

Exploring possible content and structure of a quality maritime master programme in Denmark

Jens Brauchli Jensen^{1, *}

¹ Svendborg International Maritime Academy (SIMAC), Denmark

* Corresponding author: jbj@simac.dk; Tel.: +45-72-215-691

Abstract: The growing need for highly educated individuals in the maritime sector in Denmark is contrasted by the fact that maritime education in Denmark is mostly represented by programmes at the professional bachelor level and lower. Denmark is historically a seafaring nation with a large maritime sector consisting of shipping companies, repair yards, ports, brokers, and the support industry. Comparable countries all provide maritime educational programmes at a higher academic level. This study uses interview data from experts in the maritime sector to construct a theory explicating the influential elements when creating higher academic maritime education programmes. The methodology used is constructivist grounded theory, which results in a theory which includes seven aspects: barriers, broad and deep duality, maritime domain awareness, motivating circumstances, networking, non-maritime knowledge, and theory and praxis balance. While the study has been made in a Danish context, the results are likely to transfer well in a global context because of the focus on an in-depth understanding of the elements of the theory and their connections.

Keywords: maritime education; master programme; grounded theory; lifelong learning

1. Introduction

The maritime sector is an important part of the Danish economy and culture. Denmark's maritime cluster is often called "The Blue Denmark". The Blue Denmark employed more than 100,000 persons in 2020 and was responsible for 24.6 % of the total Danish exports of goods and services this year (COWI, 2022).

With a strong maritime history and tradition, one would expect the maritime field to be strongly represented in the educational system. While this might be true for Maritime Education and Training (MET), which is the more vocational part of the maritime education system. It is not the case for higher academic education. Limited possibilities for further education in the maritime field are affecting individuals and the maritime sector. The industry needs qualified employees, and maritime professionals need options to engage in further education. There is a need for more knowledge regarding the creation of maritime master programmes other than the usual mapping of competency needs in the industry.

This study aims to explore how maritime education in Denmark could be expanded to provide an option for those wishing further education in this field while meeting the workforce needs of The Blue Denmark. Further education should be a step up from the current MET level and become European Qualifications Framework (EQF) level 7. This need leads to the following research question:

How do experts envision a Maritime Master programme that could accommodate industry demand, academic standards, individual candidates' ambitions regarding content and structure, and the underlying principles for constructing such a programme?

The paper is structured as follows: In Section 2, a preliminary literature review is undertaken. The methodology is described in Section 3. Section 4 explains the analysis before the findings are presented in Section 5. A post-analysis literature review is then developed in Section 6 to qualify the discussion and conclusions drawn in Section 7.

2. Literature Review Section

The literature review for this study has been divided into a preliminary literature review and a post-analysis literature review. These two literature reviews serve distinct roles in the grounded theory method (GTM). Often it is recommended by classic grounded theorists (Glaser & Strauss, 1967) to delay the literature review until after the analysis, but in this study, a preliminary literature review was completed to provide the researcher with heightened theoretical sensitivity, as suggested by Charmaz (2014, pp. 306–309). Careful consideration was taken not to let the views of the existing literature to overshadow the theory emerging from the data. After the analysis and theory construction, the post-analysis literature review was completed to qualify the results and discuss them in light of existing research.

In the following, a brief summation of the pre-literature review is provided. The definition of “maritime” in the context of this paper is: “associated with the sea or waterways to the sea in relation to navigation, shipping, etc.” (Dictionary.com, n.d.), which is close to the definition used by The Blue Denmark. The literature, however, offers many ambiguous definitions, which makes it important to consider the respondents’ understanding of the concept.

Maritime education and training (MET) are often narrowly defined as the education and training of seafarers. Often, the emphasis is on meeting the global standard of competence provided by the International Maritime Organization (IMO) in the Standards of Training, Certification and Watchkeeping for Seafarers (STCW). In Denmark, MET is carried out by maritime education institutions, which are independent of universities and university colleges.

MET has undergone a transformation from being mostly vocational to become increasingly academic, thus awarding other degrees in addition to STCW certificates. The increased academisation of MET in Denmark has occurred parallel to the global trend in MET (Manuel, 2017). This trend is also found in the Danish education associated with other professions and semi-professions such as nursing, teaching, and pedagogy. The trend is closely related to the relationship between theory and praxis (Johansen & Frederiksen, 2013).

Acquiring competencies is a key outcome of education. The decision regarding which competencies graduates need is crucial and one with several stakeholders. Competency is a complex construct, Salman et al. (2020) suggest that competencies can be classified into sixteen distinct types, broadly divided into two aspects: visible or hard aspects of competence and hidden or soft aspects of competence.

3. Methodology

GTM was the main methodology for this study. GTM is a qualitative approach that constructs theory from empirical data while setting existing theories and discourse aside. This line of thinking fits very well with the scope of exploring how to construct a maritime master programme. Several scholars, such as Creswell & Poth (2018, p. 83) and Charmaz (2014, p. 344), recommend GTM for exploring processes. Creswell & Poth specifically mention developing an educational programme as a prime example of a suitable process.

The data was collected by interviewing experts from the field using a semi-structured interview guide. Additional data was gathered from selected maritime master programme information websites using web archiving. Interviews were recorded and transcribed verbatim using NVivo 20. Interview respondents were selected from the following criteria: (1) being part of the maritime industry or education, (2) having at least ten years professional or academic experience, (3) being an associate professor or part of management.

Table 1. Credentials of interview respondents

Respondent	Title	Field	Experience
A	Professor	Maritime education	1 year maritime, 10 years educational
B	Vice president	Maritime shore based	15 years maritime
C	Head of education	Maritime sea-based	4 years maritime, 12 years educational
D	Manager	Maritime shore based	12 years maritime
E	Professor	Maritime education	10 years maritime, 5 years educational
F	Project engineer	Industry	Unique*
G	Professor	Maritime education	3 years maritime, 18 years educational

*This respondent was snowball sampled as a part of the theoretical sampling process because of his unique insights into the concepts emerging in the analysis.

The respondents should also together represent a broad view of the maritime field, i.e., industry, education, shore-based, sea-based etc. Seven respondents were selected, and their key credentials are presented in (Table 1.) Programmes for web archiving were selected for their theoretical value to the concepts that emerged in the interview data and their geographical and cultural closeness to Denmark. The sampled programmes are listed in (Table 2.).

Table 2. Maritime programmes sampled.

Programme name	Institution(s)	Nationality
Maritime Management (MSc)	University of South-Eastern Norway (USN)	Norway
Maritime Management (MSc)	Chalmers University of Technology	Sweden
Maritime Engineering (MSc)	Nordic Five Tech*	Scandinavian
Maritime Affairs (MSc)	World Maritime University (WMU)	Sweden

*Alliance of the Nordic technical universities: Aalto University, Chalmers University of Technology, Technical University of Denmark, KTH Royal Institute of Technology and Norwegian University of Science and Technology

The sampling method of grounded theory is theoretical sampling. Theoretical sampling starts with a small sample that is analysed and then guides further sampling in an iterative process until theoretical saturation is achieved (Charmaz, 2014, Chapter 8). Theoretical saturation is achieved when no new properties or theoretical insights emerge from new samples.

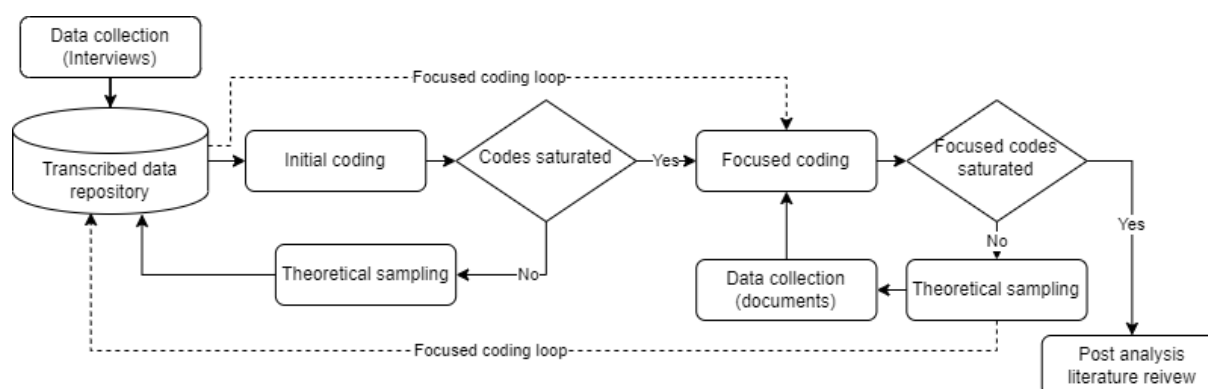


Figure 1. Phase 2 of Three Phase Research Framework

The data was collected and analysed using a modified version of the Three-Phase Research Framework (Yu & Smith, 2021) which systematically organises the process of theoretical sampling and helps determine when theoretical saturation is achieved. The framework was modified in Phase 2 (Figure 1.) because of practical considerations. Instead of doing a full analysis of each interview before conducting the next, a preliminary analysis was made to guide the process. All interview data were considered a repository that could be accessed during the full analysis to reach theoretical saturation.

All coding and memo writing was done using the computer-assisted qualitative data analysis software NVivo 20. The initial coding of interview transcripts was completed using a line-by-line approach to deconstruct the data sufficiently for the ideas to emerge that could escape in a more conventional thematic text condensation (Charmaz, 2014, p. 125). After the initial coding, focused coding was performed on the interview data. The focused codes were then enhanced using the data from the web-archived master programmes. The coding was completed using constant comparison method. The method can be broken into four steps “(1) comparing incidents applicable to each category, (2) integrating categories and their properties, (3) delimiting theory, and (4) writing theory.” (Glaser & Strauss, 1967, p. 105).

4. Analysis

The first round of open coding resulted in 38 codes which were mainly descriptive and coded for topics and themes. This result did not contain codes with sufficient theoretical depth because of their more descriptive nature. A second round of open coding was performed on three transcripts, producing 75 codes with much

higher analytic quality. Coding a few transcripts meticulously improves the understanding of the relevant material (Juul Kristensen & Hussain, 2019, p. 112).

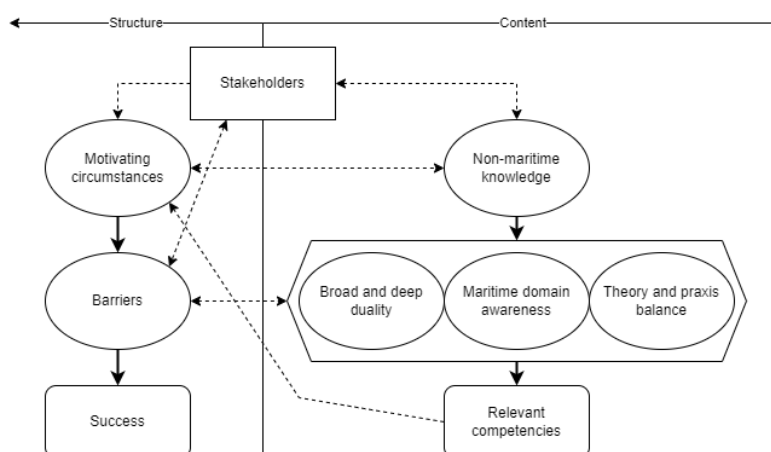
The codes from the second round of open coding were examined to see if any were suitable to become focused codes. The codes with a high appearance frequency in all tree transcripts were selected. Seven codes met this criterion, and two more were selected because of their explanatory value. The focused codes were formulated to include gerunds, emphasising the action or process. Each code was created by reviewing all coded text and the memos associated with each focused code using constant comparison on all levels. This process revealed that two of the codes were properties of other codes, ultimately resulting in a list of seven focused codes.

5. Findings

The focused codes found in the analysis were: Barriers, broad and deep duality, maritime domain awareness, motivating circumstances, networking, non-maritime knowledge and theory and praxis balance.

Barriers are circumstances that block the pursuit of a goal that, without the barrier, would be pursued. Broad and deep duality is the dialectic relationship between general and specialised competencies and the mastery level. Maritime domain awareness is the ability to apply non-maritime knowledge in a maritime context. Motivating circumstances are specific reasons for engaging in further education. Networking is creating and using interpersonal relations in the maritime field and becoming part of this practice. Non-maritime knowledge is knowledge from other disciplines that can become maritime by applying maritime domain awareness. The theory and praxis balance is the relationship between academic and explicit knowledge and vocational and tacit knowledge from both competency and epistemological perspectives.

The theory was constructed using the focused codes and their relations in the data. The theory is described in the following and illustrated in (Figure 2.).



Note. Solid arrows indicate a sequential move in the process. Punctured arrows indicate influence in either one or both directions. The bold black horizontal line indicates the border between the two core categories.

Figure 2. The Theoretical model

The contents of a master programme must contribute to the motivating circumstances. The contribution will be from the content offered (non-maritime knowledge) and from what the result is (relevant competencies). The content will be motivating because of economic value or personal interest. For all stakeholders to be motivated by content, it must strike several balances, most importantly the balance between a broad selection of subject matter while offering deep understandings in some areas. The balance must also be kept between theory and praxis to ensure a programme that meets all stakeholder expectations in a maritime context and the academic level of a master programme. Lastly, elusive maritime domain awareness must be systematically integrated into the program for every non-maritime knowledge subject.

The structure of a master programme revolves around removing barriers for stakeholders. If stakeholders are motivated by the content, only the barriers stand in the way of success. If the motivation is high, not all barriers must be removed. Removing some barriers can be costly, which may create new economic barriers. This problem calls for careful structure planning and stakeholder characteristics exploration.

Above these two dimensions the aspect of networking is hovering, which enables the program but is also a desired outcome of it and a valued competency or asset.

6. Post-analysis Literature Review

The motivations for seafarers to move from a seagoing career to one ashore can be psychosocial or structural (Haka et al., 2011). Haka argues that the psychosocial aspects are the main influence for staying at sea and going ashore. One of the largest motivations for leaving a seafaring career is the work/home balance (Caesar et al., 2021). It is also found that the salary plateau after four to six years of seafaring can contribute to the wish to leave. A major motivation for students and a major selling point for a maritime programme is the possibility of growing a network in the field. Interpersonal networks are very important to succeed in making a career. They are listed by Lau and Ng (2015) as one of the most important motivational factors for students attending maritime undergraduate and postgraduate programmes in Hong Kong.

The barriers for seafarers moving ashore can be summarised as four concepts (Barnett et al., 2006). Learned helplessness, progression from rating to officer, lack of appropriate qualifications and lack of opportunity. Of these concepts, the lack of appropriate qualifications is interesting in relation to a master's programme. Barnett et al. (2006) also list some reasons seafarers stay at sea. These reasons can easily be translated into barriers to moving ashore or engaging in education ashore. A seafarer's lifestyle and a high salary are mentioned as top factors.

The competence profile that satisfies students, industry and universities take is difficult to establish. Using industry-perceived needs as a guide leads to competencies related to operations and projects. The competence profile needed can be expressed as a T where the horizontal line represents general knowledge and the vertical line specialised competencies (Akademiet for de tekniske uddannelser, 2011). The competence profile tie into the theory and praxis balance which by some are seen as a vocational and academic division. Several studies describe this divide in upper secondary education (Halliday, 2000; Jaik, 2020; Nylund et al., 2017, 2018). The conflict also exists in higher education because of the pressure exerted by policymakers and neo-liberal market economy thinking (Rasmussen, 2020). However, some scholars argue that the tension in such a division can be harnessed and turned into a resource (Bartunek & Rynes, 2014).

7. Discussion and Conclusion

In the following the elements of the theory is discussed. The main motivating factor is the content of the programme, making it imperative to get right. This result aligns with other studies (Haka et al., 2011; Ng et al., 2009, 2011). Three factors play a role in transforming non-maritime knowledge into relevant competencies. Of these, maritime domain awareness is critical for resulting competencies to be relevant. Theory and Praxis must be both a motivator and a barrier depending on the balance struck. Broad and deep duality carries the same dialectic dynamic. It is striking the right balance in these areas that is imperative for success. The range of the specific content is wide, emphasising more on keeping content on a level that can foster deep understanding and ensure the vertical line in the T-profile. The horizontal line in the T is the knowledge for developing maritime domain awareness Content should be balanced carefully between theory and praxis, harnessing the strength of the tension between these.

Barriers are also a central element in the theory due to the weight of this topic in the data. Often the interview respondents spoke at length about specific barriers and their possible removal, often aligning with the concepts discussed by Barnett et al. (2006).

Some principles can be established. The first principle is to realise that a series of balances must be satisfied to create a successful programme. One must see these balances from the perspective of all stakeholders to get them right. Motivational circumstances must be created, and barriers removed for all stakeholders by adjusting content and structure. This theory and the focused codes should be regarded as the language for describing and explaining maritime education's creation process and help spark creative thinking. The complexity of the education field makes it beneficial to have such language to put the topic into perspective to the vast number of quantitative studies mapping industry competency needs.

References

- [1] Akademiet for de tekniske uddannelser. (2011). *De maritime industriers behov samt engagement i forhold til fremtidens maritime ingeniøruddannelse*. <https://atv.dk/udgivelser-viden/fremtidens-maritime-ingeniøruddannelse>
- [2] Barnett, M., Gatfield, D., Overgaard, B., Pekcan, C., & Graveson, A. (2006). Barriers to progress or windows of opportunity? A study in career path mapping in the maritime industries. *WMU Journal of Maritime Affairs*, 5(2), 127–142. <https://doi.org/10.1007/BF03195100>
- [3] Bartunek, J. M., & Rynes, S. L. (2014). Academics and Practitioners Are Alike and Unlike: The Paradoxes of Academic–Practitioner Relationships. *Journal of Management*, 40(5), 1181–1201. <https://doi.org/10.1177/0149206314529160>
- [4] Caesar, L. D., Cahoon, S., Fei, J., & Sallah, C. A. (2021). Exploring the antecedents of high mobility among ship officers: Empirical evidence from Australia. *Maritime Policy & Management*, 48(1), 109–128. <https://doi.org/10.1080/03088839.2020.1762012>
- [5] Charmaz, K. (2014). *Constructing grounded theory* (2. ed). SAGE.
- [6] COWI. (2022). *Beskæftigelse og produktion i Det Blå Danmark, 2021*. Danish maritime authorities. <https://www.soefartsstyrelsen.dk/Media/637859509524592301/Besk%C3%A6ftigelse%20og%20produktion%20i%20Det%20Bl%C3%A5%20Danmark%202021.pdf>
- [7] Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry & research design: Choosing among five approaches* (Fourth edition, international student edition). SAGE.
- [8] Dictionary.com. (n.d.). *Maritime*. www.Dictionary.Com. Retrieved 16 April 2023, from <https://www.dictionary.com/browse/maritime>
- [9] Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research* (5. paperback print). Aldine Transaction.
- [10] Haka, M., Borch, D. F., Jensen, C., & Leppin, A. (2011). Should I stay or should I go? Motivational profiles of Danish seafaring officers and non-officers. *International Maritime Health*, 62(1), 20–30.
- [11] Halliday, J. (2000). Critical thinking and the academic vocational divide. *The Curriculum Journal*, 11(2), 159–175. <https://doi.org/10.1080/09585170050045182>
- [12] Jaik, K. (2020). Brain drain from vocational to academic education at upper-secondary level? An empirical analysis for Switzerland. *Empirical Research in Vocational Education and Training*, 12(1), 10. <https://doi.org/10.1186/s40461-020-00095-8>
- [13] Johansen, M. B., & Frederiksen, L. L. (2013). Teori og praksis i de danske professionsuddannelser. *Nordisk Barnehageforskning*, 6. <https://doi.org/10.7577/nbf.578>
- [14] Juul Kristensen, C., & Hussain, M. A. (2019). *Metoder i samfundsvidenskaberne*. Samfundslitteratur.
- [15] Lau, Y., & Ng, A. K. Y. (2015). The motivations and expectations of students pursuing maritime education. *WMU Journal of Maritime Affairs*, 14(2), 313–331. <https://doi.org/10.1007/s13437-015-0075-3>
- [16] Manuel, M. E. (2017). Vocational and academic approaches to maritime education and training (MET): Trends, challenges and opportunities. *WMU Journal of Maritime Affairs*, 16(3), 473–483. <https://doi.org/10.1007/s13437-017-0130-3>
- [17] Ng, A. K. Y., Koo, A. C., & Jarrod Ho, W. C. (2009). The motivations and added values of embarking on postgraduate professional education: Evidences from the maritime industry. *Transport Policy*, 16(5), 251–258. <https://doi.org/10.1016/j.tranpol.2009.08.004>
- [18] Ng, A. K. Y., Koo, A. C., & Pallis, A. A. (2011). Professionalization of the shipping industry via postgraduate education. *Ocean & Coastal Management*, 54(5), 364–373. <https://doi.org/10.1016/j.ocecoaman.2010.10.031>
- [19] Nylund, M., Rosvall, P.-Å., Eiríksdóttir, E., Holm, A.-S., Isopahkala-Bouret, U., Niemi, A.-M., & Ragnarsdóttir, G. (2018). The academic–vocational divide in three Nordic countries: Implications for social class and gender. *Education Inquiry*, 9(1), 97–121. <https://doi.org/10.1080/20004508.2018.1424490>
- [20] Nylund, M., Rosvall, P.-Å., & Ledman, K. (2017). The vocational–academic divide in neoliberal upper secondary curricula: The Swedish case. *Journal of Education Policy*, 32(6), 788–808. <https://doi.org/10.1080/02680939.2017.1318455>
- [21] Rasmussen, P. (2020). Universiteterne på vej—Hvorhen? *Dansk pædagogisk tidsskrift, TEMA#1*, 9–22.
- [22] Salman, M., Ganie, S. A., & Saleem, I. (2020). The concept of competence: A thematic review and discussion. *European Journal of Training and Development*, 44(6/7), 717–742. <https://doi.org/10.1108/EJTD-10-2019-0171>
- [23] Yu, M., & Smith, S. M. (2021). Grounded Theory: A Guide for a New Generation of Researchers. *International Journal of Doctoral Studies*, 16, 553–568. <https://doi.org/10.28945/4836>