A Study on the Ability and Competency of Indian Seafarers; A Thematic Analysis Approach.

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Abstract: The term "ability" signifies the inherent capacity or condition of being competent in performing a specific activity or set of activities. Competency encompasses the assimilation of knowledge, expertise, capabilities, and actions that empower an individual to proficiently do a task. Several studies have suggested that there will be a shortage of skilled maritime labour in the coming years. The study is conducted to understand abilities and competitiveness of Indian sailors and any shortcomings in their proficiency. The study's objective is to assess the abilities of young Indian sailors from the perspective of the onboard management team. The research aims to investigate any deficiencies in the Indian marine education system's training and curriculum. India's ability to conduct a comprehensive evaluation of the concern will enable it to supply a proficient labour force that can fulfil the requirements of the expanding job market.

Keywords: Ability, seafarers, IMO, Shipping

JEL code: I2, I3, J8,

1. Introduction

India is a maritime nation, providing 9.35% of the global seafarers, and is ranked third in supply of seafarers to the global maritime industry. The Indian Ministry of Ports, Shipping, and Waterways has made several initiatives and policy decisions to increase the share of Indian seafarers at the global level. Indian seafarers employed by Indian or foreign-flagged ships have grown by approximately 45 percent in the last three years from 143940 in 2016 to 208799 in 2018. The Ministry revised the training curriculum for officers and ratings in 2016 to meet global standards and the expectations of potential foreign employers. This includes lifting an earlier ban on the conduct of some courses and the introduction of a few new national Maritime Organization (IMO) Model courses. Through these measures, the Indian Government anticipates a further increase in the employability of Indian seafarers to compete with the global maritime sector.

Although there has been a considerable surge in the supply of Chinese seafarers, there has been only a marginal increase in the global maritime labour market. The main barrier is the communicative competence of Chinese seafarers in English (Fan et al., 2018). A study on the selection of foreign seafarers in Korean flag vessels identified that the total crew cost, quality of seafarers' education and training, and supply of well-trained seafarers are the main weight factors for decision makers. Moreover, there will be a shortage of 147,500 officers by 2025, and there should be a steady supply of qualified seafarers to meet this demand (Wang and Tae Yeo, 2016).

The International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers(International Maritime organisation, 2010), an International Convention of the International Maritime Organization (IMO) ratified by signatory states, lays down the minimum basic requirements on training, certification, and watchkeeping for seafarers on an international level. The Conference of Parties to the STCW Convention was held in Manila, Philippines, in June 2010 (Youn and Seong, 2010) and brought many vital changes to the Convention and Code. The main changes in the code for were.

- Improved measures to prevent fraudulent practices associated with certificates of competency and strengthen the evaluation process (monitoring parties' compliance with the Convention).
- Revised requirements on hours of work and rest and new requirements for the prevention of drug and alcohol abuse as well as updated standards relating to medical fitness standards for seafarers.
- New certification requirements for able seafarers.

- New requirements relating to training in modern technology, such as electronic charts and information systems (ECDIS);
- New requirements for marine environment awareness training and training in leadership and teamwork.
- New training and certification requirements for electro-technical officers;
- Updating competence requirements for personnel serving on board all types of tankers, including new requirements for personnel serving liquefied gas tankers.
- New requirements for security training as well as provisions to ensure that seafarers are properly trained to cope if their ship is under attack by pirates.
- Introduction of modern training methodology including distance learning and web-based learning.
- New training guidance for personnel serving on board ships operating in polar waters; and
- New training guidance for personnel operating Dynamic Positioning Systems.

This code came into force in 1st January 1, 2012, and had a cushioning time until 2017 to its complete enforcement. Most of the changes in the code are with respect to additional training and standardization of certification to prevent fraudulent means of attaining them. India, one of the signatories to this code, has taken measures to comply with this code.

On the other hand, there has been new technological advancement in the shipping industry, and future seafarers should update their skills and competencies periodically (Baum-Talmor and Kitada, 2022). Regular examination of the mechanisms to impart education to seafarers is required. Therefore, there is a need to conduct more studies on this aspect of maritime labor in India. Surprisingly, there has not been a significant study or research to assess the quality or identify the limitations of Indian seafarers at the global stage. This paper intends to evaluate the different aspects of Indian seafarers' skills and abilities, and whether their competency is par with global expected standards. Through semi-structured interviews with industry experts, the authors intend to explore the various aspects of the above subject from the employers' perspective. Investigating the ability and competition of seafarers is a continuing concern for the maritime industry. Section 2 reviews the literature and studies related to the research. The third chapter is concerned with the research methodology employed for the study, and the fourth chapter analyzes the responses gathered from the interviews. The fifth section details the findings of the research and their implications for the maritime industry.

1. Literature Review

Relatively few historical studies have focused on the abilities of seafarers. This section discusses studies conducted over seven years related to maritime industry issues. Chinese seafarers' communication competence and its correlation with employability in the international maritime sector were investigated in (Fan et al., 2017). English communication skills were found to be prime determinants of employment in foreign vessels, and surprisingly, this was found to be declining over a period. English communication was again found to be a major criterion for the selection of Turkish Seafarers, followed by knowledge of the safety management system (Arslan et al., 2024). This cross-sectional study was conducted to assess the perceived training needs of maritime health professionals (Shah et al., 2018). Taking 23 themes into account, fitness evaluation and working conditions followed by on-board medicine and health safety at work were found to be the major issues. This research identified the need for planning an effective training program for maritime health professionals on various issues. Keeping in mind the need to familiarize personnel with the ship's layout, international maritime regulations mandate proper familiarization training. This study (Tvedt et al., 2018)compares virtual and traditional familiarization processes. Various factors, such as difficulty in optimizing the planning, costs, and variations in practices are brought forward through the study. However, virtual familiarization was found to be more effective than the traditional methods. The introduction of autonomous maritime surface ships requires new training and education for seafarers. This study (Lee et al., 2019)attempts to identify upgradation in qualifications and suggestions for improving ability in regard to cyber security, big data, and the digital revolution through training and educational programs. A similar study on the need for training in operating autonomous ships was conducted in (Shahbakhsh et al., 2022). The literature review revealed the absence of a framework to address knowledge issues related to operators of future autonomous ships. A new dynamic-human-machine model that involves ship operational systems and the interaction of seafarers with automated systems was proposed in (Fan and Yang, 2023). This study, based on two case studies, describes the feasibility of the new model and the need to probe the competencies of seafarers in the dynamic human-machine system. The effects of basic training on Seafarer's knowledge, attitude, and behavior of shipboard safety were explored in (Kamis et al., 2020). The results, based

on principal component analysis and confirmatory factor analysis, establish a clear relationship between basic training and knowledge, attitude, and behavior. The factors identified are incorporated in the training syllabus to inculcate the right attitude among seafarers. Similarly, the knowledge, skills, and abilities theory approach has been deployed to establish an assessment framework and conceptual training (Choong Pin Aun and Ahmad Fuad, 2023).

An Electroencephalogram based psychological assessment is recommended for monitoring and training seafarers (Liu et al., 2020). It was suggested that this be used to understand the human factors that impact human performance. A comprehensive review of training and education, which play a critical role in the safe conduct of ships, is detailed in (Praetorius et al., 2020). This study emphasizes the need for non-technical skills to be equally important for the safe conduct of ships. The need for digitalization and automation skills in current maritime operations was critically analyzed in (Demirel, 2020). The current institutes were apparently not found to be addressing this phenomenon in educating and training maritime seafarers. This study examines the role of digitalization in current education systems in preparing seafarers, thereby addressing current changing trends. Keeping in view the stakeholder perspective, the qualifications of future seafarers were explored in (Setiawan et al., 2021). The research findings suggest that IT skills, English communication skills, and theoretical and technical knowledge are the hard skills anticipated by stakeholders. The study suggests that students need to spend more time on simulators and engines to gain more practical knowledge. Key factors affecting Maritime Education and Training were explored among Chinese seafarers(Bao et al., 2021). Limited funding, lack of on-board training, and shortage of instructors were found to be the major factors affecting maritime education and training. Practical solutions have been advocated to improve the competence of Chinese cadets. In view of the absence of a comprehensive safety management system for training ships at the central government level in China, a doctrinal level study is conducted to understand the existing legal status of training ships and the limits of the IMO regulatory in (Choi et al., 2022). From this study, the need for training ship codes to enhance safety in the future is proposed. A literature review was conducted with the objective of exploring the theoretical foundations of job training, which could be applied in the maritime industry for board training (Mori and Manuel, 2023). The study found that the zones of proximal development, cognitive apprenticeship, and situated learning were the dominant theories related to on-the-job training. The results show that this approach is appropriate for the creation of an assessment framework for maritime pilot training. Considering the various factors affecting seafarers' mental health, a novel mental health management model was developed in (Wan et al., 2023). This model was suggested to support shipping companies in devising feasible intervention strategies for improving seafarers' mental health and navigational safety.

From the above literature review, it is evident that there are limited comprehensive studies on the shortcomings of the current maritime education and training sector in India. The current study attempts to identify the needs of maritime education to address global seafarers' skill and ability shortcomings, and thereby take necessary action through a framework to address these issues.

2. Research Methodology
2.1 Design

A qualitative research methodology was adopted based on the research objective of identifying various themes of ability and competition for Indian seafarers. Semi-structured interview-based questions were designed through interviews, in which open-ended questions would bring forth various hidden themes and phenomena (Berente et al., 2019).

3.2 Respondents Profile

Semi-structured interviews were conducted with fifteen employers of Indian seafarers. The respondents were currently sailing onboard vessels with at least 10 years of experience. All of them are management-level officers and engineers, who are directly involved in onboard training and evaluation of cadets and junior officers. Thus, the former assessment is deemed to be the most crucial for the respective shipping company in terms of the latter's future employability. About 50 senior management level seagoing staff members were interviewed, but only 18 of them had agreed positively. Of the interviews taken 18, only 15 were deemed to fit the analysis. Table 1 shows that most of the respondents sailed with foreign ships with multinational or mixed crews.

Table 1: Profile of the Respondents

Document name	Coded Segments	Gender	Designation	Total Experience	Sailed with Foreign Ship	Management Experience
Expert 1	22	Male	Captain	19	Yes	10
Expert 2	26	Male	Second Engineer	11	Yes	4
Expert 3	36	Male	Captain	32	No	11
Expert 4	27	Male	Captain	20	No	12
Expert 5	15	Male	Captain	19	Yes	10
Expert 6	19	Male	Captain	18	Yes	11
Expert 7	26	Male	Captain /Marine Pilot	24	yes	15
Expert 8	46	Male	Chief Officer	27	yes	10
Expert 9	22	Male	Captain	13	yes	0
Expert 10	21	Male	Chief Officer	13	yes	2
expert 11	27	Male	Chief Engineer	21	yes	15
Expert 12	10	Male	Captain	35	yes	12
Expert 13	21	Male	Chief Engineer	18	yes	12
Expert 14	17	Male	Chief Engineer	15	Yes	9
Expert 15	14	Male	Chief Engineer	18	yes	12

2.2 Interview protocol

Data were collected through interviews with experts. There were certain challenges in scheduling the interviews and obtaining unbiased answers to questions. Each interview lasted for approximately 20 minutes. The set of questions was circulated well in advance, which enabled the experts to prepare well in advance. The importance of conducting interviews with experts with unique experiences and qualifications provided in-depth insights. The following questions were asked:

- Are the current curriculum and training mechanisms sufficient and proficient in shaping the ability of Indian seafarers to compete in the global maritime labor market? What are these shortcomings?
- Kindly suggest new patterns of training to be developed by DG Shipping you feel will enhance young Indian officers' competence in the global shipping labor market**.**
- Are the abilities and skills of young Indian officers on par with the expected global standards?

3. Results and Analysis

Based on the objectives, the interviews were coded using four parent codes: current level of curriculum in the marine institutes, new patterns that should be adopted by these institutes, skills and abilities required by seafarers, and motivational factors for retaining seafarers. All four parent codes had child codes that provided deep insight into the parent code. The parent code configuration and frequency are shown in Table 2 to examine the co-occurrence of codes in all 15 interviews. This helps in identifying the patterns of codes and supports multidimensional analysis. Simple Code Configurations are especially suited for analyzing combinations of subcodes within one dimension. Selected codes form the rows, and the combination of these codes is marked as the frequencies of the two codes existing together. table 2 shows that none of the four codes exist together in one document. The same is shown in the bar chart in Figure 1. However, new patterns, skills, and abilities co-occurred five times, indicating a strong correlation between them. The adoption of new patterns in the curriculum also motivates seafarers to sail continuously.

Table 2: Code Configration

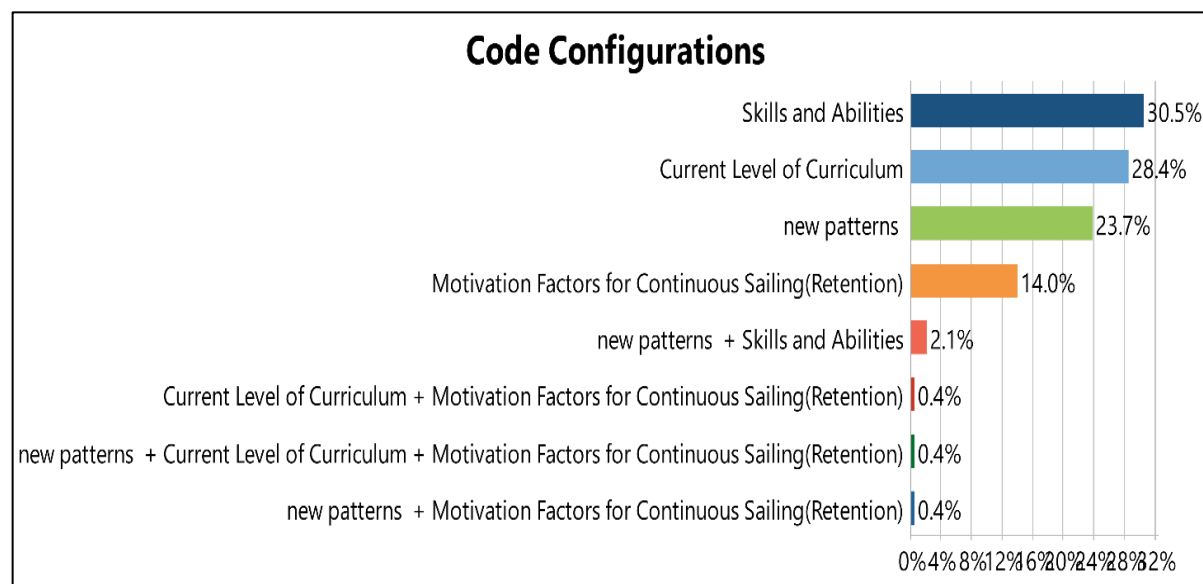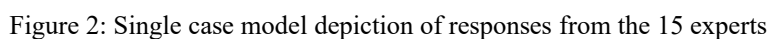| Parent Codes	Frequency	Percentage	Percentage (valid)
Skills and Abilities	72	30.51	30.51
Current Level of Curriculum	67	28.39	28.39
New patterns	56	23.73	23.73
Motivation Factors for Continuous Sailing (Retention)	33	13.98	13.98
New patterns + Skills and Abilities	5	2.12	2.12
Current Level of Curriculum + Motivation Factors for Continuous Sailing (Retention)	1	0.42	0.42
New patterns + Current Level of Curriculum + Motivation Factors for Continuous Sailing (Retention)	1	0.42	0.42
New patterns + Motivation Factors for Continuous Sailing (Retention)	1	0.42	0.42
TOTAL (valid)	236	100.00	100.00
Missing	0	0.00	-
TOTAL	236	100.00	-

Figure 1 : Bar chart of code configurations.

Further, the data of each respondent were analyzed based on a single case model to examine the importance of codes and sub-codes for each interviewee as shown in figure 2. For example, for Expert 1, motivational factors were one of the most important codes, followed by skills and abilities. A thicker line in each map indicates a higher frequency of that particular parent code.

Figure 2: Single case model depiction of responses from the 15 experts

Based on the coding done for parent and child codes, 236 codes were assigned to the interview data collected. Out of 236, 57 codes were assigned to the new patterns, 55 to the curriculum level, 86 to skills and abilities, and 38 to motivational factors. The distribution of codes and the frequency of each child code are shown in the code matrix browser in figure 3.
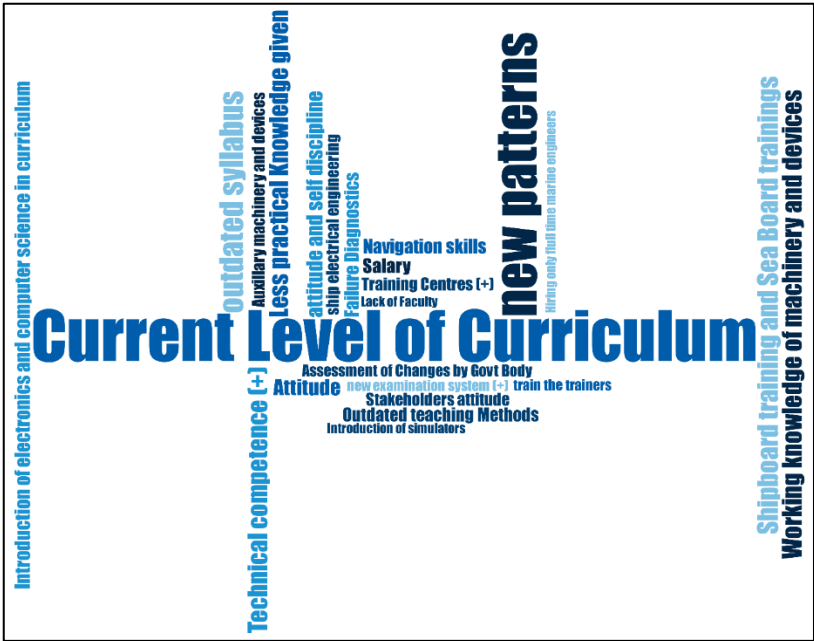

Figure 3: Coding Matrix

Figure 4: Word Cloud

4.1 Word cloud analysis

The first step towards data visualization analyzed the various attributes brought forward through qualitative analysis of the interviews. Using the word cloud method, text-based interview data, which were lengthy, were evaluated and many insights were obtained by understanding the data. As shown in figure 4, many words are depicted in various sizes, and several words are bolder than others. The intensity of the display of words and differences in sizes were displayed based on frequent appearances in the transcribed interviews. From figure 4, the current level of curriculum, new patterns, and outdated syllabi are the most frequently used words. The results indicate that the focus needs to be on improving the current curriculum, adapting new patterns of training, and upgrading the current syllabus of maritime education and training to improve the ability of seafarers.

4.2 analysis for question 1 responses

Question 1: Are the current levels of curriculum and training mechanisms sufficient and proficient in shaping the ability of Indian seafarers to compete in the global maritime labor market? What are these shortcomings?

To answer RQ1, as shown in figure 5 and table 3 the interview data were coded into the current level of maritime training and education and the new patterns suggested by the officers. Officers were from different cadres, had vast sailing, and were in management. 71.4 % Of respondents strongly agreed that current syllabus was outdated, 57.1% felt that the existing learning model imparts more of a theoretical knowledge and less practical knowledge, which makes a cadet less competent, addition to 35.7% of the respondents feel that the teaching methods followed were outdated. No Government funding or institutes lacking qualified faculties were the drawbacks pointed out by 14.3 % of the respondents. Other respondents pointed out that many maritime training institutes lack basic infrastructure and equipment for training, have crash courses that hamper with the education system in maritime institutes (7.1%).
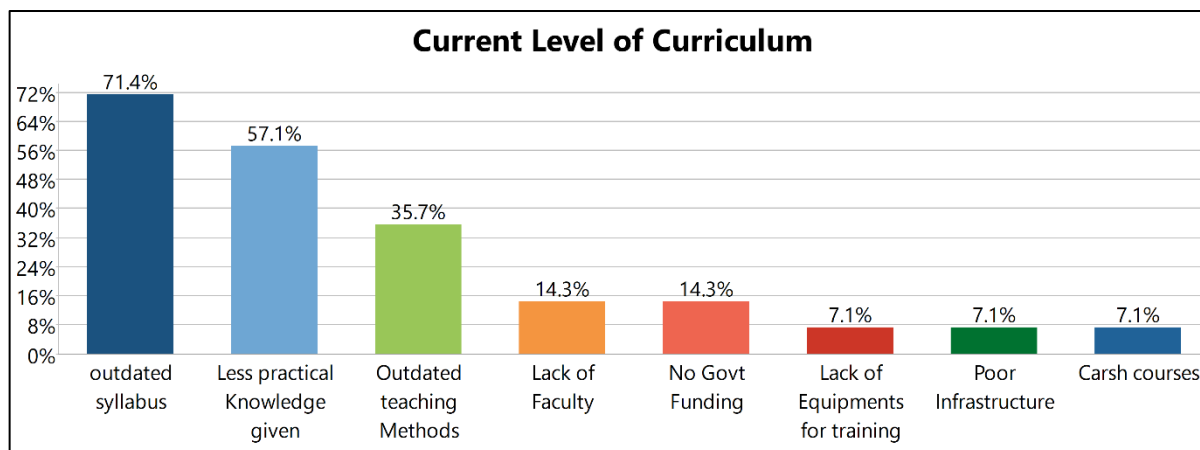

Figure 5: Current levels of curriculum

Table 3 Themes for question 1 responses

	Documents	Percentage	Percentage (valid)
outdated syllabus	10	66.67	71.43
Less practical Knowledge given	8	53.33	57.14
Outdated teaching Methods	5	33.33	35.71
Lack of Faculty	2	13.33	14.29
No Govt Funding	2	13.33	14.29
Lack of Equipments for training	1	6.67	7.14
Poor Infrastructure	1	6.67	7.14
Carsh courses	1	6.67	7.14
Documents with code(s)	14	93.33	100.00

Documents without code(s)	1	6.67	-
Analyzed documents	15	100.00	-

4.3 Analysis for responses obtained for question 2

Question 2: Kindly suggest new patterns of training to be developed by DG Shipping you feel will enhance young Indian officers to be competent in the global shipping labor market.
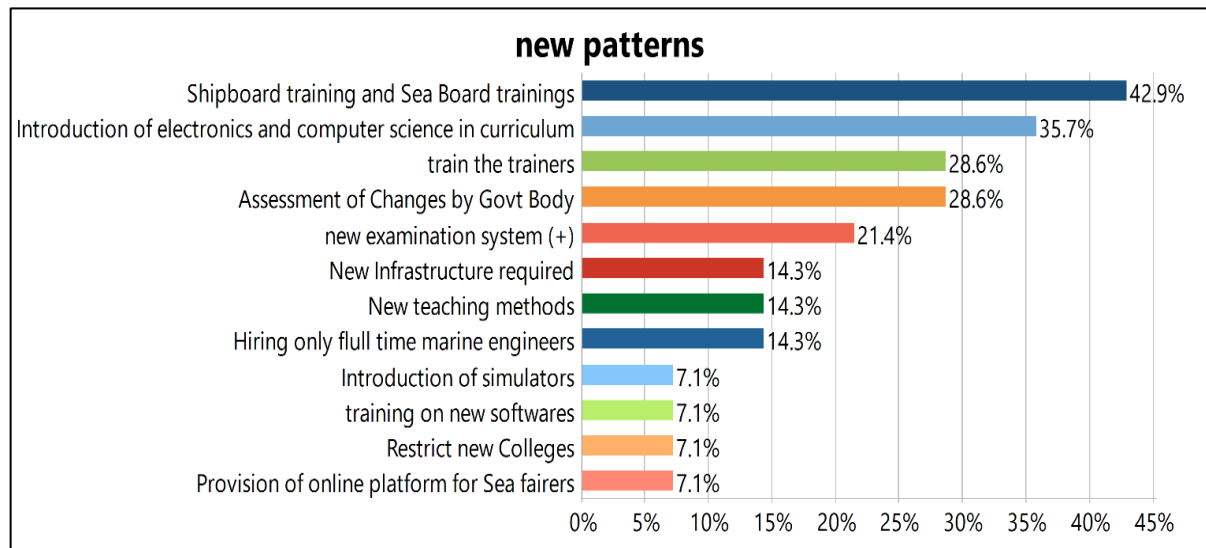

Figure 6: New patterns of Maritime Training

Table 4 Themes from responses of question 2

	Documents	Percentage	Percentage (valid)
Shipboard training and Seaboard trainings	6	40.00	42.86
Introduction of electronics and computer science in curriculum	5	33.33	35.71
train the trainers	4	26.67	28.57
Assessment of Changes by Govt Body	4	26.67	28.57
new examination system (+)	3	20.00	21.43
New Infrastructure required	2	13.33	14.29
New teaching methods	2	13.33	14.29
Hiring only full-time marine engineers	2	13.33	14.29
Introduction of simulators	1	6.67	7.14
training on new softwares	1	6.67	7.14
Restrict new Colleges	1	6.67	7.14
Provision of online platform for Seafarers	1	6.67	7.14
Documents with code(s)	14	93.33	100.00
Documents without code(s)	1	6.67	-
Analyzed documents	15	100.00	-

The respondents as shown in figure 6 and table 4 suggested many ways to improve the current level of maritime training and education; 42.9% respondents felt that both seaboard and shipboard training should be given to the new joiners to the

industry, and their curriculum must include electronics and computer science in their curriculum as agreed by 35.7% of the respondents. Some of the respondents (28.6 %) felt that there should be a mechanism to train the trainers or faculties in the institutes and a government body to assess these institutes. new examination system would be an innovative idea as suggested by 21.4% of the respondents. 14.3 % of them proposed hiring full-time faculty with new infrastructure and new innovative teaching methods. New innovative methods such as introduction of simulators, training software, online platforms, and the restriction of new training institutes are the other suggestions by some (7.14%).

4.4 Analysis for responses obtained for question 3

Question 3: Are the abilities and skills of the young Indian officers in par with the global expected standards?
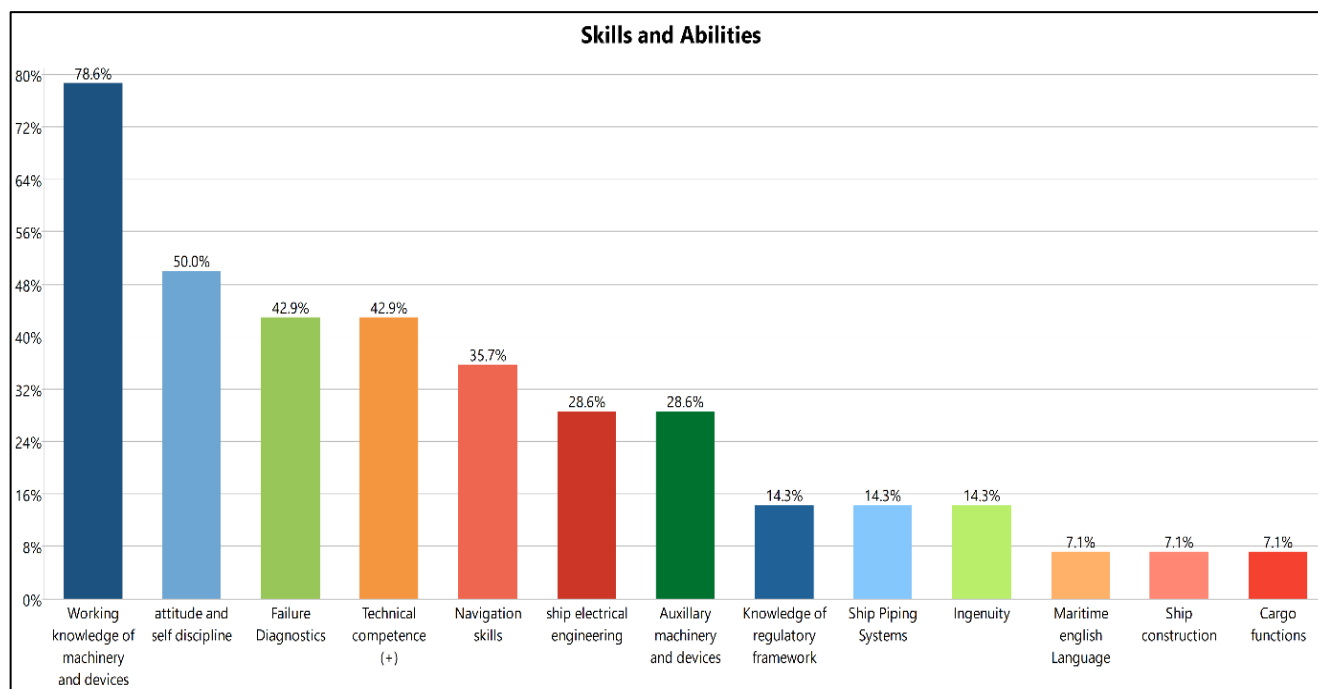

Figure 7: Themes from responses of question 3

Table 5 Themes from responses of question 3

	Documents	Percentage	Percentage (valid)
Working knowledge of machinery and devices	11	73.33	78.57
attitude and self-discipline	7	46.67	50.00
Failure Diagnostics	6	40.00	42.86
Technical competence (+)	6	40.00	42.86
Navigation skills	5	33.33	35.71
ship electrical engineering	4	26.67	28.57
Auxiliary machinery and devices	4	26.67	28.57
Knowledge of regulatory framework	2	13.33	14.29
Ship Piping Systems	2	13.33	14.29
Ingenuity	2	13.33	14.29
Maritime English Language	1	6.67	7.14
Ship construction	1	6.67	7.14

Cargo functions	1	6.67	7.14
Documents with code(s)	14	93.33	100.00
Documents without code(s)	1	6.67	-
Analyzed documents	15	100.00	-

All of them as shown in figure 7 and table 5 agree that the current abilities and skills of Indian seafarers are up to the expected global standards in maritime seafaring. It was found that current education and training mechanisms need to be upgraded. The respondents suggested that the following skills and abilities need particular attention.

4.5 Suggested Framework

The study suggests the following framework as shown in Figure 8 for implementing new patterns that will eventually help achieve the desired skills and abilities that the current maritime labour market demands. The first phase involves employing innovative training and teaching methods to modify the current curriculum and training mechanisms. Moreover, there should be an emphasis on new state-of-the art infrastructure to aid teaching. The next step is the organizing phase, in which the college should focus on hiring more knowledgeable and pioneering teachers by setting a standard benchmark. The teaching faculty should be proficient with the equipment to impart knowledge. Increased interaction between teachers and cadets through knowledge and experience sharing can enhance their understanding of the concepts. The next step is the actuating and controlling stage, where a government enterprise such as the Maritime Mercantile Department must address the following: monitoring shipboard and seaboard training; evaluating changes by a government body; deploying a new examination system; emphasising training on simulators and new software; introducing updated electrical engineering; providing blended learning; restricting the number of colleges and stopping crash courses by substandard colleges; and encouraging funding of the institutes to maintain their quality An independent body should continuously monitor the final stage, the evaluating phase, to ensure that trainees acquire practical knowledge of machinery and its parts, fault diagnostics, technical competence, and electrical engineering, all in line with the current and updated scenario. An independent body should assess and, if necessary, revise the knowledge of cargo functions, ship construction, navigation skills, and ship piping systems to align with current technical advancements. There should be no room for ingenuity while assessing these issues.
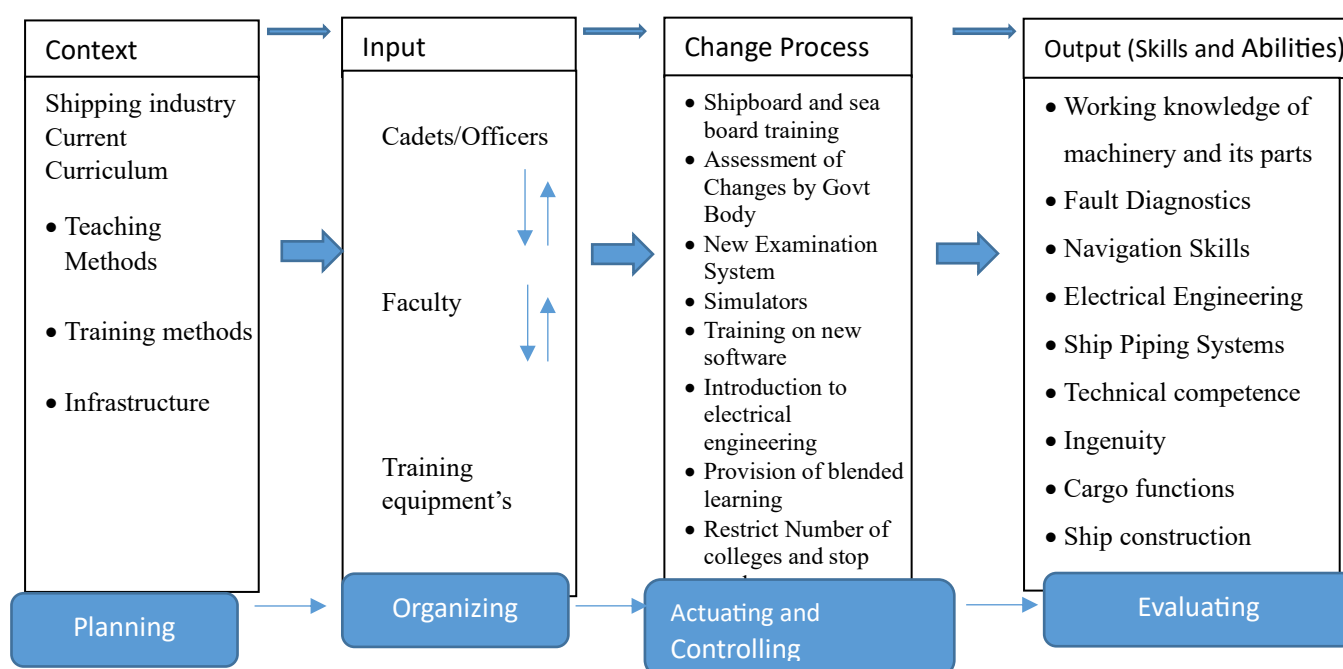

Figure 8. Suggested Framework

4.6 Motivations Factors for Retention of Seafarers.

Several respondents suggested that the retention of seafarers currently engaged in the profession is a huge challenge for stakeholders, such as shipping companies. This was a new finding during the interviews with the respondents. A seafarer with relevant experience is an asset to the organization. When the organization has made the employees content, by analyzing the motivation factors exclusive to that profession and pleasing later with them, it can pact a stanch commitment towards an organization(Saeed, 2018). Thus, from the responses, the main motivational factors for the retention of Indian seafarers are:

- Salary
- Well-equipped training centre
- Attitude or approach of the seafarer
- Adequate human resource management by a company
- Stakeholders attitude or support of the company
- Involvement of SCTW and its compliance
- Adoption of new technology

All the factors stated above, except the attitude of the seafarers, concern a shipping company and vary from one organization to another. The attitude of the seafarers mentioned by the respondents refers to their approach to the assigned tasks or duties. Seafaring a daring and tiresome job, where employees receive limited support from an organization to run the ship, unlike other shore-based professions. Therefore, the personal attitude of seafarers is also a crucial factor in their retention in the maritime labour market, and this could be a subject for further research in this context.
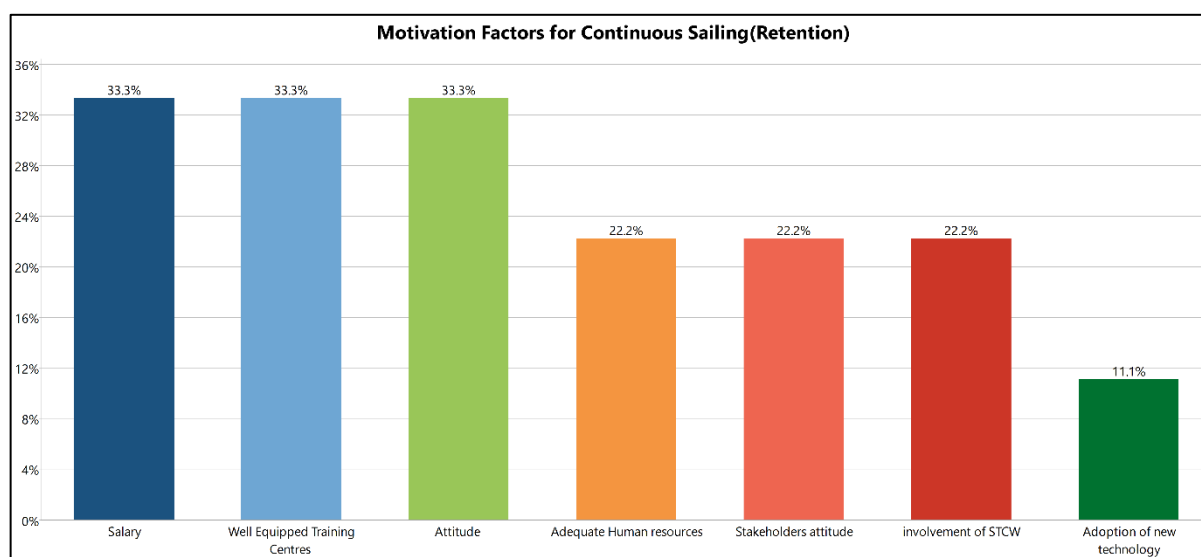

Figure 9 Motivational factors for retention of seafarers

Table 6 Motivational factors for retention of seafarers

	Documents	Percentage	Percentage (valid)
Salary	3	20.00	33.33
Well Equipped Training Centres	3	20.00	33.33
Attitude	3	20.00	33.33
Adequate Human resources	2	13.33	22.22
Stakeholders attitude	2	13.33	22.22
involvement of STCW	2	13.33	22.22
Adoption of new technology	1	6.67	11.11

DOCUMENTS with code(s)	9	60.00	100.00
DOCUMENTS without code(s)	6	40.00	-
ANALYZED DOCUMENTS	15	100.00	-

Table 7 MAXQDA maps shows two prominent clusters

Clusters	Key words
1	Salary, stakeholders' attitude and Human Resources
2	Involvement of STCW, Adoption of new technology, training Centres, Personal Attitude of sea farers

From table 6 and 7 , figure 9 and 10, the MAXQDA Map shows that stakeholder attitudes lead to seafarers' personal attitudes. Both salary and availability of human resources or manpower are driven by stakeholder (owner of the ship or the shipping company) attitudes, which in turn lead to the personal attitudes of seafarers. The map, in turn, shows that personal attitude is also influenced by the adoption of new technology, training centers, and compliance with STCW or the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (International Maritime organisation, 2010).
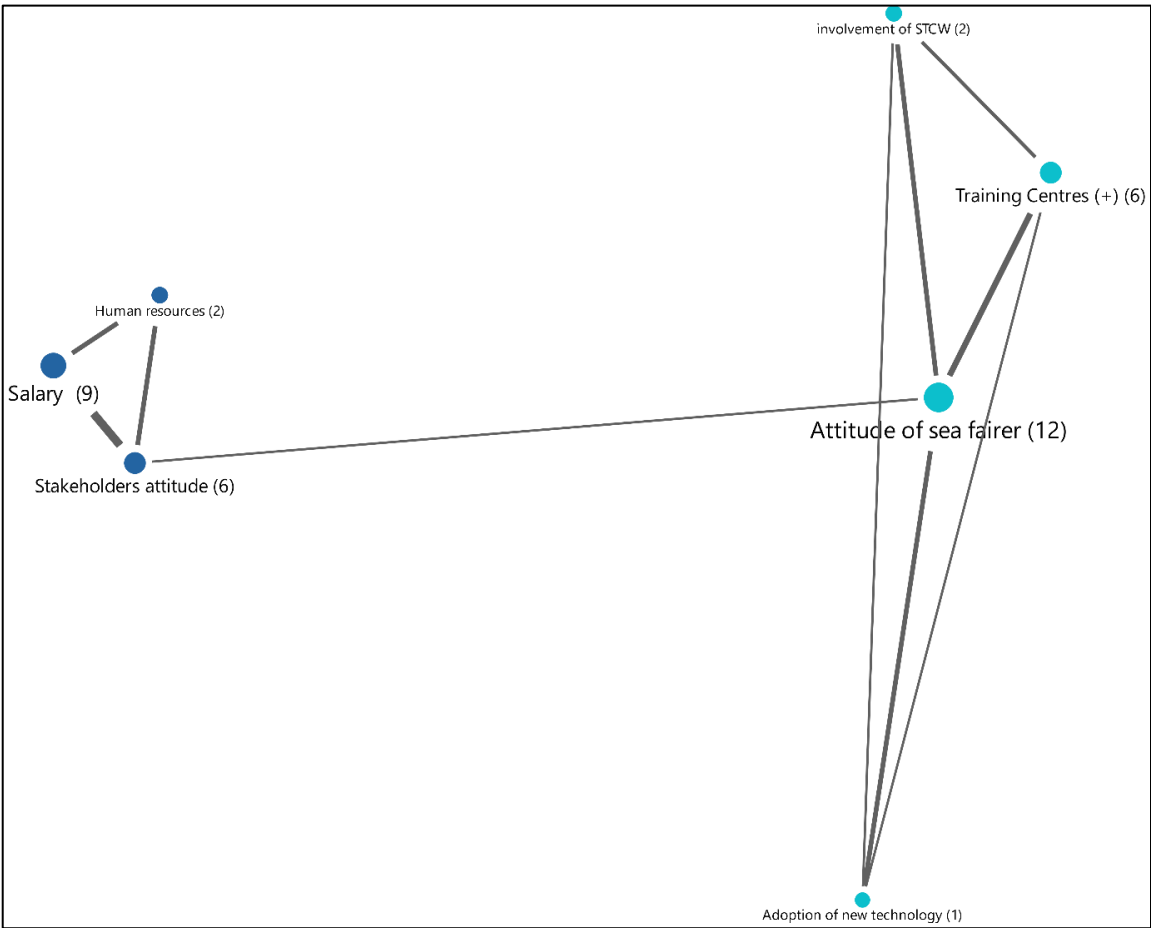

Figure 10 Clusters of themes evolved

4. Conclusion

Impending technological advancement in the maritime sector in recent times demands a comprehensive study of the competency and skills of seafarers to meet the future shortage of skilled maritime labor. This should include the competency required for trainers in maritime institutes as well as a mandatory requirement for resources and facilities available in them (Baum-Talmor and Kitada, 2022). Most of the responses have suggested that there needs to be further institutional support with regard to the seafarer's skill development and training, with corresponding regulatory and review mechanisms from the government (Shahbakhsh et al., 2022). This paper intends to cover several gaps related to the assessment of Indian seafarers' abilities and skills, in addition to studying the challenges faced in achieving their desired competency to sustain in the global maritime labor market.

In spite of grave efforts to get interviews with more respondents, the study was constrained to limited participants due to their concern of being in the limelight and of the pain of obtaining NOC (No Objection Certificate) for an interview from an organization, although confidentiality was guaranteed by the authors. The study was conducted solely to analyze the theme concerning the issue, only through management-level officers and engineers as they have first-hand sailing experience with current young officers, whose satisfying appraisal would be a benchmark for further employability and for promotion with a shipping company. The outcome of this study is expected to be useful for stakeholders in the Indian shipping industry, such as the government of India, maritime training institutes, and shipping companies employing Indian seafarers, when reviewing regulatory changes in the training and education of seafarers. This study makes the following recommendations based on the outcome of the analysis:

- the current maritime education system should incorporate updated syllabus and innovative modern teaching methods, Training institutes with poor infrastructure, lack of equipment, and faculty for trainingshould be upgraded, along with restrictions on opening new institutes.
- There should be a particular focus on new training patterns for seafarers, with regard to the current technical and industrial advancement in the maritime sector.
- Stakeholders should consider employing different factors of motivation as a means for retention of the skilled maritime workforce.

Conflict of Interest declaration: The authors declare that they have NO affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

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