senior managers. It identifies current and future key employability skills considered necessary for the onshore maritime industry and discusses the gap between skills required by industry and those provided in CLOs of maritime business degrees.
Section 5 presents the results of the online questionnaire survey with employers from the onshore maritime industry.
Section 6 provides an industry-focused employability skills set for maritime business graduates based on the survey results. In addition, the research introduces a mapping tool developed to evaluate alignment between industry employability skill sets and the CLOs and curriculum of maritime business degrees.
Section 7 recommends strategies for changes in the curriculum of maritime business degrees to align with employer-identified future skill sets. It then concludes the report with suggestions for further research.

2. Concepts of Employability skills and Course Learning Outcomes

2.1 Conceptualisation of Employability and Employability Skills

Employability refers to the capability of gaining and maintaining employment [1]. Hilage and Pollard [1, p.2] for example, indicated that individual employability 'depends on the knowledge, skills and attitudes they possess, the way they use and present these assets to employers and the context within which they seek work.' As employability skills is a complex construct, it is difficult to define it succinctly and comprehensively. Therefore, there appears to be no clearly unified view of the term although many attempts have been made. Bennett, Richardson and MacKinnon [2] argued that 'the underpinning beliefs on why, what, and for whom employability matters' are the potential for distinctions among existing definitions of employability skills. The Australian Chamber of Commerce and Industry & Business Council of Australia [3, p.14] provides an example of a comprehensive definition of employability skills by stating they are a set of skills 'required not only to gain employment, but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions'. Similarly, Yorke [4, p.8] defined employability skills as '…a set of achievements – skills, understandings and personal attributes – that make graduates more likely to gain employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy'. The above definitions of employability extend beyond employment because employment focuses on being employed while employability develops an understanding of being employable. Further, these definitions stress not only the skills required to gain a job but also the association between those skills and achieving people's potential as well as making a contribution to the enterprise, the community and the society. The Australian Qualifications Framework (AQF), which is the national policy for regulated qualifications in Australian education and training, further explained employability skills as being transferable, non-discipline specific skills a graduate may achieve through learning that have application in study, work and life contexts [5]. The transferable skills in this context are generic skills or core skills, which 'can support study in any discipline and can potentially be transferred to a range of contexts in higher education or the workplace' [6, p.76].

Academic scholars have attempted to conduct research on employability skills frameworks. The two well-known models in the literature are the USEM and CareerEDGE. The USEM model (see Fig. 1) suggests that there is a relationship between employability and good learning, and employability results from a blend of achievements in four areas i.e. understanding, skills, efficacy beliefs and metacognition [7]. Understanding refers to comprehension of disciplinary subject matters; skills refer to gaining a level of expertise in practice in academic, employment, and life in general; efficacy beliefs include personal qualities such as self-theories and efficacy beliefs; while metacognition is related to the embrace of self-awareness, which complements efficacy, learning and reflection [7].

In contrast to the theoretical-driven USEM model, CareerEDGE is a practical model of graduate employability introduced by Pool and Sewell [8]. The model has five components i.e. career, experience, degree subject knowledge, generic skills and emotional intelligence (EQ) (see Fig. 2). The model suggests that university education should help students access and develop essential employability skills, and through reflecting and evaluating these experiences, students can develop higher levels of self-efficacy, self-confidence, and self-esteem, which are the crucial links to the employability [8]. This framework aims to operationalise the concept of employability [9]. The CareerEDGE model is valuable as it can be used to 'explain the concept of employability and develop a way of evaluating employability that can be adapted for use at different stages and with different groups of people.'[10, p.8]. It has been adopted by many higher education institutions in the UK to support their employability strategy and process [10].

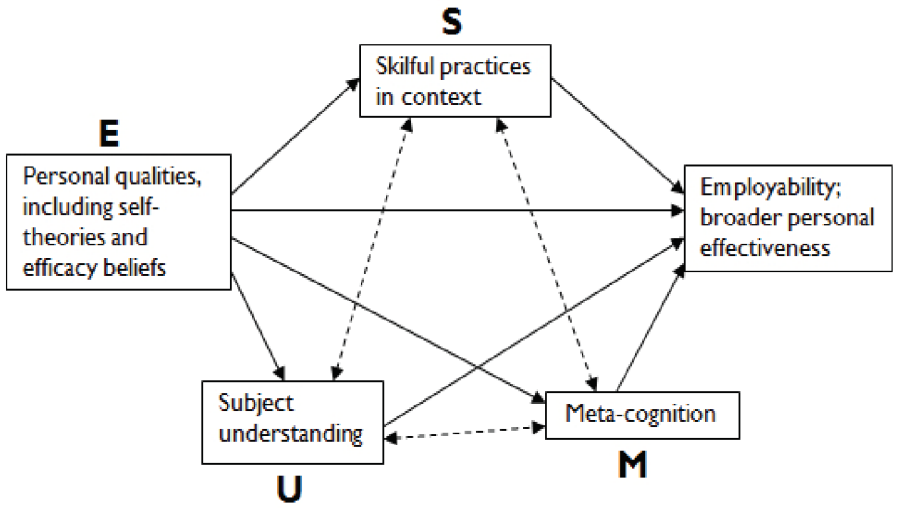

Fig. 1 The USEM model [7, p.4]

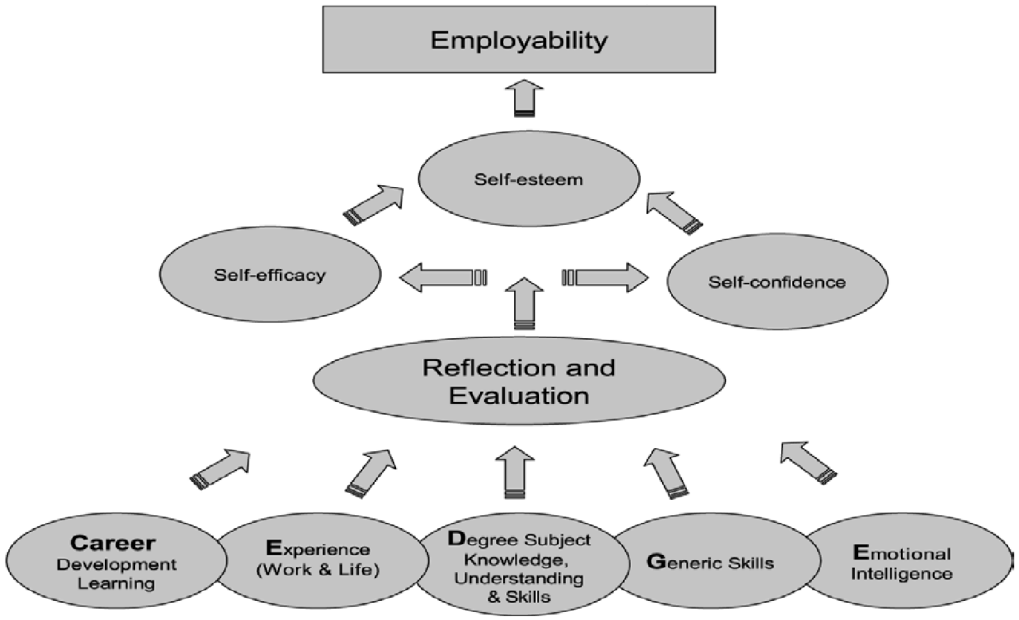

Fig. 2 Essential components of employability-CareerEDGE model [8, p.280]

There is another framework from the perspective of Australian universities for developing employability (see Fig. 3), which has been proposed by Bennett, Richardson and MacKinnon [2]. The framework illustrates that developing employability is 'cyclical in nature; steps will tend to recur and learners will move back and forth between the elements, most often engaging in more than one element at any one

time. Learners should be active participants in the development process and reflexive in their engagement with it, such that early cycles inform later cycles' [2, p.22].
The employability frameworks/models mentioned above help to explain how employability skills can be captured in the curriculum. Universities can help students prepare for translating what they learn to what employers value through various learning and teaching practices, assessments, and work-related learning.

Develop skills and knowledge	Identify and develop discipline-specific and generic skills and knowledge;
Develop self	Develop self-awareness and self-efficacy, and explore possible futures;
Develop career awareness	Develop an informed awareness of possible careers and then find or create opportunities to gain experience in these and other contexts;
Interact with others	Work with other people in multiple contexts, within and outside of study, to develop generic skills such as those in teamwork and communication;
Navigate the world of work	Apply information relating to work and/or further study and establish goals to achieve these.

Fig. 3 Framework for developing employability [2, p.22]

2.2 Relationship between Employability Skills, Graduate Attributes and Learning Outcomes

Education plays a key role in obtaining and maintaining individuals' employability. Of note is that employability has been regarded as an indicator of the quality of higher education and as a benefit of university degree programs for career and work [11]. As the Higher Education Funding Council for England (HEFCE) [12] stated:

> *Embedding employability into the core of higher education will continue to be a key priority of Government, universities and colleges, and employers. This will bring both significant private and public benefit, demonstrating higher education's*

> *broader role in contributing to economic growth as well as its vital role in social and cultural development. [p.4]*

It has been a practice for some countries such as Australia that a national standard of employability skills is set up by governments to guide education providers for developing teaching strategies and curriculum and assure quality of learning. Taking Australia as an example, the Employability Skills Framework developed in 2002 provides guidance for all education sectors including higher education [13]. The framework contains the skill sets of communication, teamwork, problem solving, self-management, planning and organising, technology, life-long learning and imitative and enterprise [3]. Further, the Australian Government developed the Core Skills for Work Developmental Framework (CSfW) in 2013 to address employability skills in the Employability Skills Framework more explicitly [14]. The CSfW is a description of a set of non-technical skills, knowledge and understandings that underpin successful participation in work as an employee, being self-employed, or as a volunteer [14]. These employability skills when combined with technical or discipline specific skills, and core language, literacy and numeracy (LLN) skills, contribute to work performance [14]. The CSfW develops a common understanding of the employability skills across industries, education sectors and the government. In the UK, CBI [15] provided a report focused on employers' view of employability skills including business and customer awareness, problem solving, communication and literacy, application of numeracy, team working, and application of information technology. The report also suggests that a positive attitude is the key foundation underpinning all these employability skills. A positive attitude is a 'can-do' approach involving a readiness to being involved, being open to new activities and ideas, and having a desire to achieve results.

When integrating employability skills into undergraduate programs in Australia, universities mainly developed graduate attributes (or graduate statements) at a university level, and then on the basis of those graduate attributes, universities favour a spectrum of approaches to identify employability skills at a faculty, discipline, and unit (subject) level [13,16,17]. Australian universities develop their own graduate statements according to the Employability Skills Framework and the CSfW. Instead of discipline specificity, graduate attributes/statements of universities reflect broader aspirational, social, ethical or humanitarian characteristics that society desires for university graduates [13]. There is an argument that employability skills can be regarded as a subset of graduate attributes because graduate attributes are normally broader and more generic than employability skills [13, 18]. For example, the University of Tasmania's Graduate Statement indicates [19, p.5]:

> *The University of Tasmania experience unlocks the potential of individuals. Our graduates are equipped and inspired to shape and respond to the opportunities and challenges of the future as accomplished communicators, highly regarded professionals and culturally competent citizens in local, national, and global society. University of Tasmania graduates acquire subject and multidisciplinary knowledge and skills, and develop critical and creative literacies and numeracies and skills of inquiry. They demonstrate the ability to apply this knowledge in changing circumstances.*
>
> *Our graduates recognise and critically evaluate issues of social responsibility, ethical conduct and sustainability, are entrepreneurial and creative, and are mindful of their own wellbeing and that of the community. Through respect for diversity and by working in collaborative ways, our graduates reflect the values of the University of Tasmania.*

The Graduate Statement reflects skills and themes that students should meet, such as ethics, entrepreneurship and creativity, sustainability, wellbeing, literacy, numeracy and work capability through experiential learning. Another good example of university graduate outcomes is from Deakin University, Australia. The university graduate learning outcomes include eight (8) key themes i.e. discipline-specific knowledge and capability, communication, digital literacy, critical thinking, problem solving, self-management, team work, and global citizenship [20].

Students undertaking bachelor degree programmes at universities are keen to acquire not only employability skills, which are transferable, generic, non-discipline specific skills, but also discipline-based skills. Therefore, universities, especially Australian universities, seek to facilitate graduates in gaining both skills by focusing on learning outcomes. Learning outcomes, as a widely accepted concept, has been discussed in academia and governments and applied into university learning and teaching practices. It is conceptualised as '…the expression of the set of knowledge, skills and the application of the knowledge and skills a person has acquired and is able to demonstrate as a result of learning' [5, p.97]. The Australian Government and Australian universities have paid special attention to the learning outcomes of university graduates by means of the implementation of a series of policies and standards. These include the Australian Qualifications Framework (AQF), the Higher Education Standards Framework (HES Framework), all of which provide guidance for Australian higher education providers when developing university standards and graduate statements, CLOs, and unit intended learning outcomes (ILOs).

Employers and universities believe the discipline-embedded approaches are the most appropriate means to develop and learn employability skills, and greater flexibility is available to address the distinctions across disciplines, faculties within a university and between universities [16, 13]. Discipline standards set out minimum learning standards for higher education courses in a specific disciplinary area. Australian Government, aligned with the AQF, has developed 11 groups of discipline standards in 2016. The discipline standards in the field of maritime business are not available, however, the Business, Management and Economics group is the most relevant to the maritime business. The Australian Business Deans Council (ABDC) has developed graduate Learning Standards, also called Threshold Learning Outcomes (TLOs), for this discipline group, encompassing accounting, marketing, economics, finance, and tourism, hospitality and events [21]. In general, the TLOs of this discipline group require minimum discipline knowledge, skills, and professional capabilities. Graduates from Bachelor Degree or Coursework Master Degree programs are expected to meet or exceed the standards required by the field of the discipline group. For example, for accounting programmes, judgement, knowledge, application skills, communication and teamwork, and self-management are the TLOs [22].

Both university standards and discipline standards have a focus on addressing learning outcomes at course level because it is a vital step to implement the overarching government and university policies into practice (see Fig.4). CLOs refer to graduate outcomes of any university degree programmes specifying what students should achieve after graduation. For example, the Bachelor of Business (Maritime and Logistics Management) offered by the Australian Maritime College has CLOs stating what graduates should achieve in relation to knowledge, application, judgement, communication and self-management on completion of the degree (see Table 1) [23]. ILOs are a popular concept, originally developed by Biggs and Tang [24], and are currently widely utilised by Australian universities. ILOs are statements about students' achievements when they successfully complete a unit, and describe the intellectual and practical skills students required to pass the unit [25].

Table 1. CLOs of BBus (Maritime and Logistics Management), Australian Maritime College

Learning Domains (criteria)	Outcomes
Knowledge	Graduates of the Bachelor Degree will be able to analyse and evaluate business management concepts and practical processes within the field of international maritime and logistics management.
Application	Graduates of the Bachelor Degree will be able to obtain, analyse and interpret data relevant to making evidence-based decisions in diverse maritime and logistics contexts.
Judgement	Graduates of the Bachelor Degree will be able to exercise initiative and judgement in contributing towards solutions to diverse problems in the maritime and logistics contexts; incorporating social, ethical, regulatory, global, and business management perspectives.
Communication	Graduates of the Bachelor Degree will be able to present a clear and coherent exposition of business management knowledge, concepts and empirical evidence relevant to the maritime and logistics industries.
Self-Management	Graduates of the Bachelor Degree will be able to reflect on performance feedback in the maritime and logistics context to identify and action learning opportunities and self-improvement.

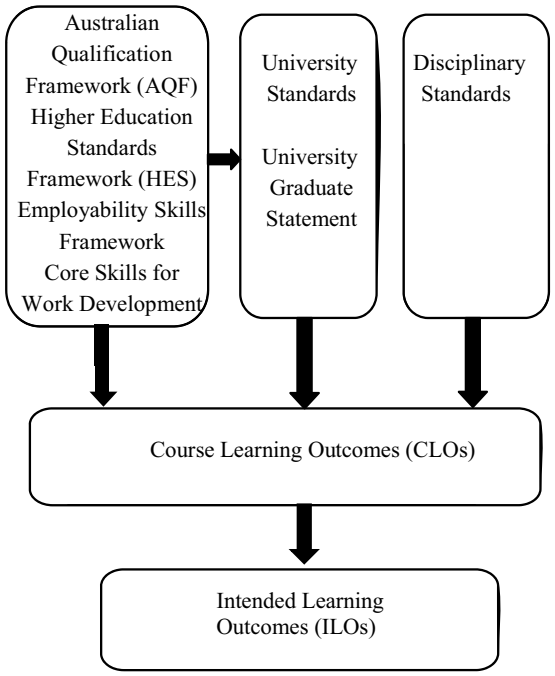

Fig. 4 Standards and frameworks guiding the development of CLOs in Australia

2.3 Embedding Employability into the Curriculum

2.3.1 Strategies for enhancing employability skills

Universities have considered a range of employability enhancement activities. These include accommodating input from industry employers in developing or modifying curriculum and adopting various learning and teaching strategies to embed employability skills within the curriculum. They aim to support the expansion of students' learning experiences that emphasises the enhancement of employability skills of students. An example of this is applying an experiential approach to learning, case studies and problem-based learning, and organising extra- or co-curricular activities [26]. Of importance, universities commonly adopt Work Integrated Learning (WIL) to help students' work-readiness. WIL activities can be fieldwork, industry-based learning, sandwich years, cooperative education, work placements and internships [13]. It can be formal or informal, real and simulated activities with credit or non-credit awards [26]. Additionally, career-mentoring programmes (for example, Career Mentor Connection program in the University of Melbourne) are university wide student support services to help students [13] gain industry knowledge and examine their own competency. In addition to career mentoring offered by universities, activities such as part-time and casual employment, volunteer work and community participation are also useful for developing students' employability skills [13].

2.3.2 Mapping employability skills with curriculum

Within the curriculum structure, students' employability skills can be enhanced through learning, teaching and assessments. Curriculum audits help to examine how and where employability skills are developed in the curriculum [7]. An audit helps to ensure that a cohesive and consistent approach to integrating employability skills across the curriculum is established. However, before assessing and mapping employability skills within a curriculum, it is important for education providers (at the Department/School or Programme level) to define employability for their programmes, i.e. what specific features of employability skills would be in the programmes [27]. The employability frameworks mentioned in section 2.1 provide a reference point for working towards the definition of employability skills for any programme. Once the list of employability skills is determined, the first step for a mapping exercise is to examine whether and how employability skills are reflected in programmes' CLOs. Subsequently, whether and how those employability skills are taught and assessed is reviewed. Once gaps are identified, actions for improvement in curriculum to enhance employability skills can be initiated.

2.4 Employability Skills for the Onshore Maritime Industry

Existing literature related to maritime education or workforce studies in the maritime industry mainly focuses on the offshore maritime industry such as seafarer research. There are limited studies on maritime business education and onshore maritime workforce skills. For extant maritime business education research, they focused on the motivation of students enrolling in postgraduate programmes in shipping management [28-31]. Ng & Yip [32] discussed the quality of maritime business curriculum using the Department of Logistics and Maritime Studies at Hong Kong Polytechnic University as a case study.

For the onshore maritime industry workforce skills, they can be occasionally found in research or reports of the transport and logistics sectors. However, academic research in transport and logistics skills mainly focus on logistics professionals rather than ports or shipping. Studies such as Murphy and Poist [33-35], Razzaque and Sirat [36], Murphy and Poist [37] and Thai, Cahoon and Tran [38], which were undertaken

in the US, Malaysia and Australia respectively, have consistent views on skills and competencies logistics professionals should possess, which are management skills, business skills and logistics skills. Jossec and Shanahan [39] claimed that leadership and management skills will continue to be significant for successful business and supply chain workers are required to be proficient with information technology skills and problem solving skills in response to technology innovations, like automation, big data, and robotics.

As one of the few research focusing on skills in the onshore maritime industry, Fernando, Sigera and Cahoon [40] found that senior managers in the Sri Lankan shipping industry believed the skills i.e. the use of computers and the internet, intuition and forecasting, analytical thinking, English language, customer service, time management, creative thinking, and the accuracy of work make a contribution to their employees ability to perform in the workplace. Han and Li [41] used the Rasch model to recognise employees' capabilities of shipping-related industries in Taiwan and construct scientific evaluation items in relation to the professional techniques and skills. The empirical study revealed 11 employability indicators within the shipping industry. These are correct document processing ability; good morality and virtue; EQ management; English proficiency of shipping terms; active working attitude and positive group interaction; learning of job-related industrial environment and development; innovative capability; commercial (international) manners and literacy; knowledge of international trading documents; business procedure of overseas import and export; language expression; and leadership. Shipping-related firms suggested that graduates from shipping management department should improve general business English proficiency, morality and virtue and EQ management, and language expression (Taiwanese, Mandarin, English or other languages).

Industry's view on employability skills from Transport and Logistics industries have also been noted. For example, the Australian Transport and Logistics Council has undertaken environmental scans each year since 2010. The environmental scans identify that Australian Transport and Logistics employers, including maritime and ports sectors, consider the following skills to be in high demand [42-44]:

- Leadership and management
- Teaching and training
- Information technology
- Financial management
- Language, literacy and numeracy (LLN)
- Problem-solving
- Analytical skills
- More sophisticated contract management practices

3. Employability Skills Embedded in CLOs of Maritime Business Degrees

3.1 Collection of CLOs of Worldwide Maritime Business Degrees

This research examines skills embedded in CLOs of undergraduate degrees of maritime business related programmes offered by universities worldwide. In order to collect information on CLOs, this research conducted comprehensive web searches on bachelor degrees of maritime business programmes. The search included IAMU member universities websites and other universities offering maritime business degrees as found via eduMaritime (www.edumaritime.net) and Google Search. Of interest was that only 24 of the IAMU member universities offer maritime business related programmes (10 from Europe and Africa, 9 from Asia Pacific and Oceania and 5 from America). By including other universities, a total of 28 were found offering undergraduate maritime business related degrees were found.

During the website search, it was found that some programmes provide comprehensive course information including CLOs, while some programmes only specify the objectives or goal of the programme. For the purpose of this study, only programmes addressing CLOs were selected for analysis.

As some programmes' CLOs are not available on the website, the research team collected information through personal networks. However, only two CLOs were obtained from Dalian Maritime University and Texas A&M University. As a result, this study collected twelve (12) CLOs of undergraduate maritime business related programmes from nine (9) universities in Europe, USA, Asia and Australia. Except for Plymouth University in the UK and Hong Kong Poly University, the rest of the universities are all IAMU member universities.

- Australia: Australian Maritime College, University of Tasmania;
- UK: Plymouth University, Liverpool John Moores University and Southampton Solent University;
- USA: Massachusetts Maritime Academy and Texas A&M University;
- Hong Kong: Hong Kong Poly University;
- China: Dalian Maritime University; and.
- Turkey: Dokuz Eylul University, Maritime Faculty.

Plymouth University offers three (3) maritime business and associated programmes i.e. BSc (Hons) Maritime Transport and Logistics, BSc (Hons) International Supply Chain and Shipping Management and BSc (Hons) Maritime Business and Logistics; each programme has similar course learning outcomes. Similarity, Southampton Solent University offers two (2) maritime business and associated programmes, i.e. BSc (Honours) Shipping and Port Management and BSc (Honours) Maritime Business, and they have similar CLOs except that the latter programme has one CLO stating that students should be able to develop and apply appropriate professional and practical skills required by the work placement. Hence, this study uses the CLOs of BSc (Hons) Maritime Business and Logistics from Plymouth University and BSc (Honours) Maritime Business from Southampton Solent University. Finally, nine (9) CLOs were included for analysis.

3.2 Comparison and Findings

Among the programmes' CLOs offered by each university, some of them are similar to those in general business degrees but with indication of the specialised field i.e. maritime and logistics. Few degree programmes clearly identify skills in their CLOs, for example the BSc (Honours) Maritime Business, Southampton Solent University addresses cognitive skills, practical, professional skills and transferrable and key skills in its CLOs. On the other hand, a few programmes, such as BSc (Honours) Maritime Business and Logistics at Plymouth University and BSc (Honours) Maritime Business and Management programme at Liverpool John Moores University, separately include information on graduates' expected specific employment related skills, including professional practical skills and transferable skills. In this study, information on CLOs and employability skills collected from various universities were used for analysis to find skills expected for graduates of maritime business related degrees.

The skills inherent in CLOs of maritime business related programmes collected are examined by using content analysis and classified into eleven (11) categories (see Appendix 1). They are knowledge, communication, critical thinking, problem-solving, self-management, social responsibility/ethics, teamwork, computer and IT skills, global perspective, research skills and experiential learning. The following summarises the results and discusses and findings:

- **Knowledge**
  Knowledge is a common component found in CLOs across all programmes. The Australian Qualification Framework [6, p.96] stated that 'knowledge refers to what a graduate knows and understands and it can be described in terms of depth, breadth, kinds of knowledge and complexity'. What knowledge should a maritime business degree graduate have in order to enhance their employability? Based on the information collected, there are two types of

knowledge, i.e. general business knowledge and specific knowledge in the maritime and logistics related fields.

The majority of the programmes' CLOs generally state that graduates are expected to apply general business knowledge to maritime and logistics related fields without indicating details. However, some programmes' CLOs specify core business knowledge that students should learn and apply. Core business knowledge includes management, financial management, marketing, human resource management, international business and analytical methods (mathematical and statistical methods).

As for specialised knowledge, some degree programmes' CLOs simply state it in a general way. For example, 'Discuss a wide range of aspects, issues and practices within maritime business based on key concepts and theory; Systematically and critically review a body of knowledge within the study and practice of maritime business and the maritime industry, including elements of new and specialised knowledge' (Southampton Solent University, BSc (Honours) Maritime Business). However, few CLOs of programmes indicate specific maritime related knowledge, such as maritime business, ship finance, logistics, supply chain management, information systems, maritime policy, environment and geography.

Each programme's course structure may not be the same because of the difference in the nature of degree, duration of degree and focus, hence it is not easy to conclude what common critical knowledge a maritime business degree graduate should have. Through interviews and surveys with senior managers in the industry, additional information may be obtained to identify industry requirements.

- **Communication**

  Communication is an important CLO which is often included in most of the programmes. Maritime business graduates should have verbal and written communication skills enabling them to communicate to a wide range of audiences so that the information conveyed is received and understood. Students should be able to present a clear and coherent exposition of business management knowledge, concepts and empirical evidence relevant to the maritime and logistics related industries. In addition, using modern electronic and multimedia technology for communication is essential for graduates. For programmes not delivered in English, such as Dalian Maritime University, graduates are expected to be able to communicate internationally through foreign languages.

- **Critical thinking**

  All programmes' CLOs require students to demonstrate critical thinking, which is an intellectual skill. Scriven and Paul [45] defined critical thinking as 'the intellectually disciplined processes of actively and skilfully evaluating information and conceptualizing a solution, through tools including observation, experience, reflection, reasoning, or communication, as a guide to belief and action.' Skills used in critical thinking therefore include analysing, synthesising, evaluating, observing, reflecting on possible outcomes and creative and innovative thinking. Appendix 1 shows that many programmes' CLOs require students being able to demonstrate critical thinking skills individually or in a team with the ability to analyse, synthesise, evaluate information, data or ideas from various sources in the field of maritime business and logistics related areas. Critical thinking entails effective communication abilities. With critical thinking skills, students are able to anticipate and solve problems, enhancing their problem solving skill, which is also one of the important skills embedded in CLOs.

- **Problem Solving Skills**

  Problem solving is used to create solutions for diverse problems in the maritime business world. It involves analytical and creative skills. The majority of programmes' CLOs indicate that maritime business students should be able to recognise problems in the maritime and logistics related fields, analyse information, evaluate and appraise solutions, and draw appropriate conclusions and recommendations for a variety of maritime business needs. In addition,

students should be able to use decision support tools, quantitative techniques and IT skills computer and communication technology to analyse complex information and data for solving problems.

- **Self-Management**
  Many programmes' CLOs identify expectations that students should be responsible for their learning such as managing time and tasks; demonstrate autonomy and accountability in deterring and achieving personal and group objectives; and reflect their performance feedback to identify and action learning opportunities and self-improvement. These expectations are referred to as self-management skills where it is expected that students work and learn independently and take responsibility for personal actions.
- **Social responsibility/ethics**
  There are few programmes' CLOs clearly indicating that students should be aware of professional ethical conduct both academic, individual and in business, and understand the concept of social responsibility. Students should be able to show a socially responsible and ethically sound attitude in relation to social, cultural, economic and environmental issues.
- **Team Work**
  Teamwork is another skill included in some of the CLOs. Students should be able to work collaboratively with others from different disciplines and backgrounds. They need to work as a member of a team to formulate solutions to complex problems, and can lead a team project or activity, showing responsibility, professional behaviour and mentoring skills.
- **Computer/IT skills**
  Many programmes' CLOs indicate that students should understand the applications of information systems in a variety of contexts related to business and transportation; and utilise computer and information management skills for data analyse and maritime business and management purpose.
- **Global perspective**
  Four CLOs address that maritime business graduates should develop a diverse and global perspective to work in a global society. They should be able to demonstrate a global outlook and understand cultural diversity, globalization and their implications for business.
- **Research skills**
  Some programmes require students to conduct a research project related to maritime business or logistics issues. They should demonstrate the abovementioned skills necessary to plan, conduct and report an original research. Despite some programmes' CLOs not mentioning research skills, they do require students to complete a research project in their programme, for example, Maritime and Logistics Management at the Australian Maritime College.
- **Experiential learning**
  Two programmes including BSc (Honours) Maritime Business and Bachelor of International Maritime Business offered by Southampton Solent University and Massachusetts Maritime Academy respectively have included experiential learning in their CLOs. Through experiential learning, students will have unique opportunities for integrating, applying and further sharpening their shipping and business knowledge and professional skills.

In summary, CLOs in the maritime business related degree programmes describe expectations that maritime business graduates should have broad and coherent general business and maritime business related knowledge and be able to apply the knowledge when undertaking professional work. Graduates should have cognitive skills such as critical thinking; practical skills such as problem solving, research skills, application of knowledge; and transferable skills including communication, self-management, teamwork, and the use of computer and IT skills in a maritime business and management context. In addition, graduates should be able to demonstrate a global perspective, and conduct themselves in a professional, socially responsible and ethical manner in life and in diverse business environments.

4. Interview Findings and Discussion

The research team conducted focus group and individual (face to face and telephone) interviews with 27 senior industry managers in Australia, the US and Canada. Existing maritime industry contacts in the Departments of three partner universities were used to select interviewees. The particular groups of interviewees chosen include shipping, port and maritime logistics service providers, as they are the key potential employers of maritime business graduates. In Australia, the partners at the Australian Maritime College (AMC) conducted two focus groups interviews with six (6) participants in Melbourne and four (4) in Sydney, five (5) face to face and two (2) telephone individual interviews. The research partner in A&M Texas conducted five (5) individual telephone interviews and the Memorial University (MU) Newfoundland undertook a focus group with five managers from the shipping industry. The sectors the interviewees work for include shipping, port and terminal, freight forwarding, trading, logistics, chartering and brokering, ship management and ship agency. Their positions in the workplace included CEO, managing director, director, human resource manager, division manager, and functional managers.

The major questions asked in interviews were:

- key employability skills necessary for graduates to succeed in maritime-related organisations;
- skill differences between a business graduate and a maritime business graduate for a graduate position;
- most important employability skills of a recent graduate from a maritime business degree; and
- key employability skills necessary for graduate success in 10 years' time.

The following sections address and discuss the three (3) major findings from interviews.

4.1. Key Employability Skills of Maritime-related Organisations

As each participant worked in separate areas of the maritime industry, they deem certain knowledge and skills to be important relative to their specification. However, certain proficiencies were deemed important by all the interviewees.

- **Communication**
  Communication was unanimously recognised as the most important skill. The maritime industry spans the entirety of the globe and operates every day. One must be able to clearly and concisely communicate with members of other countries, speaking different languages, and maintaining other cultural values. Effective communications allow people to operate together as an effective team. Communication skills include empathy, active listening, written (email, letter, reports), and verbal (face to face; telephone) communication. Students graduating in this era must be able to communicate effectively in all electronic forms. Graduates today must be able to write emails, formulates spreadsheets, create presentations, and compile data in effective and concise manners; in addition to person-to person effective communication. Communication skill requirements differ between levels and the role employees play in the organisation. For example in the principle office of a port company, written skills are required significantly, whereas in the operational level, oral communication is the core. Chartering and broking companies for example, require good negotiating skills.
- **Adaptability and flexibility**
  These two skills are highly required when working in onshore maritime organisations. The maritime industry is changing and the business has so many moving parts completing one goal, so one must be able to handle the nature of a dynamism and complexity. Therefore, employees should be adaptable to the ever-changing environment and have a good attitude towards learning to find out new skillsets to meet future changes. They also need to be flexible in the work place

eg willing to move between jobs and willing to travel. Employees who can move quickly through exposing and posting them somewhere, such as working overseas (for a multi-national company), are able to upgrade their skills. For instance, they can start improving the leadership management skills by managing people.

- **An inquisitive mind**
  Many respondents indicated that they expect their employees can show interest and willingness in learning. Attitude towards learning is the most important strategy for meeting future changes in the industry. Respondents stated their interest in potential employees with the ability to self-motivate, find solutions on their own, and constantly learn. Employers are looking for those displaying the ability and initiative to research and find answers quickly and effectively on their own. Employees working in the field for longer periods will garner more knowledge and glean applicable information through on job training; however, they must desire to learn more through self-motivation and self-reliance. With such a proactive attitude towards learning, employees will be able to expose and experience themselves across the organisation and further their career.
- **Self-management**
  The majority of respondents state that employees should have self-management skills such as time management, ability to prioritise tasks effectively, ability to cope with pressure, ability to learn on the job, self-reliance, and work ethic. A few interviewees also emphasised the importance of emotional intelligence in the work place. In addition, employees should be able to receive criticism and discern the difference between constructive and employment-jeopardizing criticism. This is particularly important to those new graduate employees just out of universities, as they may tend to make mistakes.
- **Analytical and problem-solving**
  Such skills are considered critical for daily operations in the on shore maritime industry. Employees should be able to think critically, holistically, collect data and analyse data to assist themselves or managers in decision-making.
- **Interpersonal skills**
  Interviewees emphasised interpersonal skills as in the maritime industry many things happen because of relationships. The skills required are to engage and build relationships with both stakeholders and staff from the various areas. Although some people may have interpersonal skills naturally, some need to develop them further.
- **Computer skills**
  Employees are expected to have basic computer literacy, proficiency in using core computer software (in particular Excel), and in the use of technology to organise data and disseminate information.
- **Team work**
  Respondents stated that they require potential employees who can work in a team. They should be able to operate as a good teammate through cooperation, communication, and playing multiple roles to achieve the objective of teamwork.
- **Knowledge**
  Interviewees indicated the various knowledge, relative to their specific areas, necessary to work in the onshore maritime related organisation:
  - Shipping business operation and management
  - Port operation and management
  - Stevedoring operation
  - Maritime geography
  - Financial accounting
  - Financial management
  - Logistics and supply chain management
  - Marketing

- International trade
- Transport systems including intermodal transportation
- Maritime law
- Commercial law
- Project management
- Naval architecture
- Documentation for exporting and importing
- Marine insurance
- Overview of the maritime industry
- Freight forwarding
- Systems concept
- Information Communication Technology (ICT) in the maritime industry

4.2 Advantages of Maritime Business Graduates for a Graduate Position

Interview respondents perceived that a general business degree graduate specialises in business management and the related skills for any particular business from a general point of view. The business graduate would have a couple of advantages in certain corporate governance, finance, and management. On the other hand, a maritime business graduate is educated and trained in similar way to general business degree but with specific focus on the maritime industry. A maritime business graduate would have some niche advantages, such as a real understanding of maritime business, logistics and transport, but they may have less specialised knowledge of business skills such as marketing. Therefore, major skill differences between the two degrees are the specific knowledge in the maritime and logistics related industry.

Considering the nature of the maritime industry, it is likely that maritime business degree graduates may have more advantages to be employed by onshore maritime organisations than general business degree graduates. Some respondents from chartering and brokering companies, ship management and ship agencies expressed their preference for recruiting maritime business graduates due to their industry specific knowledge. One respondent stated that smaller maritime business organisations prefer maritime business graduates; however, for larger organisations that have a broad outlook, they consider they can provide effective training for any areas of shortfall in the degree. Hence, maritime business graduates may or may not be advantageous. In other words, such organisations consider that regardless of being a general or maritime business graduate, they can learn the area, which they are not familiar with. This is because on job training is crucial; therefore, from the management perspective of a big organisation, it may not matter whether it is a business or maritime business degree. As one interviewee from an international shipping company stated:

> *"From a training perspective, new graduate employees should be exposed to all the different areas, such as sales, customers, commercial, logistics, maritime business degree graduates may get logistics ahead of others but when going to commercial side, they are behind. So when moving them across, they have plusses in some areas, but minuses, versus a general degree, they will have plusses in commercial and finance, but no idea about logistics or, planning. So maybe it will be balanced out."*

Of interest is that Australian port companies do not usually hire maritime business graduates for graduate positions. A respondent from a port corporation expressed that commerce, engineering and accounting degrees are three main degrees employees have. Ports are a very broad church and not only you have to understand the operational requirements, the terminology and what people are talking about, but you also have to understand commercially when you're doing the business. Ports may prefer employing the maritime business degree holder who has worked in shipping first and that potentially will have been the grounding that they will have been given that will allow the transition across to ports. In other words,

graduates with maritime business degrees normally do not move directly into ports without coming through shipping or one of those other areas first, as they would probably lack the skills.
Whether maritime business related organisations prefer maritime business degree graduates is investigated further through an online survey to more maritime related business organisations and the findings are discussed in section 5 of this report.

4.3 Future Key Employability Skills

All interview respondents agreed that a future trend of the maritime industry is automation and the utilisation of technology and information systems (i.e. Internet of Things (IoT) application). For example, future trends in port and terminal operations are automation, working with sensors, more financial accountability, and articulating around computers and automatic systems. Hence, it is important for graduates to understand that the various types of technology and information systems look like and how they work, as well as understanding the best commercial return from those types of equipment.
Considering the evolving nature of the maritime industry, graduates should have an aptitude toward such change. Respondents suggested that the aptitude graduates should have is to get themselves involved and understand what the changing/evolving needs of the industry are. Once they are involved, they will be interested and able to find out what actually the industry requirement is. They would then tend to equip themselves with the needs of the industry requirement.
In responding to future trends and challenges in the maritime industry, interviewees suggested the following key employability skills will be necessary for graduates in 10 years' time.

- Proficiency in IT skills, computer skills and technology application. In fact, currently industry courses related to IT is no more about programming but specific business application. For maritime business courses to be kept attractive maybe more IT and engineering type of subjects that could be included to help graduates differentiate themselves.
- A basic understanding of IT infrastructure and system management.
- Management skills: managing tasks done by computers; managing IT technicians rather than stevedores if ports go to automation; management of technology and people using it.
- Data management and analytical skills: access database skills (not necessarily programming but some basic rudimentary skills), data monitoring, and data analysis.
- Risk assessment cannot be replaced by computers, hence having people who understand and do risk management is necessary.
- Adaptability: respondents still consider that adaptability continues being an important skill because it is a continually evolving industry and having the adaptability to the changing environment is probably critical. Employees should be able to adapt to the changing work practice, and be willing to learn and continue to learn new technology and adopt various technology to the workplace.
- Awareness of focusing on communities and environmental concerns such as reducing greenhouse emission.
- Despite adopting technology for operations and management, port and shipping industries are going to be continually regulated in safety, environment and security areas. Therefore, people in ports and shipping should have more understanding of laws and the susceptibility of the organisations to prosecution, and have a much greater handle on engagement with those regulators of the State at several levels.
- In Australia, due to declining seafarers in Australia, for ship management companies, they will face technical skills shortage problem; ship management should require combined hybrid skills i.e. with technical skills and business management type of skills (maritime business graduate

programmes may help). However, the company may need to provide a pathway to help those employees who have no experience of sailing, into the industry to assist vessel management.

- Other skills such as forward thinking, people skills, work ethics and multi skills to be competent were mentioned by interviewees.

4.4 Skills Gap between CLOs of Maritime Business Degrees and Industry Requirements

Considering both the CLOs of the nine programmes studied and the information given during the face-to-face interviews, it can be observed that there are some strong similarities in the skills required by industry and CLOs. For example, both general business knowledge, such as financial management and marketing, is required by the industry, in addition to specific information relating to the maritime industry and logistics. Other similarities were evident in discussions related to the categories of self-management, team work and computer/IT skills. There were three study areas included in CLOs that were not mentioned by industry interviewees. Neither ethics, a global perspective nor experiential learnings were discussed. It may be that these skills are taken-for-granted by industry or are of little importance and therefore not mentioned; that is, they may not be considered as something that can be taught. Alternatively, it may be that these are areas of learning that employers consider are taught on the job, after completion of a study programme. However, few respondents mentioned work ethics important for the next 10 years' time.

Some areas appeared to have a different focus when comparing the CLOs and listening to industry viewpoints. Firstly, analytical and problem-solving skills were seen by industry to include critical thinking and research; the impression given was these are a body of skills that need to be integrated and cohesive, not separated. Noticeably, industry was keen on graduates having inquiring minds, being interested and willing to learn. Fostering such skills may sometimes be assumed in universities, with little emphasis being given to engaging students in the processes of learning by inquiry in CLOs.

Secondly, communication as a category is far more refined in industry's views than is shown in CLOs. The requirements are far more specific and given greater importance by industry. Unquestionably, industry is keen to have graduates that are skilled in all aspects of communication, not only written and verbal skills. As an example, industry included active listening, negotiating skills and being proficient across all electronic media. Interpersonal skills are also included by the maritime industry as necessary; such skills can be developed through effective delivery of communication-related studies. More emphasis on broader communication skills in CLOs may benefit industry.

A key skills gap in CLOs is adaptability and flexibility. The maritime industry is dynamic and complex; graduates that can adapt and be flexible are vital to further their careers in an industry where change is a given. A willingness to change roles or locations, to upgrade skills and see various perspectives are critical. Including adaptability and flexibility as a key CLO may assist universities to better meet industry requirements.

The above discussion demonstrates that CLOs and maritime industry requirements are commonly harmonised in areas such as knowledge, self-management and computer/IT skills. However, modifying CLOs relating to communication and problem solving to give more specific emphasis, depth of study and focus may benefit industry as universities will be providing more comprehensive skill sets for these critical areas. Finally, including adaptability, flexibility and an inquiring mind in CLOs may increase the value of maritime business programmes to the dynamism and complexity that are inherent in the maritime industry.

The skills required for maritime business graduates obtained from interviews were validated through an online questionnaire survey to onshore maritime organisations, which is presented in the next section.

5. Survey to Industry Employers

5.1 Method

This project conducted an online survey of onshore maritime organisations to elicit their views on the employability skills necessary for undergraduate maritime business degree graduates to work in the onshore maritime industry. The questionnaire, consisting of two parts, was developed in terms of interview outcomes. Part A included 6 questions. The first question investigated the importance of current and future employability skills necessary for maritime business degree graduates, which had initially been found during the interviews. A 5-point Likert scale was used to measure the importance of skills, with 1 meaning no importance, 2 little importance, 3 moderate importance, 4 most importance, and 5 great importance. The questions allowed respondents to choose 'unsure' if they were not certain about the answers. Respondents were also asked about their views on whether current skills required for maritime business graduates will change in 10 years' time and explain why or why not (question 2). The interview outcomes identified that technology may have major impact on maritime business and operations necessary for maritime industries, therefore question 3 asked participants to rate the importance of skills associated with technology changes. Question 4 asked participants to rank the seven (7) skill themes asked in questions 1 and 3, i.e. communication, problem solving, digital literacy, technology, adaptability, self-management, and team work. There was an open-ended question asking respondents on their views of the skills that will be essential in the next 10 years. The final question in part A was to find whether the onshore maritime industry prefers a maritime business degree graduate when they hire a new employee, which was an issue found during the interviews. Part B of the questionnaire was about respondents' organisational details.

Pre-testing of the survey was undertaken by sending the survey link to seven academic staff at AMC, Texas A&M, and MU. One industry professional was also asked to participate in the pre-test. Questions were modified based on the feedback received by the pre-testing participants. The questionnaire is attached as Appendix 2 in this report.

To receive useful responses from employers in the onshore maritime industry, this research adopted a convenient and purposive sampling method by using existing maritime industry contacts in the Departments of three partner universities as sampling frames. As the data are accessible it is convenient in that the research partners know the characteristics of listed companies, which ones are important potential employers for the maritime business departments' graduates, and therefore using this sampling methods meets the objective of this research. The total number of the samples on the contact lists is 402 with 110 in Australia, 197 in the US, and 97 in Canada. All contacts on the lists were selected for survey. The research team conducted email online surveys through SurveyMonkey in the three countries during the period of 9 March 2017 and 18 April 2017. The research partners in the respective university distributed questionnaires to the 402 targeted participants. A follow-up email and some phone calls were made subsequently to seek more responses.

5.2 Data Analysis Techniques

This research used descriptive statistics to summarise the collected data through statistics software SPSS22. The means and standard deviations (SD) of employability skills were summarised and discussed in 5.5.1 and 5.5.2. A one-way ANOVA test was also performed to investigate whether there would be different views in employability skills (questions A1 and A3) and preference in hiring maritime business graduates (question A6) among respondent groups in terms of countries. When undertaking the ANOVA test for each item, the homogeneity of variances among the three countries' responses was tested. If there was a significant difference in variances, a robust test of equality of means was conducted. Because the sample size of each country is unequal, with a statistically significant one-

way ANOVA result the Post Hoc test Tukey-Kramar (with equal variances) and Games-Howell (with unequal variances) were subsequently run to confirm where the differences occurred between groups.

5.3 Response Rate and Respondents' Profile

One hundred and seventeen (117) responses were received, among them 44 were from Australia, 39 from the US, 28 from Canada, and 6 incomplete. The response rate was 29% (see Table 2). Respondents of those incomplete responses answered more than half of the questions; hence, all incomplete data were included for analysis. The missing data were recoded when conducting descriptive statistics analysis.

Table 2. Survey response rate

	Survey distributed	Responses received	Response rate
Australia	110	44	40%
USA	197	39	20%
Canada	95	28	29%
Incomplete		6	
Total	402	117	29%

Figures 5 and 6 show respondents' profile in terms of organisation and position. The majority of respondents (78.3%) were from the shipping industry, including shipping companies (41.4%), ship management companies (18%), shipping agent (5.4%), and chartering and brokering companies (13.5%). About 32.4% of respondents worked for the port industry, including 14.4% from port companies/authorities and port and terminal operators respectively, and 3.6% were port agencies. About 32.4% of respondents were from the logistics sector, including freight forwarding companies (11.7%), NOVCC (5.4%), and logistics companies (15.3%). There were 6.3% of respondents working for government departments and 10.8% were exporters and importers.

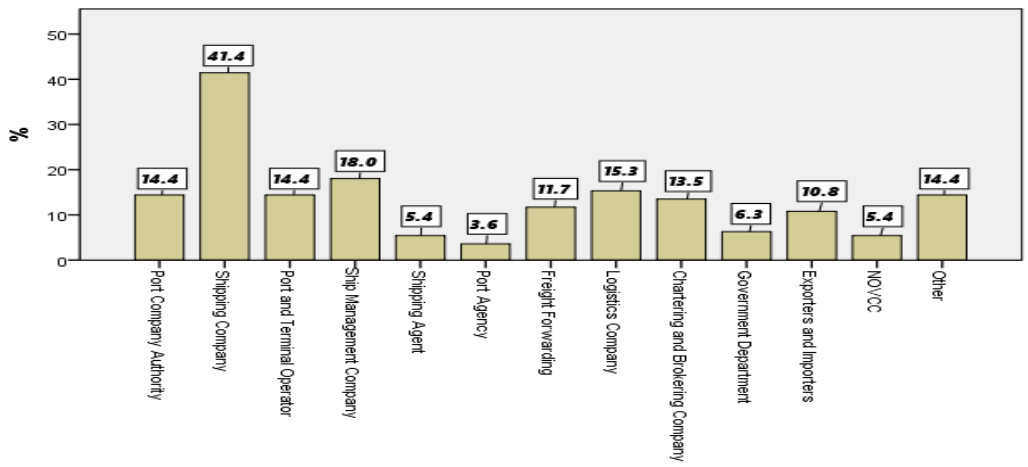

Fig. 5 Respondents' organisations

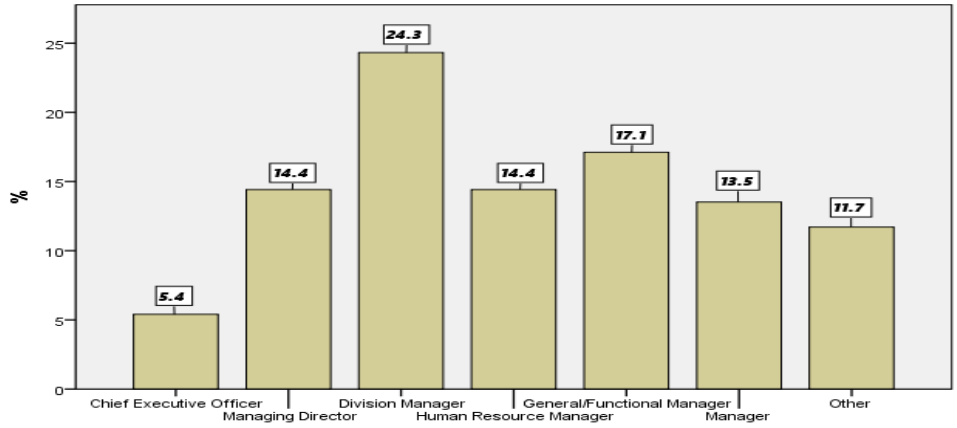

Fig. 6 Respondents' positions

5.4 Reliability and No-response Test

The reliability of the survey questionnaire and non-response bias was measured, using the Cronbach's Alpha test and extrapolation method respectively. The Cronbach's Alpha value of the 78 Likert scale items of this research was 0.95. It shows that the internal consistency of the questionnaire scales was very good.

The extrapolation method, assuming that respondents responding later are to be more similar to non-respondents, was used for testing non-response bias [46]. The late respondents are those who respond to the last of several contacts during the data collection period [47]. In this email online survey research, three waves of contacts were made i.e. initial email and two follow up emails. Table 3 below shows the responses yielded in each wave of contact. Because the last wave yielded 35 responses, which was more than the minimum sample of 30, the 35 responses were considered as late respondents [48]. The testing process was to compare early respondents (i.e. initial emailing 44) to late respondents (second follow up 35) to determine if there are differences between the two groups [46]. All 78 Likert-scale item questions pertaining to the importance of employability skills and 9 nominal questions were used for comparison, using an independent t tests. The results showed that among 87 items tested, only five items were of statistically significant difference (Table 4). For questions A1.57, A1.58 and A1.66, the mean values of early and late responses were all above 4, so the differences between the two groups were mainly the degree of importance within the scale of 'great importance'. Later respondents had a slightly stronger view on the importance of those three skills than early respondents. The main areas of difference were in the maritime business knowledge (i.e. A1.27 and A1.32). The early respondents had considered moderate importance of the knowledge of documentation of exporting and importing and ICT in the maritime industry, while late respondents considered them slight importance. Overall, the test results show that the non-response bias was not a serious problem in the research.

Table 3. Waves of contacts for the online survey

Wave	Responses yielded
Initial emailing (8 March 2017)	44
First follow up (22 March 2017)	38
Second follow up (4 April 2017)	35
Total	117

Table 4. Statistically significant differences between the early respondents and late respondents

Item	Mean of early respondents	Mean of late respondents	Mean difference	Significant (2 tailed t test)
A1.27 Documentation for Exporting and Importing	3.38	2.85	0.52	0.019
A1.32 Knowledge of ICT in the Maritime Industry	3.25	2.42	0.79	0.012
A1.57 Facilitating and accepting team decision	4.02	4.42	-0.40	0.010
A1.58 Ability to work on their own and self-start	4.13	4.48	-0.34	0.010
A1.66 Receptiveness to constructive criticism/feedback	4.04	4.48	-0.44	0.005

5.5 Analysis Results and Discussion

5.5.1 Current important employability skills

Question A1 of the questionnaire, listing seven (7) skill themes and knowledge with their respective skills obtained from interviews, asked participants to rate their importance. These skills include communication, discipline (maritime business) specific knowledge, problem solving, digital literacy, adaptability, teamwork and self-management.

- **Communication**
  Table 5 shows that all skills were deemed great to most important. All items' mean values are above 4 except emotional intelligence, intercultural competency and negotiation skills, which are still above 3.60. The top five communication skills maritime business graduates should have include an ability to communicate with customers and other stakeholders, ability to summarise or synthesise information, active listening and understanding, writing skills including reports and emails, ability to make coherent argument, and interpersonal skills. Respondents added networking skills with internal and external stakeholders as an addition skill in the open-ended question. A respondent who is a graduate of MLM AMC commented on the importance of communication by stating '*concise communication will always be the most critical skill*'. Further, based on his experience as a port manager in a shipping agency organisation, he stated that it is important to have "*the ability to convey information to people from a non-English speaking background in a concise and authoritative manner*". The comment reflects the importance of the skills of making coherent argument and verbal communication, and intercultural competency.

Table 5. Communication skills

	Skill	Mean	SD	Rank
A1.9	Ability to communicate with customers and other stakeholders	4.48	0.7381	1
A1.2	Ability to summarise or synthesise information	4.32	0.5821	2
A1.5	Active listening and understanding	4.27	0.7384	3
A1.1	Writing skills including reports, emails	4.25	0.5858	4
A1.3	Ability to make coherent argument	4.25	0.6811	4
A1.6	Interpersonal skills	4.21	0.7015	6
A1.4	Verbal presentation/communication	4.11	0.6536	7
A1.10	Conflict resolution skills	4.07	0.7512	8
A1.11	Negotiation skills	3.99	0.8560	9
A1.8	Intercultural competency	3.79	0.8763	10
A1.7	Emotional intelligence eg empathy	3.65	0.9127	11

The ANOVA test was undertaken to examine whether there were differences in the perception of those communication skills between the three countries' respondent groups. The results showed that across the countries there was no different view of three respondent groups on the importance of these communication skills except one, conflict resolution skills, with the F value 4.325 and p value of 0.016 (Table 6). The Tukey-Kramar Post Hoc Test shows there was a significant different view on the importance of conflict resolution skills between Australian and the US respondents. Australian respondents considered such skills were more important (mean 4.38) than that from the US respondents (mean 3.87).

Table 6. ANOVA test results-items with statistically significant difference

Item	Country	N	Mean	F value	Sig
Conflict resolution skills	Australia	44	4.3182	4.325	0.016
	United States of America	39	3.8718		
	Canada	28	3.9643		
	Total	111	4.0721		

- **Discipline specific knowledge**

  Respondents considered the 21 maritime business disciplinary knowledge skills, derived from interview outcomes, on a scale of moderately to great important (Table 7). The top 10 knowledge skills that maritime business graduates should know are shipping business operation and management (3.92), an overview of the maritime industry (3.9), logistics (3.85), international trade (3.62), project management (3.61), port operation and management (3.59), transport systems including intermodal transportation (3.57), supply chains (3.56), maritime geography (3.53), and financial management (3.48). Despite few shipping industry managers suggested, during the interviews, that maritime business graduates should have understanding of naval architecture, the survey outcome revealed that it is not essential to a maritime business major profession as it is the least important knowledge with a mean of only 2.61. Of interest is that respondents considered employers' knowledge of ICT in the maritime industry of little importance (2.82) although ICT applications is a trend in the maritime industry. It maybe because companies outsource ICT functions or have experts employed in that area so it is not essential for maritime business graduates to have such knowledge. Besides, a respondent specified that maritime business graduates should have the knowledge of shipping and the environment. This echoes the finding from interviews that the awareness of focusing on communities and environmental concerns such as reducing greenhouse emission is important for the future.

Table 7. Maritime business knowledge

	Knowledge	Mean	SD	Rank
A1.12	Shipping Business Operation and Management	3.95	0.9270	1
A1.29	Overview of the Maritime Industry	3.90	0.9772	2
A1.18	Logistics	3.85	0.8471	3
A1.21	International Trade	3.62	0.9625	4
A1.25	Project Management	3.61	0.9813	5
A1.13	Port Operation and Management	3.59	0.9391	6
A1.22	Transport Systems (including Intermodal transportation)	3.57	0.9032	7
A1.19	Supply Chains	3.56	0.9233	8
A1.15	Maritime Geography	3.53	0.9521	9
A1.17	Financial Management	3.48	0.8769	10
A1.23	Maritime Law	3.45	1.0128	11
A1.16	Financial Accounting	3.35	0.8642	12
A1.27	Documentation for Exporting and Importing	3.25	1.0331	13
A1.20	Marketing	3.23	0.9039	14
A1.24	Commercial Law	3.13	0.9518	15
A1.14	Stevedoring Operation	3.12	0.9840	16
A1.28	Marine Insurance	3.05	1.0574	17
A1.30	Freight Forwarding	2.94	0.9939	18
A1.31	Systems Concept	2.88	1.2674	19
A1.32	Knowledge of ICT in the Maritime Industry	2.81	1.4199	20
A1.26	Naval Architecture	2.61	1.0664	21

The ANOVA results showed there were statistically significantly different views among respondents from Australia, the US and Canada on the importance of the following eight discipline specific knowledge (see Table 8 below). The causes for the variability of responses may be that specific knowledge required across sectors in the onshore maritime industry varies.

- Supply chains: Australian respondents considered the knowledge of supply chains (mean 3.86) more important than that of the US respondents (mean 3.35). There was no difference between Australian and Canadian respondents on the view.
- International trade: similar to the outcome above, there was a difference in the view of importance on the knowledge of international trade. Australian respondents considered the knowledge of international trade (mean 3.91) more important than that of the US respondents (mean 3.33). There was no difference in view between Australian and Canadian respondents on this knowledge.
- Transport systems (including intermodal transportation): The difference occurred between Australian and the US respondents. Australian respondents viewed transport systems knowledge more important, with a mean of 3.75, than that the US respondents (mean 3.28). There was no difference between Australian and Canadian respondents.
- Maritime law: The difference occurred between the US respondents and Canadian respondents. Canadian respondents considered the knowledge of maritime law is more important (mean 3.89) comparing to that of the US respondents' view (mean 3.05). There was no difference in view between Australian and the US respondents on this knowledge.
- Commercial law: The differences occurred between Australian and the US respondents, and the US and Canadian respondents. The US respondents thought the knowledge of commercial law was little important with a mean of 2.71, while Australian respondents and Canadian respondents considered it moderately important with a mean of 3.18 and 3.61 respectively.

Table 8. ANOVA test results-items with statistically significant difference

Item	Country	N	Mean	F value	Sig
Supply Chains	Australia	44	3.8636	4.231	0.017
	United States of America	39	3.3590		
	Canada	28	3.3571		
	Total	111	3.5586		
International Trade	Australia	44	3.9091	4.005	0.021
	United States of America	39	3.3333		
	Canada	28	3.7143		
	Total	111	3.6577		
Transport Systems (including Intermodal transportation)	Australia	44	3.7500	3.751	0.027
	United States of America	39	3.2821		
	Canada	28	3.7857		
	Total	111	3.5946		
Maritime Law	Australia	44	3.5000	6.032	0.003
	United States of America	39	3.0513		
	Canada	28	3.8929		
	Total	111	3.4414		
Commercial Law	Australia	44	3.1818	7.945	0.001
	United States of America	39	2.7179		
	Canada	28	3.6071		
	Total	111	3.1261		
Marine Insurance	Australia	44	2.9091	3.472	0.035
	United States of America	39	2.8718		
	Canada	28	3.5000		
	Total	111	3.0450		
Systems Concept	Australia	44	3.0000	4.650	0.012
	United States of America	39	2.4615		
	Canada	28	3.3571		
	Total	111	2.9009		
Knowledge of ICT in the Maritime Industry	Australia	44	3.2045	3.326	0.040
	United States of America	39	2.4103		
	Canada	28	2.8571		
	Total	111	2.8378		

- Marine insurance: The different view between the US and Canadian respondents on the importance of this knowledge contributed to the overall statistically significant difference among groups. Canadian respondents considered marine insurance moderately important with a mean of 3.5, while the US respondents considered it of little importance with a mean of 2.87.

- System concept: There was a significant different view on the importance of system concept between the US and Canadian respondent groups. The US respondents considered this concept little important (mean 2.46), while Canadian respondents thought it moderately important (mean 3.36).
- Knowledge of ICT in the Maritime industry: The different view between the Australian and the US respondents on the importance of this knowledge contributed to the overall statistically significant difference among groups. Australian respondents considered this knowledge moderately important with a mean of 3.20, while the US respondents expressed that it was of little importance with a mean of 2.41.

- **Problem solving**

  Respondents considered problem-solving skills to be moderately to great important. As shown in Table 9, respondents considered decision making and justification, critical thinking, multi-tasking, analytical thinking, and knowledge application being the top five important skills of problem solving. Respondents also expected graduates to be able to think holistically (mean 3.99).

Table 9. Problem solving skills

	Skill	Mean	SD	Rank
A1.37	Decision making and justification	4.36	0.6494	1
A1.35	Critical thinking	4.23	0.7356	2
A1.36	Multi-tasking	4.17	0.8934	3
A1.39	Analytical thinking	4.15	0.7798	4
A1.38	Knowledge application	4.06	0.6860	5
A1.40	Ability to think holistically	3.99	0.9423	6
A1.33	Data analysis	3.68	0.7523	7
A1.34	Numeracy	3.56	0.9594	8

The ANOVA test results (see Table 10) showed that there was an overall significant difference in the view of importance on one skill i.e. numeracy between the three countries' respondent groups. The results of Game-Howell test (unequal variances among groups) revealed that the difference occurred between Australian and the US respondents. The reason for the difference may be because the schooling system in the US and Canada has more focus on numeracy and students may have better basic numeracy skills so the industry takes it for granted and did not think it is very important. While in Australia, numeracy skills are still of high concern among industry, government and tertiary institutions.

Table 10. ANOVA test results-items with statistically significant difference

Item	Country	N	Mean	F value	Sig
Numeracy	Australia	44	3.9091	4.965	0.009
	United States of America	39	3.3590		
	Canada	28	3.3214		
	Total	111	3.5676		

- **Digital Literacy**

  Table 11 shows that proficiency in using core computer software eg Excel and Word was the most important skill of digital literacy. Maritime business graduates are expected to have basic computer literacy and use technology to organise data and disseminate information, and use digital devices. Proficiency in using ICT was of least importance (mean 2.91). As discussed earlier, this may be because companies employ IT professional or outsource ICT functions so

maritime business graduates are not required to be proficient in using ICT. The ANOVA test results showed that there was no significant difference in the view of importance on these skills between the three countries' respondent groups.

Table 11. Digital literacy skills

	Skill	Mean	SD	Rank
A1.42	Proficiency in using core computer software (eg Excel, Word)	4.05	0.6929	1
A1.44	Computer literacy	4.02	0.7654	2
A1.45	Using technology to organize data	3.89	0.7044	3
A1.46	Using technology to disseminate information	3.84	0.7763	4
A1.43	Use of digital devices	3.76	0.7503	5
A1.41	Proficiency in using ICT	2.91	1.4262	6

- **Adaptability**

Adaptability was strongly emphasised by senior industry managers during the interviews. The survey outcome is consistent with that obtained from interviews. All adaptability skills were scored as being of great importance with a mean value above 4 (see Table 12). Among them, ability to learn (4.57) is the most important requirement by the industry, followed by self-motivation (4.54), adapting to changes (4.39) in the industry, resilience (4.18), confidence (4.06), ability to work in multicultural environment (4.02) and inquisitiveness (4.01).

Table 12. Adaptability skills

	Skill	Mean	SD	Rank
A1.49	Ability to learn	4.57	0.5620	1
A1.53	Self-motivation	4.54	0.5176	2
A1.50	Adapting to changes in the industry	4.39	0.6560	3
A1.47	Resilience	4.18	0.8053	4
A1.48	Confidence	4.06	0.6733	5
A1.52	Ability to work in multicultural environment	4.02	0.8303	6
A1.51	Inquisitiveness	4.01	0.8252	7

The ANOVA test results showed there was no significant difference between countries' respondent groups in the view on the importance of all adaptability skills except self-motivation. The results of Game-Howell test (unequal variances among groups) revealed that the difference occurred between the US and Canadian respondents (see Table 13). The US respondents considered a higher level of importance of this skill, with a mean of 4.71, compared to the view of Canadian respondents (mean 4.32). However, all respondents considered this skill of great importance.

Table 13. ANOVA test results-items with statistically significant difference

Item	Country	N	Mean	F value	Sig
Self-motivation	Australia	44	4.5000	5.269	0.007
	United States of America	39	4.7179		
	Canada	28	4.3214		
	Total	111	4.5315		

- **Team work**

  An ability to work in a team was deemed as a great to most important skill for maritime business graduates; all items are of a mean value above 4 (Table 14). Graduates should be able to contribute to team performance (4.32), cooperate with others (4.31), facilitate and accept team decision (4.10), and play multiple roles (4.02). A respondent specified that willingness to teach others in a team skills and knowledge needed for jobs is also important. The ANOVA test results showed that there was no significant difference in the view of importance on these skills between the three countries' respondent groups.

Table 14. Team work skills

	Skill	Mean	SD	Rank
A1.56	Contributing to team performance	4.32	0.6386	1
A1.54	Cooperating with others	4.31	0.5940	2
A1.57	Facilitating and accepting team decision	4.10	0.7700	3
A1.55	Ability to play multiple roles	4.02	0.8303	4

- **Self-management**

  Table 15 shows that all eleven (11) self-management skills were rated great to most important with mean values all above 4. This implies that industry employers have a very high expectation that maritime business graduates should have very competent self-management skills. Among them, strong work ethics is the most important (4.54), followed by learning from experience (4.50), learning to prioritise tasks (4.45) and ability to learn on the job (4.45). Time management (4.43) and demonstrating a willingness to work (4.43) were also seen as being essential.

Table 15. Self-management skills

	Skill	Mean	SD	Rank
A1.68	Strong work ethics	4.54	0.5858	1
A1.67	Learning from experience	4.50	0.6106	2
A1.60	Ability to learn on the job	4.45	0.5798	3
A1.64	Learning to prioritise tasks	4.45	0.6499	3
A1.59	Demonstrating a willingness to work	4.43	0.5771	5
A1.63	Time management	4.43	0.6340	5
A1.65	Initiative	4.39	0.6427	7
A1.58	Ability to work on their own and self-start	4.36	0.5940	8
A1.62	Ability to get the job done in time with good quality	4.36	0.6626	8
A1.66	Receptiveness to constructive criticism/feedback	4.24	0.7028	10
A1.61	Self-reliance	4.15	0.7103	11

The ANOVA test results showed there was no significant difference between countries' respondent groups in the view on the importance of all self-management skills except two i.e. ability to work on their own (A1.58) and self-start and strong ethics (A1.68). In respect of the item A1.58, the Tukey test results revealed that difference occurred between the US and Canadian respondents. The US respondents considered maritime business graduates should have very high ability to work on their own and self-start (mean 4.56) compared to the view of Canadian respondents (4.2). For the item of strong work ethics, the results of Game-Howell test (unequal variances among groups) showed that the difference occurred between the US and Canadian respondents (see Table 16). The US respondents considered a very high level of importance of strong work ethics, with a mean of 4.71, compared to the view of Canadian respondents (mean 4.32). However, all respondents considered this skill to be of great importance.

Table 16. ANOVA test results-items with statistically significant difference

Item	Country	N	Mean	F value	Sig
Ability to work on their own and self-start	Australia	44	4.2727	3.725	0.027
	United States of America	39	4.5641		
	Canada	28	4.2143		
	Total	111	4.3604		
Strong work ethics	Australia	44	4.5000	3.426	0.036
	United States of America	39	4.7179		
	Canada	28	4.3571		
	Total	111	4.5405		

5.5.2 Skills in the next 10 years

5.5.2.1 Skills/knowledge may differ in 10 years' time

Question A2 asked respondents whether skills/knowledge listed in question A1 may differ over the next 10 years. The results are mixed with about a half (50.88%) of respondents considering that skills/knowledge may be different while 49.12% of respondents did not think they may change. Most respondents considered that technology change, including automation and digitalisation, was the main driver for changing skills/knowledge in the future. As one respondent commented:

> *The working environment will continue to adapt to new technologies that will have to be incorporated into the skillset of the employees. I believe more independence will be necessary with more innovation and technology.*

Technology is ever advancing so that it will have a massive growth in change, which will eventually affect operations in the maritime industry. For example, for communication, one respondent stated "*Increasing reliance on data, social media rather than traditional forms of communication, practitioners will be under pressure to evolve."* It is critical to adapt new methods and tools in different areas of business operations within the industry. In addition to technology changes, many respondents believed that the maritime industry has been undergoing a constant process of change and evolution, and adapts to wider commercial and political pressures. Therefore, skills/knowledge required for the industry might differ over the next 10 years. For example, one respondent identified that consolidation of service providers are squeezing out the smaller businesses. In smaller businesses there is much more emphasis on all-rounders while bigger businesses may have narrow focus for employees.

On the other hand, many respondents argued that the wide range of skills listed in question A1 including adaptability help define those who will succeed in this industry and should cover any eventually that will arise, no matter what changes in technology are adapted. One respondent specified:

> *I believe the same skill sets will still be relevant over the next 10 years, however their application may change. For example, we know technology will improve and new methods and processes will be developed over this time period. This will change how people work but the skills to organize, evaluate and lead will still be required.*

Respondents believed that the core skills are the basic principles to which changes in technology have minimal impact. Being able to manage self as well as manage others are critical business skills. Existing skills highlighted as most important are those which will facilitate change over the next decade.

In summary, skills that would or would not change depend on the various roles, skills required and new technologies added. One respondent stated *"The maritime industry leap will not be more significant than in the last 15 years with automation. Computer system skills are here and required today but will need to be enhanced."* Certainly, for the high automated and digitalised maritime industry, personnel with high-level skills and knowledge that may well be quite different to these currently required in the industry.

5.5.2.2 Skills associated with technology change

As discussed above, technology change is a norm and digitalisation and automation will continuously play a significant role in the maritime industry in the next 10 years. Therefore, it is important for maritime business graduates to know what skills in response to technology change should be possessed. Question A3 aimed to get industry employers' views on the importance of relevant technology skills in 10 years' time. As shown in Table 17, the top five important skills are the use of technology (4.25), computer skills (4.23), analytical skills (4.19), problem detection and solving from data (4.11), and data monitoring and analysis (3.96). Nevertheless, management of technology (3.93) and technology related risk are also deemed quite important (3.87). The findings reveal that maritime business graduates should focus on the skills of managing technology rather than technology per sec.

Table 17. Technology skills

	Skill	Mean	SD	Rank
A1.70	Use of technology	4.25	0.6984	1
A1.69	Computer skills	4.23	0.6657	2
A1.72	Analytical skills	4.19	0.6768	3
A1.77	Problem detection and solving from data	4.11	0.7378	4
A1.75	Data monitoring and analysis	3.96	0.7802	5
A1.71	Management of technology (eg managing automation	3.93	0.8897	6
A1.78	Technology related risk management	3.87	0.8572	7
A1.76	Access database skills	3.60	0.9093	8
A1.74	Using ICT system in the maritime industry	3.40	1.4917	9
A1.73	Understanding of ICT infrastructure	3.16	1.4548	10

The ANOVA test results showed that there was no difference between countries' respondent groups in the view of importance on these technology skills.

5.5.2.3 Ranking of employability skills

Respondents were asked to rank seven (7) employability skills they require maritime business graduates to have in 10 years' time. The outcomes showed that communication was the most important skill, followed by problem solving, adaptability, self-management and teamwork (see Fig. 7). Despite technology changes being a future trend, respondents did not think skills of digital literacy and technology as important as the transferrable skills such as communication, adaptability and self-management. The ANOVA result revealed there was no difference in ranking the importance of these employability skills except self-management. The main difference occurred between the US respondents and Canadian respondents. The US respondents regarded self-management (mean value 4.79) more important than Canadian respondents (mean value 3.29).

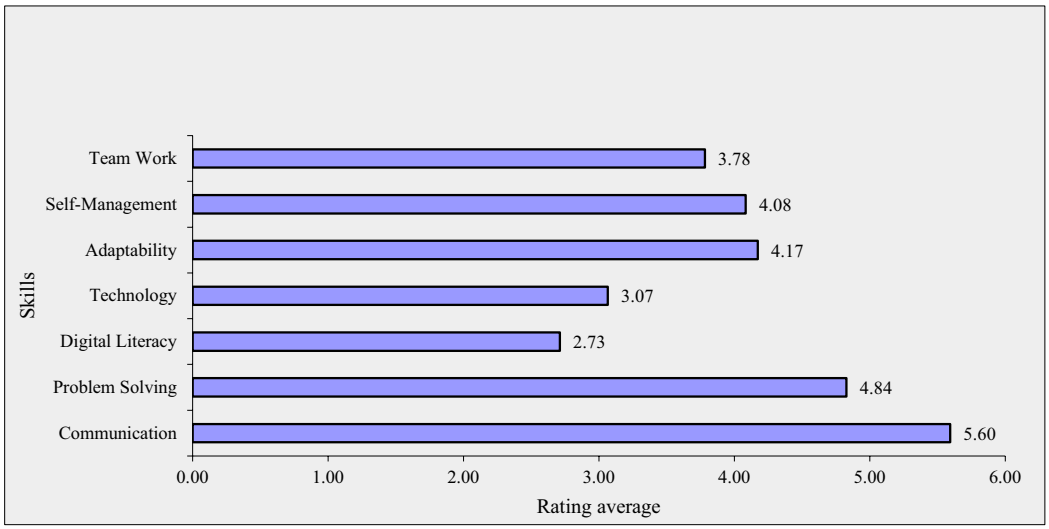

Fig. 7 Ranking employability skill themes

5.5.2.4 Skills/knowledge required from maritime business degree graduates in 10 years' time

Respondents specified skills/knowledge required for the next 10 years in their responses to open-ended questions A2 and A5. Most of them indicated many of the skills/knowledge listed in question A1 and A3 will remain, such as communication, adaptability, creative thinking, problem solving, self-management, and computer skills.

Communication is still emphasised as the most important skill, which will always trump other skills. Few respondents commented that technology will have a massive growth in change which will eventually impact their business operations such as online order or booking. As a result, communication methods will be affected and more emails and phone communications rather than face to face are required. The rapid change in the work environment means greater adaptability will be required to update oneself with newer technologies and changing culture practices. In addition, respondents considered maritime business graduates should have a high level of computer skills and up to date skills; this will be very valuable to employers as these skills are lacking and there is limited time to upgrade these skills once a career has started. Knowledge such as financial analysis, accounting, human resource management, chartering, maritime law, business law, ship operation and management, international trade, supply chains etc. is still emphasised by respondents for maritime business in the future.

According to the responses obtained, the following are additional skills/knowledge required from maritime business degree graduates in 10 years' time. Of notice is that several respondents stated the importance of strong work ethics and multilingual skill.

- Digitally proficiency
- Bi-lingual/Multilingual
- Strong work ethics
- Leadership
- Crisis management
- Media relations
- Accountability
- Social interaction with others
- A balance between technology and interpersonal skills
- Providing students the ability to understand without IT assistance

- Specific business/technical expertise applicable to the role at hand, i.e. Operations, health, safety, security and environment (HSSE), finance, technical etc.
- Practical comprehension as opposed to theoretical
- Solid foundation of vessels and vessel operation
- Cyber security
- Admiralty law, dispute resolution
- Social and political understanding
- Encouraging or implementing internship/work experience with the local industry
- Enthusiasm
- Digital disruption management
- Eco knowledge
- International shipping policies
- Big data management
- Root cause analysis utilising data

5.5.3 Preference of hiring maritime business graduates in the onshore maritime industry

As discussed in section 4.2, interview outcomes revealed that not all onshore maritime organisations consider employing maritime business graduates with the first preference. To get a broader view on this issue, survey question A6 asked respondents whether they prefer a maritime business degree graduate or general business degree graduate when hiring a new employee. The results showed that more than half (52.3%) of onshore maritime organisations preferred maritime business graduates, while only 4.5% prefer general business graduates (see Fig.8). However, 32.43% of respondents felt indifferent between maritime and general business graduates. The findings show that maritime business graduates seem to be still slightly preferred but it may depend on the nature of onshore maritime organisations.

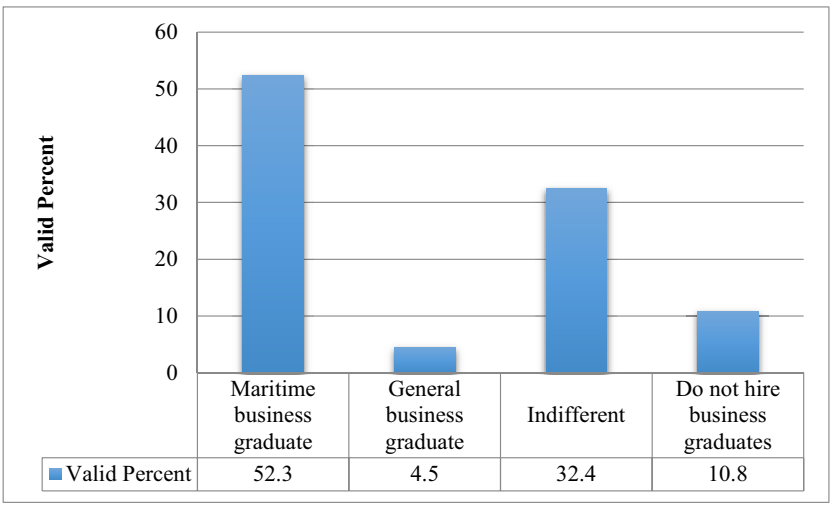

Fig. 8 Preference of employing maritime business graduates

In terms of organisation (see Table 18), organisations i.e. government departments (85.7%), chartering and brokering companies (80%), port agencies (75%), shipping agents (66.7%), shipping companies (60.9), exporters and importers (58.3%), port companies/authorities (56.3%), port and terminal operators (56.3%), and logistics companies (52.9%) had more than 50% of respondents preferring maritime business graduates. On the other hand, 53.8% of freight forwarding company respondents had an

indifferent view on hiring maritime or business degree graduates, followed by ship management companies and NOVCC (50% respectively). About 18.8% and 16.7% of respondents from port and terminal operators and exporters and importers respectively expressed that they hired general business graduates.

Table 18. Preference of employing maritime business graduates-organisational view

Organisation		Maritime business graduate	General business graduate	Indifferent	Do not hire business graduates	Total
Port Company Authority	Count	9	0	5	2	16
	% within organisation	56.3%	0.0%	31.3%	12.5%	
Shipping Company	Count	28	0	15	3	46
	% within organisation	60.9%	0.0%	32.6%	6.5%	
Port and Terminal Operator	Count	9	3	4	0	16
	% within organisation	56.3%	18.8%	25.0%	0.0%	
Ship Management Company	Count	9	0	10	1	20
	% within organisation	45.0%	0.0%	50.0%	5.0%	
Shipping Agent	Count	4	0	2	0	6
	% within organisation	66.7%	0.0%	33.3%	0.0%	
Port Agency	Count	3	0	1	0	4
	% within organisation	75.0%	0.0%	25.0%	0.0%	
Freight Forwarding Company	Count	6	0	7	0	13
	% within organisation	46.2%	0.0%	53.8%	0.0%	
Logistics Company	Count	9	0	8	0	17
	% within organisation	52.9%	0.0%	47.1%	0.0%	
Chartering and Brokering Company	Count	12	0	3	0	15
	% within organisation	80.0%	0.0%	20.0%	0.0%	
Government Department	Count	6	0	0	1	7
	% within organisation	85.7%	0.0%	0.0%	14.3%	
Exporters and Importers	Count	7	2	3	0	12
	% within organisation	58.3%	16.7%	25.0%	0.0%	
NOVCC	Count	3	0	3	0	6
	% within organisation	50.0%	0.0%	50.0%	0.0%	
Other	Count	6	0	4	6	16
	% within organisation	37.5%	0.0%	25.0%	37.5%	
Total	Count	58	5	36	12	111
	% of Total	52.3%	4.5%	32.4%	10.8%	100.0%

Briefly, the findings revealed that that the shipping industry, including shipping company, shipping agent and chartering and brokering, preferred hiring maritime business degree graduates the most, while

freight forwarding companies and NOVCC did not. It is noted that 55% of the respondents from ship management companies, a sector of the shipping industry, expressed they were indifferent in or did not hire business graduates. This may be because ship management companies normally prefer employees having seagoing experiences, according to the interviewees working for an international ship management company in Australia.

In terms of country, Table 19 below shows that over half of the US and Canada respondents preferred maritime business graduates, while only 40.9% of Australian respondents preferred maritime business graduates. About 40.9% of Australian respondents felt indifferent between maritime business and general business graduates, which is equal to the percentage of preferring maritime business graduates. On the other hand, only 33.3% and 17.9% of the US and Canadian respondents respectively had a view of indifferent. Among the responses of indifferent, 50% of them were from Australian respondents, while 36.1% and 13.9% were from the US and Canadian respondents. Among the Australian responses, almost all types of organisation had respondents expressing a view of indifferent. The findings imply that in Australia, onshore maritime organisations may be keen to be neutral when choosing maritime and general business graduates. This finding is consistent with that found during the interviews in Australia, as discussed in section 4.2.

Table 19. Preference of employing maritime business graduates-country's view

Country	Degree	Maritime business graduate	General business graduate	Indifferent	Do not hire business graduates	Total
Australia	Count	18	3	18	5	44
	% within Australia.	40.9%	6.8%	40.9%	11.4%	100.0%
	% of Total	31%	60%	50%	41.7%	39.6%
United States of America	Count	22	2	13	2	39
	% within the US	56.4%	5.1%	33.3%	5.1%	100.0%
	% of Total	38%	40%	36.1%	16.7%	35.1%
Canada	Count	18	0	5	5	28
	% within Canada	64.3%	0.0%	17.9%	17.9%	100.0%
	% of Total	31%	0.0%	13.9%	41.7%	25.2%
Total	Count	58	5	36	12	111
	% the three countries.	52.3%	4.5%	32.4%	10.8%	100.0%

5.6 Summary of Survey Findings

Key findings from the survey are summarised below.

- The important employability skills for maritime business graduates include communication, problem solving, adaptability, self-management, team work, and digital literacy and technology.
- Seven-teen (17) topics of maritime business knowledge were deemed moderate to great important.
- Communication was considered the most important employability skill by the industry employers surveyed. Industry employers expect their employees have ability to communicate

effectively with customers and other stakeholders. This requires all the communication skills investigated in this research to achieve.

- Industry employers surveyed in this research seemed to consider transferrable skills (generic skills or core skills) such as communication, problem solving, adaptability, self-management, and team work and more important than disciplinary technical skills.
- Regardless of how the maritime business environment will change in next 10 years, the industry employers believed that those generic skills will remain important as they are the basic principles of working in onshore maritime organisations.
- Technology change may drive the need to change some skills/knowledge in the future. Demand for digital literacy and technology knowledge and skills have increased due to the maritime industry having a trend of moving towards digitalisation and automation. However, the survey findings revealed that a skills focus for maritime business graduates will not be the technology itself but the use and management of technology, computer skills, and data management (eg big data) including monitoring, analysis, problem detection and solving.
- For future skills/knowledge required from maritime business degree graduates in 10 years' time, the survey respondents identified communication and adaptability are the most important ones. They expected maritime business graduates should be able to adopt new technology or means for communication, and can be more adaptable given the highly dynamic nature of the maritime industry. Moreover, they hope that graduates could be equipped with a higher level of computer skills, have strong work ethics and multilingual skills.
- The survey results showed that among the half of respondents (52.3%) preferring hiring maritime business graduates for a new position, the shipping industry employers preferred the most except ship management companies who preferred employees with seagoing experience. Freight forwarding companies and NOVCC did not have such preference. Among the three countries i.e. Australia, the US and Canada, Australian onshore maritime organisations seemed to be more neutral when choosing maritime and general business graduates.

6. Aligning Industry Employability Skill Sets and Curriculum

6.1 Employability Skills Set for Maritime Business Graduates

What should maritime business programmes provide for students to enhance their employability? The practical employability framework, the CareerEDGE, discussed in section 2.1 provides a starting point for thought. The framework includes five major components of employability i.e. Career, Experience, Degree subject knowledge, Generic Skills and Emotional intelligence. The first two require strong support from universities by providing relevant career planning and consultancy programmes for students, and implementing learning and teaching strategy enhancing students' working experience such as Working Integrated Learning. As for the last three i.e. degree subject knowledge, generic skills and emotional intelligence, industry input is important for maritime business degrees to develop curriculum to cover these knowledge and skills. This research project investigated the onshore maritime organisations' view on maritime business knowledge and skills required for undergraduate maritime business students, and develops a skills set for maritime business graduates based on the survey results. With supports from the university and through developing these essential skills and reflecting and evaluating learning experiences, students are able to develop higher levels of self-efficacy, self-confidence, and self-esteem to achieve employability.

The skills set shown in Table 20 contains skills and knowledge items with means above 3 according to the survey results. The skills set from industry employers' perceptions consists of six (6) skill themes with 46 skills and seventeen (17) maritime business knowledge. The six skill themes are Communication (10 skills), Problem Solving (7 skills), Adaptability (7 skills), Self-Management (9 skills), Team Work (4 skills), and Digital Literacy and Technology (9 skills). Of notice is that the skill themes digital literacy

and technology, used in the survey as a current skill theme and future skill theme respectively, are integrated as a theme namely 'digital literacy ad technology'. In respect of the theme of communication, respondents regarded the item 'ability to communicate effectively with customers and other stakeholders' most important, which is in fact underpinned by graduates having the 10 key skills of communication listed in the category. In the theme of problem solving, two skills i.e. 'analytical thinking' and 'data analysis' are collapsed as 'analytical thinking and data analysis'. For the self-management skill theme, as the skills of 'self-reliance' and 'ability to work on their own and self-star' are similar so these two are collapsed together as 'self-reliance'. Similarly, the skill of 'ability to get the job done in time with good quality' is collapsed with another skill 'time management' as 'time and quality management'. Additionally, the analytical skill initially listed under the theme of technology was integrated with analytical thinking and data analysis under the theme of problem solving.

To align the required skills and knowledge from the perspective of onshore maritime organisations and maritime business undergraduate curriculum, firstly, the providers of maritime business programmes should consider industry inputs in the CLOs. Fig.9. is an extended model from Fig.4, illustrated in section 2.2, regarding the development of a degree programme's CLOs in Australia. The industry perspective of skills required with the overarching government and university standards lead to the development of a programme's CLOs. Secondly, it is essential to examine whether those industry required skills and knowledge are taught in maritime business undergraduate courses. In the next section, the research team develops a mapping tool for evaluating alignment between industry required skills and CLOs and curriculum of maritime business undergraduate courses.

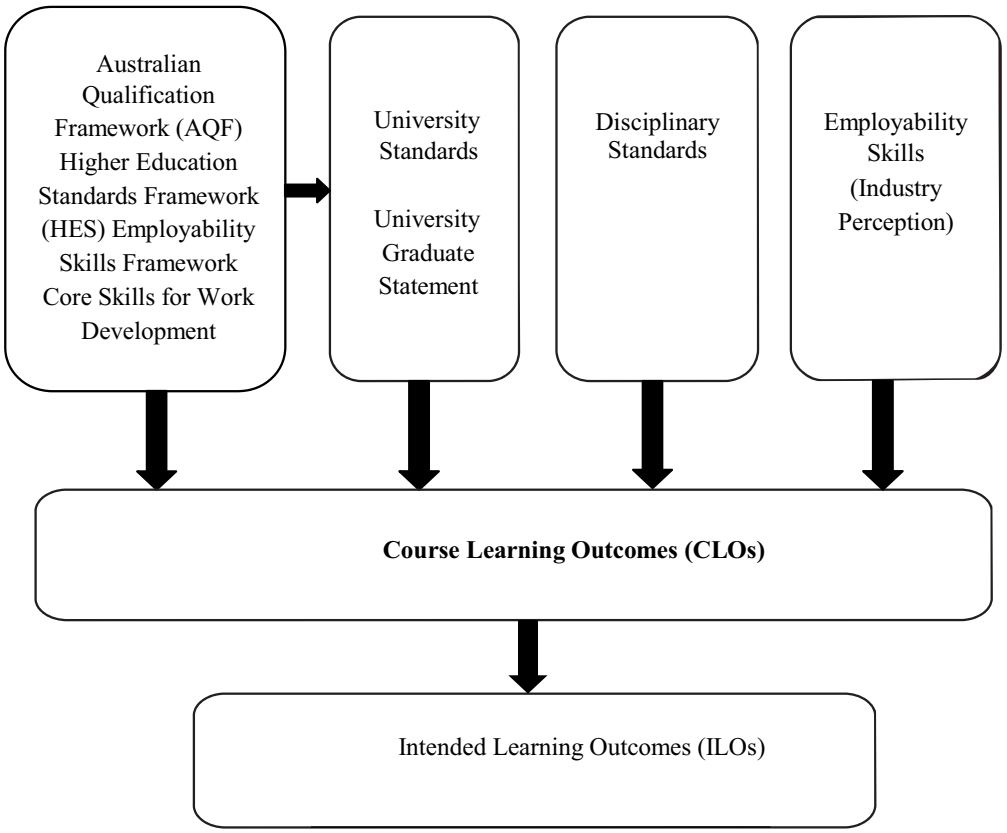

Fig. 9 CLOs with industry input

Table 20. The employability skills set for maritime business graduates-the onshore maritime industry's perspectives

Communication	Problem Solving	Adaptability	Self-Management	Team Work	Digital Literacy and Technology	Maritime Business Degree Knowledge
• Ability to summarise or synthesise information • Active listening and understanding • Writing skills including reports, emails • Ability to make coherent argument • Interpersonal skills • Verbal presentation/communication • Conflict resolution skills • Negotiation skills • Intercultural competency • Emotional intelligence	• Decision making and justification • Critical thinking • Multi-tasking • Analytical thinking and data analysis • Knowledge application • Ability to think holistically • Numeracy	• Ability to learn in dynamic environment • Self-motivation • Adapting to changes in the industry • Resilience • Confidence • Ability to work in multicultural environment • Inquisitiveness	• Strong work ethics • Learning from experience • Ability to learn on the job • Learning to prioritise tasks • Demonstrating a willingness to work • Time and quality management • Initiative • Self-reliance • Receptiveness to constructive criticism/feedback	• Contributing to team performance • Cooperating with others • Facilitating and accepting team decision • Ability to play multiple roles	• Computer skills including using core computer software (eg Excel, Word) • Applied use of technology including digital devices • Problem detection and solving from data • Computer literacy • Data monitoring and analysis • Management of technology (eg managing automation) • Technology related risk management • Using ICT systems in the maritime industry • Understanding of ICT infrastructure	• Shipping Business Operation and Management • Overview of the Maritime Industry • Logistics • International Trade • Project Management • Port Operation and Management • Transport Systems (including Intermodal transportation) • Supply Chains • Maritime Geography • Financial Management • Maritime Law • Financial Accounting • Documentation for Exporting and Importing • Marketing • Commercial Law • Stevedoring Operation • Marine Insurance

6.2 A Mapping Tool

The skills set in Table 18 is used as the base for developing a mapping tool to examine alignment between industry required employability skills and CLOs and curriculum. With this skills set, the undergraduate maritime business course coordinator is suggested to firstly examine whether their programmes' CLOs cover these six skill themes, followed by undertaking an evaluation of how and to what extent those respective skills under each theme are delivered and assessed in the degree curriculum. The reason for taking the second step for alignment evaluation is because that not all skills are reflected in CLOs but are delivered in the curriculum.

The mapping tool, aligning the CLOs and curriculum of maritime business degrees with industry required employability skills, consists of three worksheets (see Fig. 10) showing alignments in the course and unit (subject) levels. In the course level, **Worksheet One**, namely **CLOs and curriculum alignment**, undertakes the evaluation. It consists of three parts, first, aligning the six skill themes with CLOs; second, mapping each skill and knowledge with current course curriculum by evaluating to what extent (score 0-5) the skills/knowledge are covered in the curriculum.

Of notice is that the measurement of the extent of skills covered in the course level should be based on how each unit in the course aligns with the skills required. Therefore, each unit coordinator is suggested to undertake the evaluation of unit alignment using the employability skills. **Worksheet Three**, namely **Unit modules' alignment** is designed for measuring the level of each module (or topic) within a unit align with employability skills in terms of learning activities (LA) including teaching and assessments. Scores 0-5 are used for measurement. The number of worksheet threes that are required to be used depends on the number of units/subjects offered in the course, eg the Maritime Business degree offered by AMC consists of 24 units/subjects, and so 24 such worksheets should be included in the tool. The final average total score of the each skill in the columns of LA and 'assessed' in the spreadsheet are linked to the corresponding columns showing the unit's name in **Worksheet Two**, namely **Total units' alignment**.

Worksheet Two shows the level of alignment for all units delivered in the course. The average total scores of each skill alignment in terms of 'LA' and 'assessed' for all units are linked to the respective columns in Worksheet One to complete the mapping activity.

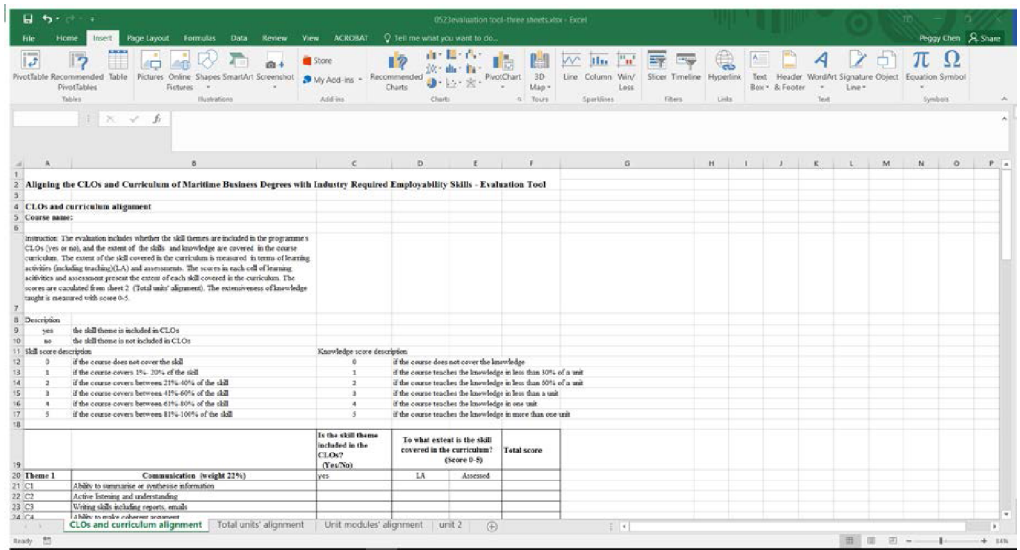

Fig. 10 Layout of the evaluation worksheets

In Worksheet One, a weight is allocated to each skill theme based on the survey respondents' ranking on the importance of the skill themes (see Fig. 7 on page 35). In terms of the mean values of each theme, a weight of 22% is allocated to communication, followed by 19% to problem solving, 16% to adaptability, 16% to self-management, 15% to team work, and 12% to digital literacy and technology. Each weight reflects the extent to which the onshore maritime industry emphasised on each skill theme. It is used for benchmarking the level of each skill theme emphasised in the course, which is calculated by dividing each theme's final average score by the total average scores of the six themes. The benchmarking results help to find out whether there is over or under emphasis on the skill theme in the course curriculum, and provide recommendation for further curriculum improvement. Appendix 3 presents the three worksheets and illustrates an example.

7. Recommendations and Conclusions

7.1 Recommended Strategies

This empirical study has given a clear indication of what is important from employers' perspectives for graduates to have studied whilst at university. The following are the recommendations for CLOs and curriculum of maritime business degrees, based on the findings.

- **Undertake mapping of the curriculum regularly**.
  The mapping tool identifies in-depth both learning activities and assessment items that will incorporate transferable skills and both maritime industry and specialist knowledge. Utilising the mapping tool results is a vital means to inform curriculum development. Mapping highlights areas of excellence, in addition to those areas that need more emphasis and development. Besides informing course development, mapping can also inform course promotional literature.
- **A curriculum that allows the development of transferable skills within the context of the maritime industry**.
  Providing the context of the skills is paramount as this enables graduates to better meet industry's requirements on graduation. The following examples of strategies are given for developing communication skills in the curriculum; similar approaches can be used for other key transferable skills.
  - A focused communication unit/subject to ensure all aspects of the skill, such as active listening and the ability to summarise or synthesise information, is included early in the course. This provides the foundation for activities over the course of the degree. The following two sub-strategies reinforce its effective implementation.
    - Many universities include written assignments and oral presentations as assessment tasks in various units/subjects throughout the course. These types of assessment items do not always include associated learning activities that ensure students have a high level of skill and understanding of the significance of these communication skills to their future employers. It is therefore recommended that these skills are included as both learning activities and assessment items throughout the course, in different units/subjects.
    - In addition to these more common approaches, more breadth and depth of communication is required by industry. This can be achieved for example, by appropriate use of activities such as role plays, scenario analysis and applied exercises that allow students to engage with each other to fully develop communication and teamwork skills. These activities need to form an ongoing element of learning activities and assessment items in all units. Such emphasis will ensure that students fully hone their skills in a range of different contexts relevant to the maritime industry.

- It is recommended that the capstone unit or equivalent includes communication skills as part of its assessment, to ensure the skills have been further developed throughout the course since the first-year foundational unit/subject.

- **Inclusion of work experience and/or being involved with a mock organisation as part of the curriculum**.
  - Work experience provides many opportunities for students to develop skills that are required by the maritime industry. Having a component of work experience will enable students to better understand context and the generic skill requirements. Such experience needs to be meaningfully assessed and integrated to ensure it has contributed to the CLOs and is an effective learning experience. Additionally, the choice of companies/role/tasks need to be considered to ensure students are learning appropriate skills that will be transferable.
  - Universities that utilise a mock organisation and give students opportunities to participate in decision-making with a range of realistic events and practices will better equip students for the maritime industry. Such mock organisations can help students perceive the value of adaptability and highlight any personal development practices they may need to further develop to equip themselves for the reality of working in the dynamic maritime industry.
- **Consider incorporating non-specialist units into the curriculum**.
  For example, a breadth unit such as a language would help industry with their interest in multi-lingual graduates. This is important for education systems where the teaching of a second language is not part of the standard school curriculum. Other breadth units that may be valuable include units in Logic and/or Decision Making.

An objective for this research was to suggest ways that university courses can enable dynamic alignment to ensure that future changes in required industry skill sets are incorporated. The following recommendations will strongly contribute to that objective.

- **Forming an Industry Liaison/Advisory Committee with industry leaders to seek advice on curriculum content and CLOs**.
  Regular meetings where curriculum and outcomes are reviewed by the committee will ensure relevance in the dynamic environment of the maritime industry. It is suggested that meetings are held regularly, at a minimum of every second year.
- **Inviting regular presentations from a range of industry leaders and HR managers to both staff and students**.
  Such presentations will enable staff and students to be aware of current requirements of the different elements of the maritime industry.
- **Membership of relevant industry associations**
  Such membership helps keep abreast of industry changes and maintain a network of contacts within the maritime industry. The network will be valuable for forming the Liaison/Advisory committee, potential presentations and creating opportunities for work experience for students.
- **Incorporating applied use of technology in context** throughout the course, similarly to the inclusion of the generic skills in the second Recommendation above. Graduates are expected to have the fundamental uses of technology at their fingertips.

One of the key findings of this research is that industry requires graduates that are adaptable. The maritime industry is dynamic, change is the norm, and hence in some respects this finding is unsurprising. Yet adaptability is not a subject area that would normally form part of the maritime business curriculum. Consequently, another recommendation of this report is that adaptability be included in the curriculum. Its inclusion may necessitate changes to the focus of learning activities and teaching methods. For example, adopting experiential learning through real play exercises.

7.2 Conclusions and Further Research

The maritime industry underpins international business and world trade. Business management is critical for the maritime industry, requiring highly trained individuals and teams to lead the development, implementation and control of sound contemporary management practices. Maritime business degrees are developed for meeting such demand by providing management personnel for the onshore business-related roles. This research has investigated key aspects of the curriculum and CLOs of maritime business degrees. Background information on curriculum development and comparisons of CLOs, at different maritime universities, enabled the research team to develop an understanding of key requirements for curriculum content. Following this process with interviews with key industry leaders, a survey was developed. The results of this research study show the importance of both background knowledge and transferable skills relevant to the maritime industry. Background knowledge of the industry itself, logistics and international trade are necessary for graduates, particularly in conjunction with specialised information on shipping business operations and management.

Of interest is that employers considered transferrable skills, such as communication, problem-solving, adaptability, self-management and teamwork as being more important than technical and professional knowledge and skills. With the importance of customer relationships to the industry, it is unsurprising that these generic skills are highly sought-after by industry. Developing the transferable skills throughout the course will further add value to the maritime business graduate when seeking employment.

The mapping tool developed by this research can assist maritime business degree providers in evaluating the extent of alignment between their curriculum and CLOs and industry preferred employability skills. Regular mapping exercises will inform curriculum development or evolution.

In addition to regular mapping curriculum, this research recommends several strategies to enhance alignment between curriculum and employability skills, including future requirements arising from industry dynamism. These include developing transferable skills within the context of the maritime industry; implementing work integrated learning or being involved with a mock organisation; hosting regular Industry Liaison/Advisory Committee meetings; inviting industry leaders for presentation; promoting student memberships of relevant industry associations; incorporating applied use of technology throughout the course; and considering incorporating non-specialist units into the curriculum.

As with all research studies there are limitations; additionally, the development of the mapping tool has raised some further questions that have not been fully addressed. Consequently, the research team are including recommendations for further research projects. Figure 11 shows the linkage between the current project and the future recommended research projects detailed below. The expected outcomes of future research are identified in Figure 11, including the better alignment with industry needs and the development of new teaching activities and methods. The following are the recommended future research projects.

- The views of graduating students were not part of the scope of the current project. Conducting surveys to graduates working in the maritime industry to receive their perceptions on employability skills and any gaps between employability skills and course curricula would add another dimension to the study.
- The mapping tool can be tested by its use in IAMU member universities which offer maritime business degrees. Feedback from its testing may lead to further refinement of the tool.
- This research can be extended further by involving more maritime universities, as this project is based on 3 IAMU universities that are culturally similar. Involving more maritime universities in different countries in both Asia and Europe will help to validate the results. Additionally, considering the diversity of industry practices or business environments in different regions and countries will help further refine the mapping tool.

- Innovative teaching activities and methods for maritime business degrees can be researched or developed to better meet industry requirements for transferable employability skills. Adaptability for instance, may require the development of applied learning approaches. Additionally, the results of testing of the mapping tool may provide ideas for innovative teaching approaches.

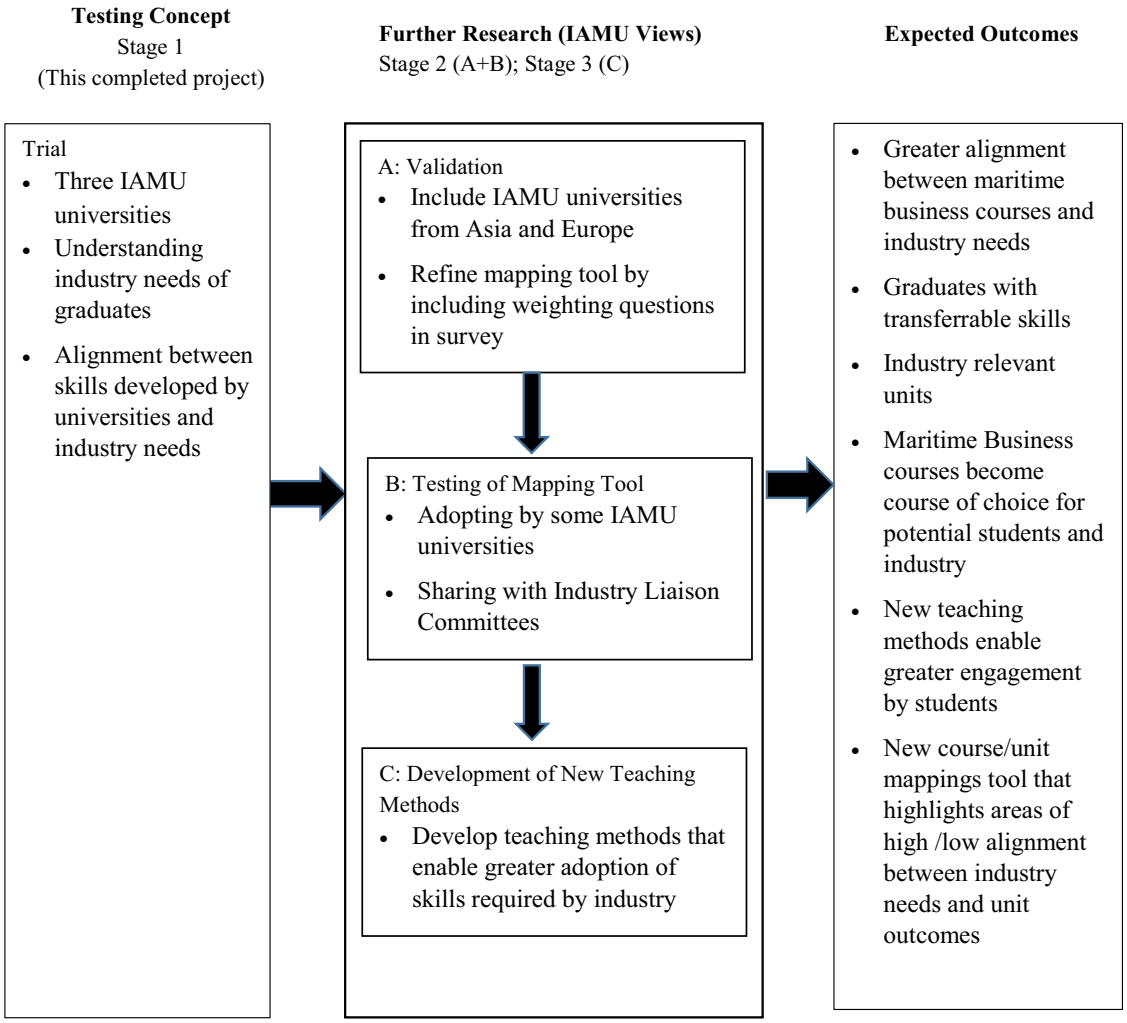

Fig. 11 Recommended further research

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appendix

Appendixes

Appendix 1 Skills Embedded in the CLOs of Nine Maritime Business Degree Programmes

Country	Australia	UK			USA		China		Turkey
University	Australian Maritime College/University of Tasmania	Plymouth University	Liverpool John Moores University	Southampton Solent University	Massachusetts Maritime Academy	Texas A&M University	Dalian Maritime University	Hong Kong Poly University	Dokuz Eylul University, Maritime Faculty
Degree programme Skill/knowledge	BBs (Maritime and Logistics Management)	BSc (Hons) Maritime Business and Logistics	BSc(Hons) Maritime Business and Management	BSc (Honours) Maritime Business	International Maritime Business (IMB)	Bachelor of Maritime Administration	Bachelor of Management (Traffic Management)	BBA (Hons) in International Shipping and Transport Logistics	BSc Maritime Business Administration
Knowledge	Business management concepts and practical processes within the field of international maritime and logistics management	Demonstrate literacy in the terminology, classification and nomenclature associated with their BSc (Hons) Maritime Business and Logistics degree	Demonstrate knowledge of the structure of and inter-relationships within the maritime business sectors	Independently access information, ideas and evidence within the field of Maritime Business from a wide range of secondary and primary sources. Discuss a wide range of aspects, issues and practices within maritime business based on key concepts and theory. Systematically and critically, review a body of knowledge within the study and practice of maritime business and the maritime industry, including elements of new and specialised knowledge.	Possess a strong foundation in the core functional areas in international business and management, as well as in maritime business.	Master the depth of knowledge required for a maritime administration degree	Master the basic science theory and management knowledge required by this major systematically, learn the latest developments in the relevant fields, control the related engineering technology and possess the necessary knowledge of humanities and law.	Apply basic financial theories, analyse financial reports and understand the operation of financial markets	Application of knowledge on business, economics, law, logistics, transportation and shipping to maritime business administration problems
Communication	Present a clear and coherent exposition of business management knowledge, concepts and empirical evidence relevant to the maritime and logistics industries	Communicate effectively by written and verbal means	Communicate effectively to a wide range of individuals by a variety of means	Communicate effectively using media, styles and protocols appropriate to the context, audience and purpose of the communication.		Communicate effectively	Have the language ability to communicate internationally	Communicate effectively in English, Putonghua and written Chinese, at a level appropriate for business purposes	Independent decision-making, self-discipline, oral and written communication skills.

								and general conversation	
Critical thinking	Analyse and evaluate business management concepts and practical processes within the field of international maritime and logistics management	Evaluate the general management of a shipping company or maritime organisation Evaluate the supply chain and the role of maritime transport Appraise proposals for general and ship finance	Integrate theory and practice Synthesise information from a variety of sources Formulate hypotheses	Critically analyse, evaluate and synthesise information, data and ideas, some at the forefront of knowledge in the field of Maritime Business and related areas	Work individually or as part of a team, in projects to evaluate and analyse critical issues and cases, and present their findings professionally	Demonstrate critical thinking by applying strategic analysis	Be able to independently acquire, raise, analyse and solve problems **with pioneering and innovating spirit.**	Apply creative thinking in the business setting Identify and analyse those aspects of the domestic and global business environment that set the 'parameters of choice' within which business organizations set objectives and take actions	Creativity, critical thinking, self-confidence, entrepreneurship and leadership.
Problem-solving	Obtain, analyse and interpret data relevant to making evidence-based decisions in diverse maritime and logistics contexts Be able to exercise initiative and judgement in contributing towards solutions to diverse problems in the maritime and logistics contexts;	Manage the planning, design and execution of a practical investigation of an issue from the problem-recognition stage through the evaluation and appraisal of results to the production of a formal report	Analyse situations and draw appropriate conclusions and recommendations Evaluate solutions to maritime business problems Test hypotheses Apply concepts and principles of discipline to complex situations Develop the ability to plan policies and strategies for a variety of maritime business needs Utilise problem solving skills in a variety of	Apply knowledge and skills, including theoretical knowledge, to differing contexts, including practical or work-related situations Independently design, plan and execute responses to solve complex maritime industry and business problems, both abstract and practical, in a range of variable contexts, including work contexts	Students will be able to analyse complex information and data using decision support tools, quantitative techniques and IT skills in a variety of contexts related to business and transportation		The ability to analyse and solve the practical problems Be able to independently acquire, raise, analyse and solve problems with pioneering and innovating spirit.	Identify and analyse the means by which value is created in goods and services and delivered to users Evaluate the processes and structures through which organizations plan, decide, motivate and control their activities;	Skills to gather data related with maritime transportation, to develop strategy and plans, to implement and assess performance results. Skills to use and develop contemporary business administration techniques

			theoretical and practical situations						
Self-Management	Be able to reflect on performance feedback in the maritime and logistics context to identify and action learning opportunities and self-improvement	The ability to exercise initiative and personal responsibility The ability to make decisions in complex and unpredictable contexts Manage time and tasks for lifelong learning The ability to apply appropriate skills and work with minimal supervision	Manage time and work to deadlines Project plan and time/task management	Demonstrate autonomy and accountability in determining and achieving personal and group objectives, exercising leadership where appropriate Reflect constructively on own performance	Develop a strong sense of discipline, integrity, responsibility, self-confidence, leadership and inter-personal skills necessary to work effectively in an increasingly complex and dynamic world.		Possess certain ability to undertake operational work in the specialty of his (her) own and basic ability and quality to undertake those work in adjacent fields		Plan, implement and control in maritime businesses in the scope of business functions and objectives Self-development skills to follow science-technology and contemporary issues through lifelong learning principles
Social responsibility/ethics	Be able to exercise initiative and judgement in contributing towards solutions to diverse problems in the maritime and logistics contexts; **incorporating social, ethical, regulatory**, global, and business management perspective		Show a socially responsible and ethically sound attitude in relation to social, cultural, economic and environmental issues			Practice ethical leadership		Identify and respond appropriately to ethical issues as they arise generally and in the business setting;	Equipped with professional values and ethics.
Team work			Work as a member of a team to formulate solutions to complex problems	Demonstrate team skills.	Be able to work, individually or as part of a team, in projects to evaluate and analyse critical issues and cases, and present their findings professionally.	Work collaboratively			Skills to realize interdisciplinary and interdisciplinary team works.
Computer/IT skills		Computer and Information Management skills	Utilise tools and techniques to analyse maritime business needs		Be able to analyse complex information and data using decision **support tools,**			Understand the applications of information systems in business and	Self-development skills to follow science-technology

			Effectively use IT for maritime business and management purposes		**quantitative techniques and IT skills** in a variety of contexts related to business and transportation			evaluate their effectiveness and managerial implications	
Global	Be able to exercise initiative and judgement in contributing towards solutions to diverse problems in the maritime and logistics contexts; incorporating social, ethical, regulatory, **global, and business management perspective**					Develop a diverse and global perspective to work effectively in a global society		Demonstrate a global outlook and understand cultural diversity, globalization and their implications for business	Equipped with universal, social, international, national and personal vision
Research skill			Demonstrate skills necessary to plan, conduct and report a programme of original research Conduct research into a variety of maritime business issues	Conduct basic research					Skills to define, research and solve maritime business administration problems
Experiential Learning				Develop and apply appropriate professional and practical skills required by the work placement	Students will acquire hands-on experiential learning through cooperative programs at sea or ashore which afford unique opportunities for integrating, applying and sharpening further their shipping and business knowledge and professional skills.				

Appendix 2 Survey Questionnaire

International Association of Maritime Universities (IAMU) Research Project

Aligning the course learning outcomes of maritime business degrees with industry preferred skill sets to increase student employability in the onshore maritime industry

SECTION A – Employability skills necessary for maritime business degree graduates

A1. The following table lists employability skills that may be necessary for maritime business degree graduates to work in the onshore maritime industry.

Please consider the importance of each skill in preparing maritime business degree graduates for their career in the onshore maritime industry.

		No importance	Little importance	Moderate importance	Great importance	Most importance	Unsure
	Communication	**0**	**1**	**2**	**3**	**4**	**5**
A1.1	Writing skills including reports, emails						
A1.2	Ability to summarise or synthesise information						
A1.3	Ability to make coherent argument						
A1.4	Verbal presentation/communication						
A1.5	Active listening and understanding						
A1.6	Interpersonal skills						
A1.7	Emotional intelligence eg empathy						
A1.8	Intercultural competency						
A1.9	Ability to communicate with customers and other stakeholders						
A1.10	Conflict resolution skills						
A1.11	Negotiation skills						
	Discipline Specific Knowledge (Discipline = Maritime Business)	**0**	**1**	**2**	**3**	**4**	**5**
A1.12	Shipping Business Operation and Management						
A1.13	Port Operation and Management						
A1.14	Stevedoring Operation						
A1.15	Maritime Geography						
A1.16	Financial Accounting						
A1.17	Financial Management						
A1.18	Logistics						
A1.19	Supply Chains						
A1.20	Marketing						
A1.21	International Trade						
A1.22	Transport Systems (including Intermodal transportation)						
A1.23	Maritime Law						
A1.24	Commercial Law						
A1.25	Project Management						
A1.26	Naval Architecture						
A1.27	Documentation for Exporting and Importing						
A1.28	Marine Insurance						
A1.29	Overview of the Maritime Industry						
A1.30	Freight Forwarding						
A1.31	Systems Concept						
A1.32	Knowledge of ICT in the Maritime Industry						
	Problem Solving	**0**	**1**	**2**	**3**	**4**	**5**
A1.33	Data analysis						

A1.34	Numeracy						
A1.35	Critical thinking						
A1.36	Multi-tasking						
A1.37	Decision making and justification						
A1.38	Knowledge application						
A1.39	Analytical thinking						
A1.40	Ability to think holistically						
	Digital Literacy	**0**	**1**	**2**	**3**	**4**	**5**
A1.41	Proficiency in using ICT						
A1.42	Proficiency in using core computer software (eg Excel, Word)						
A1.43	Use of digital devices						
A1.44	Computer literacy						
A1.45	Using technology to organize data						
A1.46	Using technology to disseminate information						
	Adaptability	**0**	**1**	**2**	**3**	**4**	**5**
A1.47	Resilience						
A1.48	Confidence						
A1.49	Ability to learn						
A1.50	Adapting to changes in the industry						
A1.51	Inquisitiveness						
A1.52	Ability to work in multicultural environment						
A1.53	Self-motivation						
	Teamwork	**0**	**1**	**2**	**3**	**4**	**5**
A1.54	Cooperating with others						
A1.55	Ability to play multiple roles						
A1.56	Contributing to team performance						
A1.57	Facilitating and accepting team decision						
	Self-Management	**0**	**1**	**2**	**3**	**4**	**5**
A1.58	Ability to work on their own and self-start						
A1.59	Demonstrating a willingness to work						
A1.60	Ability to learn on the job						
A1.61	Self-reliance						
A1.62	Ability to get the job done in time with good quality						
A1.63	Time management						
A1.64	Learning to prioritise tasks						
A1.65	Initiative						
A1.66	Receptiveness to constructive criticism/feedback						
A1.67	Learning from experience						
A1.68	Strong work ethics						
	Others (Please specify them and rate them)	**0**	**1**	**2**	**3**	**4**	**5**

A2. Do you think the above skills/knowledge may differ over the next 10 years?

□ Yes
□ No
Why?

A3. Technology change such as automation may have major impact on maritime business and operations necessary for maritime industries. How important do you think the following skills associated with technology changes will be for maritime business graduates in 10 years' time?

		No importance	Little importance	Moderate importance	Great importance	Most importance	Unsure
		0	**1**	**2**	**3**	**4**	**5**
	Technology						
A1.69	Computer skills						
A1.70	Use of technology						
A1.71	Management of technology (eg managing automation						
A1.72	Analytical skills						
A1.73	Understanding of ICT infrastructure						
A1.74	Using ICT system in the maritime industry						
A1.75	Data monitoring and analysis						
A1.76	Access database skills						
A1.77	Problem detection and solving from data						
A1.78	Technology related risk management						
	Others (Please specify them and rate them)						

A4. Please rank in order of importance, where 1 is the most important, the following employability skills you will require maritime business graduates to have in 10 years' time.

□ Communication
□ Problem Solving
□ Digital Literacy
□ Technology
□ Adaptability
□ Self-Management
□ Team Work

A.5 Please explain which other skills/knowledge you may require from maritime business degree graduates in 10 years' time.

_____

A.6 When you hire a new employee, do you prefer a maritime business degree graduate or general business degree graduate?

□ Maritime graduate
□ General business graduate
□ Indifferent
□ Do not hire business graduate

SECTION B – Organisational details

B1. Please choose from the following sectors that your organization belongs to.

□ Port Company/Authority
□ Shipping Company
□ Port and Terminal Operator
□ Ship Management Company
□ Shipping Agent
□ Port Agency
□ Freight Forwarding Company
□ Logistics Company
□ Chartering and Brokering Company
□ Government Department
□ Exporters/Importers
□ NOVCC
□ Other (please specify)

B.2 Please identify your role in the organization.

□ Chief Executive Officer
□ Managing Director
□ Division Manager
□ Human Resource Manager
□ General/Functional Manager (eg Sales, Operational)
□ Manager
□ Other (please specify)

B.3 Please indicate where you are located.

□ Australia
□ United States of America
□ Canada

If you are interested in a summary of survey findings, please provide your details so we can send you a copy when it becomes available. Your contact details will be kept confidential.

Name:
Email address:

This completes the survey, thank you for your time and assistance with this important research.

Appendix 3 A Mapping Tool for Evaluating Alignment between the Industry Required Employability Skills and CLOs and Curriculum for Maritime Business Programmes

Worksheet Three

Unit modules' alignment: Aligning employability skills with each unit/subject										
Unit name:										
Instruction: The evaluation should be undertaken based on the unit/subject coordinator's aspect of to what extent (i.e. scores 0-5) the skills are covered in each module/topic of the unit in terms of learning activities (including teaching)(LA)and assessments.										
Score description										
0	if the module does not cover the skill									
1	if the module covers 1%- 20% of the skill									
2	if the module covers between 21%-40% of the skill									
3	if the module covers between 41%-60% of the skill									
4	if the module covers between 61%-80% of the skill									
5	if the module covers between 81%-100% of the skill									
		Learning activities (LA)					**Assessed**		**Average total (LA)**	**Average total (Assessed)**
	Modules or Topics	Module 1	Module 2	Module 3	Module 4	Module 5	Ass1	Ass2		
Theme 1	**Communication**									
C1	Ability to summarise or synthesise information									
C2	Active listening and understanding									
C3	Writing skills including reports, emails									
C4	Ability to make coherent argument									
C5	Interpersonal skills									
C6	Verbal presentation/communication									
C7	Conflict resolution skills									
C8	Negotiation skills									
C9	Intercultural competency									
C10	Emotional intelligence									
Theme 2	**Problem Solving**									
PS1	Decision making and justification									
PS2	Critical thinking									
PS3	Multi-tasking									
PS4	Analytical thinking and data analysis									
PS5	Knowledge application									
PS6	Ability to think holistically									
PS7	Numeracy									
Theme 3	**Adaptability**									
A1	Ability to learn in dynamic environment									
A2	Self-motivation									
A3	Adapting to changes in the industry									
A4	Resilience									
A5	Confidence									
A6	Ability to work in multicultural environment									
A7	Inquisitiveness									
Theme 4	**Self-Management**									
SM1	Strong work ethics									
SM2	Learning from experience									
SM3	Ability to learn on the job									
SM4	Learning to prioritise tasks									
SM5	Demonstrating a willingness to work									
SM6	Time and quality management									
SM7	Initiative									
SM8	Self-reliance (Ability to work on their own and self-start)									
SM9	Receptiveness to constructive criticism/feedback									
Theme 5	**Team work**									
T1	Contributing to team performance									
T2	Cooperating with others									
T3	Facilitating and accepting team decision									
T4	Ability to play multiple roles									
Theme 6	**Digital Literacy and Technology**									
DLT1	Computer skills including using core computer software (eg Excel, Word)									
DLT2	Applied use of technology including digital devices to:									
	Disseminating information									
	Organising data									
	Accessing databases for research /information									
DLT3	Problem detection and solving from data									
DLT4	Computer literacy									
DLT5	Data monitoring and analysis									
DLT6	Management of technology (eg managing automation)									
DLT7	Technology related risk management									
DLT8	Using ICT system in the maritime industry									
DLT9	Understanding of ICT infrastructure									

Worksheet Two

Total units' alignment

This worksheet presents each unit's alignment with employability skills in terms of learning activities (LA) and assessments. The alignment scores in the respective column of learning activities and assessment under each unit are caculated from worksheet 3 . The final two columns show the average total alignment scores of total units for each skill in terms of learning activities and assessments.

Unit /subject names in the course		Unit 1		Unit 2		Average total	
		LA	Assessed	LA	Assessed	LA	Assessed
Theme 1	**Communication**						
C1	Ability to summarise or synthesise information						
C2	Active listening and understanding						
C3	Writing skills including reports, emails						
C4	Ability to make coherent argument						
C5	Interpersonal skills						
C6	Verbal presentation/communication						
C7	Conflict resolution skills						
C8	Negotiation skills						
C9	Intercultural competency						
C10	Emotional intelligence						
Theme 2	**Problem Solving**						
PS1	Decision making and justification						
PS2	Critical thinking						
PS3	Multi-tasking						
PS4	Analytical thinking and data analysis						
PS5	Knowledge application						
PS6	Ability to think holistically						
PS7	Numeracy						
Theme 3	**Adaptability**						
A1	Ability to learn in dynamic environment						
A2	Self-motivation						
A3	Adapting to changes in the industry						
A4	Resilience						
A5	Confidence						
A6	Ability to work in multicultural environment						
A7	Inquisitiveness						
Theme 4	**Self-Management**						
SM1	Strong work ethics						
SM2	Learning from experience						
SM3	Ability to learn on the job						
SM4	Learning to prioritise tasks						
SM5	Demonstrating a willingness to work						
SM6	Time and quality management						
SM7	Initiative						
SM8	Self-reliance (Ability to work on their own and self-start)						
SM9	Receptiveness to constructive criticism/feedback						
Theme 5	**Team work**						
T1	Contributing to team performance						
T2	Cooperating with others						
T3	Facilitating and accepting team decision						
T4	Ability to play multiple roles						
Theme 6	**Digital Literacy and Technology**						
DLT1	Computer skills including using core computer software (eg Excel, Word)						
DLT2	Applied use of technology including digital devices to:						
	Disseminating information						
	Organising data						
	Accessing databases for research /information						
DLT3	Problem detection and solving from data						
DLT4	Computer literacy						
DLT5	Data monitoring and analysis						
DLT6	Management of technology (eg managing automation)						
DLT7	Technology related risk management						
DLT8	Using ICT system in the maritime industry						
DLT9	Understanding of ICT infrastructure						

Worksheet One

Aligning the CLOs and Curriculum of Maritime Business Degrees with Industry Required Employability Skills - Evaluation Tool

CLOs and curriculum alignment
Course name:

Instruction: The evaluation includes whether the skill themes are included in the programme's CLOs (yes or no), and the extent of the skills and knowledge are covered in the course curriculum. The extent of the skill covered in the curriculum is measured in terms of learning activities (including teaching)(LA) and assessments. The scores in each cell of learning acitivities and assessment present the extent of each skill covered in the curriculum. The scores are caculated from sheet 2 (Total units' alignment). The extensiveness of knowledge taught is measured with score 0-5.

Description	
yes	the skill theme is included in CLOs
no	the skill theme is not included in CLOs

Skill score description	
0	if the course does not cover the skill
1	if the course covers 1%- 20% of the skill
2	if the course covers between 21%-40% of the skill
3	if the course covers between 41%-60% of the skill
4	if the course covers between 61%-80% of the skill
5	if the course covers between 81%-100% of the skill

Knowledge score description	
0	if the course does not cover the knowledge
1	if the course teaches the knowledge in less than 30% of a unit
2	if the course teaches the knowledge in less than 60% of a unit
3	if the course teaches the knowledge in less than a unit
4	if the course teaches the knowledge in one unit
5	if the course teaches the knowledge in more than one unit

		Is the skill theme included in the CLOs? (Yes/No)	To what extent is the skill covered in the curriculum? (Score 0-5)		Total score
Theme 1	**Communication (weight 22%)**	yes	LA	Assessed	
C1	Ability to summarise or synthesise information				
C2	Active listening and understanding				
C3	Writing skills including reports, emails				
C4	Ability to make coherent argument				
C5	Interpersonal skills				
C6	Verbal presentation/communication				
C7	Conflict resolution skills				
C8	Negotiation skills				
C9	Intercultural competency				
C10	Emotional intelligence				
	Average score				
	% of total average				
Theme 2	**Problem Solving (weight 19%)**				
PS1	Decision making and justification				
PS2	Critical thinking				
PS3	Multi-tasking				
PS4	Analytical thinking and data analysis				
PS5	Knowledge application				
PS6	Ability to think holistically				
PS7	Numeracy				
	Average score				
	% of total				
Theme 3	**Adaptability (weight 16%)**				
A1	Ability to learn in dynamic environment				
A2	Self-motivation				
A3	Adapting to changes in the industry				
A4	Resilience				
A5	Confidence				
A6	Ability to work in multicultural environment				
A7	Inquisitiveness				
	Average score				
	% of total				
Theme 4	**Self-Management (weight 16%)**				
SM1	Strong work ethics				
SM2	Learning from experience				
SM3	Ability to learn on the job				
SM4	Learning to prioritise tasks				
SM5	Demonstrating a willingness to work				
SM6	Time and quality management				
SM7	Initiative				
SM8	Self-reliance (Ability to work on their own and self-start)				
SM9	Receptiveness to constructive criticism/feedback				
	Average score				
	% of total				
Theme 5	**Team work (weight 15%)**				
T1	Contributing to team performance				
T2	Cooperating with others				
T3	Facilitating and accepting team decision				
T4	Ability to play multiple roles				
	Average score				
	% of total				
Theme 6	**Digital Literacy and Technology (weight 12%)**				
DLT1	Computer skills including using core computer software (eg Excel, Word)				
DLT2	Applied use of technology including digital devices to:				
	Disseminating information				
	Organising data				
	Accessing databases for research /information				
DLT3	Problem detection and solving from data				
DLT4	Computer literacy				
DLT5	Data monitoring and analysis				
DLT6	Management of technology (eg managing automation)				
DLT7	Technology related risk management				
DLT8	Using ICT system in the maritime industry				
DLT9	Understanding of ICT infrastructure				
	Average score				
	% of total				
	Total score				
Knowledge	**Maritime business degree knowledge**	**Indicate the extensiveness of knowledge taught in the programme (Score 0-5)**	**Note**		
K1	Shipping Business Operation and Management				
K2	Overview of the Maritime Industry				
K3	Logistics				
K4	International Trade				
K5	Project Management				
K6	Port Operation and Management				
K7	Transport Systems (including Intermodal transportation)				
K8	Supply Chains				
K9	Maritime Geography				
K10	Financial Management				
K11	Maritime Law				
K12	Financial Accounting				
K13	Documentation for Exporting and Importing				
K14	Marketing				
K15	Commercial Law				
K16	Stevedoring Operation				
K17	Marine Insurance				

An illustration

This illustration is for indicative purposes only in terms of how the tool may be applied. To simplify the process, it uses only two units with five modules each for alignment evaluation. The scores filled in each skill in the two Worksheet Three (i.e. unit one and unit 2) do not reflect the real situation.

Worksheet One: Unit one

Unit modules' alignment: Aligning employability skills with each unit/subject

Unit name: MB1

Instruction: The evaluation should be undertaken based on the unit/subject coordinator's aspect of to what extent (i.e. scores 0-5) the skills are covered in each module/topic of the unit in terms of learning activities (including teaching)(LA)and assessments.

Score description	
0	if the module does not cover the skill
1	if the module covers 1%- 20% of the skill
2	if the module covers between 21%-40% of the skill
3	if the module covers between 41%-60% of the skill
4	if the module covers between 61%-80% of the skill
5	if the module covers between 81%-100% of the skill

		Learning activities (LA)					Assessed		Average total (LA)	Average total (Assessed)
	Modules or Topics	Module 1	Module 2	Module 3	Module 4	Module 5	Ass1	Ass2		
Theme 1	**Communication**									
C1	Ability to summarise or synthesise information	0	1	2	4	5	4	4	2	4
C2	Active listening and understanding	0	1	0	0	0	0	0	0	0
C3	Writing skills including reports, emails	0	2	1	0	0	5	5	1	5
C4	Ability to make coherent argument	1	2	1	2	1	5	5	1	5
C5	Interpersonal skills	0	1	0	0	0	0	0	0	0
C6	Verbal presentation/communication	0	1	1	1	1	0	5	1	3
C7	Conflict resolution skills	0	0	0	0	0	0	0	0	0
C8	Negotiation skills	0	0	0	0	0	0	0	0	0
C9	Intercultural competency	0	2	2	0	0	0	0	1	0
C10	Emotional intelligence	0	1	0	0	0	0	0	0	0
Theme 2	**Problem Solving**									
PS1	Decision making and justification	0	2	4	2	2	5	5	2	5
PS2	Critical thinking	1	2	1	1	4	4	5	2	5
PS3	Multi-tasking	0	0	0	0	0	0	0	0	0
PS4	Analytical thinking and data analysis	0	2	3	3	4	3	4	2	4
PS5	Knowledge application	1	3	3	3	4	4	4	3	4
PS6	Ability to think holistically	3	3	2	3	1	4	1	2	3
PS7	Numeracy	0	0	0	2	4	2	5	1	4
Theme 3	**Adaptability**									
A1	Ability to learn in dynamic environment	0	1	1	1	1	0	0	1	0
A2	Self-motivation	0	0	0	0	0	0	0	0	0
A3	Adapting to changes in the industry	0	0	0	0	0	0	0	0	0
A4	Resilience	0	0	0	0	0	0	0	0	0
A5	Confidence	0	0	0	0	0	0	0	0	0
A6	Ability to work in multicultural environment	0	0	3	3	0	0	0	1	0
A7	Inquisitiveness	0	0	2	2	0	0	0	1	0
Theme 4	**Self-Management**									
SM1	Strong work ethics	4	0	0	0	0	5	5	1	5
SM2	Learning from experience	0	0	0	0	0	0	0	0	0
SM3	Ability to learn on the job	0	0	0	0	0	0	0	0	0
SM4	Learning to prioritise tasks	2	0	0	0	0	0	0	0	0
SM5	Demonstrating a willingness to work	0	2	2	2	2	0	0	2	0
SM6	Time and quality management	2	0	0	0	0	5	5	0	5
SM7	Initiative	0	1	1	1	1	4	4	1	4
SM8	Self-reliance (Ability to work on their own and self-start)	3	3	3	3	3	4	4	3	4
SM9	Receptiveness to constructive criticism/feedback	0	0	3	0	0	0	0	1	0
Theme 5	**Team work**									
T1	Contributing to team performance	0	3	3	3	3	0	0	2	0
T2	Cooperating with others	1	3	3	3	3	0	0	3	0
T3	Facilitating and accepting team decision	0	2	3	3	3	0	0	2	0
T4	Ability to play multiple roles	1	2	0	1	0	0	0	1	0
Theme 6	**Digital Literacy and Technology**									
DLT1	Computer skills including using core computer software (eg Excel, Word)	0	3	0	0	0	3	2	1	3
DLT2	Applied use of technology including digital devices to:									
	Disseminating information	0	1	0	0	0	0	0	0	0
	Organising data	0	1	2	2	2	0	0	1	0
	Accessing databases for research /information	0	1	2	2	2	0	0	1	0
DLT3	Problem detection and solving from data	0	0	0	0	0	0	0	0	0
DLT4	Computer literacy	0	0	0	0	0	0	0	0	0
DLT5	Data monitoring and analysis	0	0	0	0	0	0	0	0	0
DLT6	Management of technology (eg managing automation)	0	0	0	0	0	0	0	0	0
DLT7	Technology related risk management	0	0	1	1	1	0	0	1	0
DLT8	Using ICT system in the maritime industry	0	0	0	0	0	0	0	0	0
DLT9	Understanding of ICT infrastructure	0	1	0	3	1	0	3	1	2

Worksheet three: Unit 2

Unit modules' alignment: Aligning employability skills with each unit/subject

Unit name: MB2

Instruction: The evaluation should be undertaken based on the

Score description

0	if the module does not cover the skill
1	if the module covers 1%- 20% of the skill
2	if the module covers between 21%-40% of the skill
3	if the module covers between 41%-60% of the skill
4	if the module covers between 61%-80% of the skill
5	if the module covers between 81%-100% of the skill

		Learning activities (LA)					Assessed		Average total (LA)	Average total (Assessed)
	Modules or Topics	Module 1	Module 2	Module 3	Module 4	Module 5	Ass1	Ass2		
Theme 1	**Communication**									
C1	Ability to summarise or synthesise information	2	1	2	4	5	4	4	3	4
C2	Active listening and understanding	1	1	1	0	0	0	0	1	0
C3	Writing skills including reports, emails	0	2	2	0	0	5	5	1	5
C4	Ability to make coherent argument	1	2	1	2	1	5	5	1	5
C5	Interpersonal skills	1	1	0	2	0	0	0	1	0
C6	Verbal presentation/communication	0	1	1	1	1	0	5	1	3
C7	Conflict resolution skills	0	0	0	0	0	0	0	0	0
C8	Negotiation skills	0	0	0	0	0	0	0	0	0
C9	Intercultural competency	0	2	2	2	2	0	0	2	0
C10	Emotional intelligence	0	1	0	0	0	0	0	0	0
Theme 2	**Problem Solving**									
PS1	Decision making and justification	0	1	1	2	2	1	2	1	2
PS2	Critical thinking	1	2	1	1	2	3	3	1	3
PS3	Multi-tasking	0	0	0	0	0	0	0	0	0
PS4	Analytical thinking and data analysis	0	2	3	3	4	3	4	2	4
PS5	Knowledge application	1	3	3	3	4	4	4	3	4
PS6	Ability to think holistically	3	3	2	3	1	4	1	2	3
PS7	Numeracy	0	0	0	0	0	0	0	0	0
Theme 3	**Adaptability**									
A1	Ability to learn in dynamic environment	0	1	1	1	1	0	0	1	0
A2	Self-motivation	0	0	0	0	0	0	0	0	0
A3	Adapting to changes in the industry	0	0	0	0	0	0	0	0	0
A4	Resilience	0	0	0	0	0	0	0	0	0
A5	Confidence	0	0	0	0	0	0	0	0	0
A6	Ability to work in multicultural environment	0	0	3	3	0	0	0	1	0
A7	Inquisitiveness	0	0	2	2	0	0	0	1	0
Theme 4	**Self-Management**									
SM1	Strong work ethics	4	0	0	0	0	5	5	1	5
SM2	Learning from experience	0	0	0	0	0	0	0	0	0
SM3	Ability to learn on the job	0	0	0	0	0	0	0	0	0
SM4	Learning to prioritise tasks	2	0	0	0	0	0	0	0	0
SM5	Demonstrating a willingness to work	0	2	2	2	2	0	0	2	0
SM6	Time and quality management	2	0	0	0	0	5	5	0	5
SM7	Initiative	0	1	1	1	1	4	4	1	4
SM8	Self-reliance (Ability to work on their own and self-start)	3	3	3	3	3	4	4	3	4
SM9	Receptiveness to constructive criticism/feedback	0	0	3	0	0	0	0	1	0
Theme 5	**Team work**									
T1	Contributing to team performance	0	3	3	3	3	0	0	2	0
T2	Cooperating with others	1	3	3	3	3	0	0	3	0
T3	Facilitating and accepting team decision	0	2	3	3	3	0	0	2	0
T4	Ability to play multiple roles	1	2	0	1	0	0	0	1	0
Theme 6	**Digital Literacy and Technology**									
DLT1	Computer skills including using core computer software (	0	3	0	0	0	3	2	1	3
DLT2	Applied use of technology including digital devices to:									
	Disseminating information	0	1	0	0	0	0	0	0	0
	Organising data	0	1	2	2	2	0	0	1	0
	Accessing databases for research /information	0	1	2	2	2	0	0	1	0
DLT3	Problem detection and solving from data	0	0	0	0	0	0	0	0	0
DLT4	Computer literacy	0	0	0	0	0	0	0	0	0
DLT5	Data monitoring and analysis	0	0	0	0	0	0	0	0	0
DLT6	Management of technology (eg managing automation)	0	0	0	0	0	0	0	0	0
DLT7	Technology related risk management	0	0	1	1	1	0	0	1	0
DLT8	Using ICT system in the maritime industry	0	0	0	0	0	0	0	0	0
DLT9	Understanding of ICT infrastructure	0	1	0	3	1	0	3	1	2

Worksheet Two: Total units' alignment

Total units' alignment

This worksheet presents each unit's alignment with employability skills in terms of learning activities (LA) and assessments. The alignment scores in the respective column of learning activities and assessment under each unit are caculated from worksheet 3 . The final two columns show the average total alignment scores of total units for each skill in terms of learning activities and assessments.

Unit /subject names in the course		Unit 1		Unit 2		Average total	
		LA	Assessed	LA	Assessed	LA	Assessed
Theme 1	**Communication**						
C1	Ability to summarise or synthesise information	2	4	3	4	3	4
C2	Active listening and understanding	0	0	1	0	0	0
C3	Writing skills including reports, emails	1	5	1	5	1	5
C4	Ability to make coherent argument	1	5	1	5	1	5
C5	Interpersonal skills	0	0	1	0	1	0
C6	Verbal presentation/communication	1	3	1	3	1	3
C7	Conflict resolution skills	0	0	0	0	0	0
C8	Negotiation skills	0	0	0	0	0	0
C9	Intercultural competency	1	0	2	0	1	0
C10	Emotional intelligence	0	0	0	0	0	0
Theme 2	**Problem Solving**						
PS1	Decision making and justification	2	5	1	2	2	3
PS2	Critical thinking	2	5	1	3	2	4
PS3	Multi-tasking	0	0	0	0	0	0
PS4	Analytical thinking and data analysis	2	4	2	4	2	4
PS5	Knowledge application	3	4	3	4	3	4
PS6	Ability to think holistically	2	3	2	3	2	3
PS7	Numeracy	1	4	0	0	1	2
Theme 3	**Adaptability**						
A1	Ability to learn in dynamic environment	1	0	1	0	1	0
A2	Self-motivation	0	0	0	0	0	0
A3	Adapting to changes in the industry	0	0	0	0	0	0
A4	Resilience	0	0	0	0	0	0
A5	Confidence	0	0	0	0	0	0
A6	Ability to work in multicultural environment	1	0	1	0	1	0
A7	Inquisitiveness	1	0	1	0	1	0
Theme 4	**Self-Management**						
SM1	Strong work ethics	1	5	1	5	1	5
SM2	Learning from experience	0	0	0	0	0	0
SM3	Ability to learn on the job	0	0	0	0	0	0
SM4	Learning to prioritise tasks	0	0	0	0	0	0
SM5	Demonstrating a willingness to work	2	0	2	0	2	0
SM6	Time and quality management	0	5	0	5	0	5
SM7	Initiative	1	4	1	4	1	4
SM8	Self-reliance (Ability to work on their own and self-start)	3	4	3	4	3	4
SM9	Receptiveness to constructive criticism/feedback	1	0	1	0	1	0
Theme 5	**Team work**						
T1	Contributing to team performance	2	0	2	0	2	0
T2	Cooperating with others	3	0	3	0	3	0
T3	Facilitating and accepting team decision	2	0	2	0	2	0
T4	Ability to play multiple roles	1	0	1	0	1	0
Theme 6	**Digital Literacy and Technology**						
DLT1	Computer skills including using core computer software (eg Excel, Word)	1	3	1	3	1	3
DLT2	Applied use of technology including digital devices to:						
	Disseminating information	0	0	0	0	0	0
	Organising data	1	0	1	0	1	0
	Accessing databases for research /information	1	0	1	0	1	0
DLT3	Problem detection and solving from data	0	0	0	0	0	0
DLT4	Computer literacy	0	0	0	0	0	0
DLT5	Data monitoring and analysis	0	0	0	0	0	0
DLT6	Management of technology (eg managing automation)	0	0	0	0	0	0
DLT7	Technology related risk management	1	0	1	0	1	0
DLT8	Using ICT system in the maritime industry	0	0	0	0	0	0
DLT9	Understanding of ICT infrastructure	1	2	1	2	1	2

Worksheet one: CLOs and curriculum alignment

Aligning the CLOs and Curriculum of Maritime Business Degrees with Industry Required Employability Skills - Evaluation Tool

CLOs and curriculum alignment

Course name:

Instruction: The evaluation includes whether the skill themes are included in the programme's CLOs (yes or no), and the extent of the skills and knowledge are covered in the course curriculum. The extent of the skill covered in the curriculum is measured in terms of learning activities (including teaching)(LA) and assessments. The scores in each cell of learning acitivities and assessment present the extent of each skill covered in the curriculum. The scores are caculated from sheet 2 (Total units' alignment). The extensiveness of knowledge taught is measured with score 0-5.

Description	
yes	the skill theme is included in CLOs
no	the skill theme is not included in CLOs

Skill score description		Knowledge score description	
0	if the course does not cover the skill	0	if the course does not cover the knowledge
1	if the course covers 1%- 20% of the skill	1	if the course teaches the knowledge in less than 30% of a unit
2	if the course covers between 21%-40% of the skill	2	if the course teaches the knowledge in less than 60% of a unit
3	if the course covers between 41%-60% of the skill	3	if the course teaches the knowledge in less than a unit
4	if the course covers between 61%-80% of the skill	4	if the course teaches the knowledge in one unit
5	if the course covers between 81%-100% of the skill	5	if the course teaches the knowledge in more than one unit

		Is the skill theme included in the CLOs? (Yes/No)	To what extent is the skill covered in the curriculum? (Score 0-5)		Total score
Theme 1	**Communication (weight 22%)**	yes	LA	Assessed	
C1	Ability to summarise or synthesise information		3	4	7
C2	Active listening and understanding		0	0	0
C3	Writing skills including reports, emails		1	5	6
C4	Ability to make coherent argument		1	5	6
C5	Interpersonal skills		1	0	1
C6	Verbal presentation/communication		1	3	3
C7	Conflict resolution skills		0	0	0
C8	Negotiation skills		0	0	0
C9	Intercultural competency		1	0	1
C10	Emotional intelligence		0	0	0
	Average score				**2**
	% of total average				**19%**
Theme 2	**Problem Solving (weight 19%)**	yes			
PS1	Decision making and justification		2	3	5
PS2	Critical thinking		2	4	5
PS3	Multi-tasking		0	0	0
PS4	Analytical thinking and data analysis		2	4	6
PS5	Knowledge application		3	4	7
PS6	Ability to think holistically		2	3	5
PS7	Numeracy		1	2	2
	Average score				**4**
	% of total				**34%**
Theme 3	**Adaptability (weight 16%)**	no			
A1	Ability to learn in dynamic environment		1	0	1
A2	Self-motivation		0	0	0
A3	Adapting to changes in the industry		0	0	0
A4	Resilience		0	0	0
A5	Confidence		0	0	0
A6	Ability to work in multicultural environment		1	0	1
A7	Inquisitiveness		1	0	1
	Average score				**0**
	% of total				**3%**
Theme 4	**Self-Management (weight 16%)**	yes			
SM1	Strong work ethics		1	5	6
SM2	Learning from experience		0	0	0
SM3	Ability to learn on the job		0	0	0
SM4	Learning to prioritise tasks		0	0	0
SM5	Demonstrating a willingness to work		2	0	2
SM6	Time and quality management		0	5	5
SM7	Initiative		1	4	5
SM8	Self-reliance (Ability to work on their own and self-start)		3	4	7
SM9	Receptiveness to constructive criticism/feedback		1	0	1
	Average score				**3**
	% of total				**22%**
Theme 5	**Team work (weight 15%)**	no			
T1	Contributing to team performance		2	0	2
T2	Cooperating with others		3	0	3
T3	Facilitating and accepting team decision		2	0	2
T4	Ability to play multiple roles		1	0	1
	Average score				**2**
	% of total				**16%**
Theme 6	**Digital Literacy and Technology (weight 12%)**	no			
DLT1	Computer skills including using core computer software (eg Excel, Word)		1	3	3
DLT2	Applied use of technology including digital devices to:				
	Disseminating information		0	0	0
	Organising data		1	0	1
	Accessing databases for research /information		1	0	1
DLT3	Problem detection and solving from data		0	0	0
DLT4	Computer literacy		0	0	0
DLT5	Data monitoring and analysis		0	0	0
DLT6	Management of technology (eg managing automation)		0	0	0
DLT7	Technology related risk management		1	0	1
DLT8	Using ICT system in the maritime industry		0	0	0
DLT9	Understanding of ICT infrastructure		1	2	3
	Average score				**1**
	% of total				**7%**
	Total score				**13**

Knowledge	**Maritime business degree knowledge**	**How much is the knowledge taught in the programme? (Score 0-5)**	**Note**
K1	Shipping Business Operation and Management	5	
K2	Overview of the Maritime Industry	5	
K3	Logistics	5	
K4	International Trade	5	
K5	Project Management	0	
K6	Port Operation and Management	5	
K7	Transport Systems (including Intermodal transportation)	5	
K8	Supply Chains	5	
K9	Maritime Geography	1	
K10	Financial Management	4	
K11	Maritime Law	5	
K12	Financial Accounting	3	
K13	Documentation for Exporting and Importing	4	
K14	Marketing	5	
K15	Commercial Law	5	
K16	Stevedoring Operation	1	
K17	Marine Insurance	1	

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