

## Meeting Stakeholders' Interests in Developing a Bachelor Programme in Nautical Studies

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**Abstract:** This paper deals with the question how to meet various stakeholders' interests in developing a new Bachelor programme in Nautical Studies. The relevant international, European and national administrative requirements are reviewed. Furthermore the interests of potential employers and graduates from a Bachelor programme in Nautical Studies are discussed. The paper is based on a real-world case at the Centre of Maritime Studies at Hochschule Bremen (University of Applied Sciences), Germany and refers to its competing specific environment. Finally, as a result of the discussion, the chosen structure and content of the Bachelor programme in Nautical Studies is presented.

**Keywords:** Bachelor programme in Nautical Studies, Bologna Process, STCW-Convention, Stakeholder Approach, Shore Based Employment, Accreditation

## 1. INTRODUCTION

Decisions on how to design a new study programme generally have to take into account a wide range of different interests and market requirements. This is quite evident in the academic field of Nautical Studies. This paper deals with the question how to meet various stakeholders' interests in developing a new Bachelor programme in Nautical Studies. It is based on a real-world case at the University of Applied Sciences Bremen, Germany where the existing course in Nautical Studies (German “Diplom-Wirtschaftsingenieur für Seeverkehr”) had to be totally redesigned as a result of the introduction of Bachelor and Master programmes in German higher education institutions.

The first section reviews various administrative requirements for developing a new programme in Nautical Studies. First, it discusses the supranational framework (STCW – International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, Quality Certification etc.) as well as the European framework (i.e. Bologna Requirements, EMSA – European Maritime Safety Agency). Next, national requirements are elaborated for both the STCW related parts of the study programme and its general academic accreditation. Additional requirements are also identified at both federal state and university levels. Section two discusses, with the help of expert interviews, the interests of potential employers of graduates from a Bachelor programme in Nautical Studies. These employers include, among others, ship operators, ship owners, ship managers, institutions from the field of maritime administration, academies, classification societies, marine insurance companies and other members of the maritime sector. This labour-market related discussion is enhanced by looking also at the interests of potential students. Here, the different possible entry levels into an academic Nautical Study programme have to be analysed. Section three focuses on competing national and international Nautical Study programmes. In section four the German system of accreditation is discussed. The final section summarises the findings of the paper and presents, as a result of the discussion, the chosen structure and content of the Bachelor programme in Nautical Studies at the University of Applied Sciences Bremen.

## 2. COMPETING PROGRAMMES

Before developing a new programme of nautical studies it will be prudent to conduct a market study to ascertain what the competition is offering. From the perspective of the Centre of Maritime Studies at Hochschule Bremen, the competition is seen as German universities and colleges, and other international universities in close vicinity, that offer nautical study programmes

### 2.1 *Non-Universities*

In Germany there are four colleges offering STCW A II/2 related study programmes: Fachschule für Seefahrt Flensburg, Fachschule Seefahrt Leer, Fachschule Seefahrt Rostock-Warnemünde and Staatliche Seefahrtsschule Cuxhaven.

Before entering college a student has to complete a three year training period as ship mechanic (AB deck and engine) or alternatively a three year programme as “Schiffsbetriebstechnischer Assistent” (assistant on ship’s operation technology). The two year study programme at all four colleges embraces both general subjects (i.e. mathematics,

physics, chemistry, German and English language) and subjects covering the STCW A II/2 requirements. Students are taught by college instructors who usually also are qualified master mariners. The nautical programmes offered are harmonized between the relevant state departments of education. Consequently, programme differentiation is challenging.

## **2.2 German Universities**

In Germany there are five campuses offering programmes in Nautical Studies. From West to East there are: Leer (Hochschule Emden/Leer), Elsfleth (Jade Hochschule), Bremen (Centre of Maritime Studies at Hochschule Bremen), Flensburg (Fachhochschule Flensburg) and Warnemünde (Hochschule Wismar). All have a long tradition in maritime training. For example, Bremen School of Navigation, being one of the predecessors of Hochschule Bremen, was founded in the year 1799. Today, all German nautical campuses belong to Universities of Applied Sciences. While education is scientifically based, it retains a strong practical focus and is highly applications oriented. Professors at such institutions are required to have both an academic background and several years of non-university work experience in a subject related position [1]. As of January 2011 there were 1,371 students enrolled in German Nautical Study programmes.

All competing German Nautical Study programmes embrace eight semesters, including 52 weeks seafaring practice in line with the Training Record Book for Deck Cadets. Taking into account that most of the content of Nautical Study programmes is more or less determined by the STCW regulations, there is very little room for differentiation. For example, Leer offers, in addition to the core-curriculum, modules covering the field of technical and natural sciences (especially ship technology) whereas Flensburg puts a special emphasis on supply chain management and logistics.

## **2.3 International Universities**

Other universities emphasize the following subjects in addition to general navigational studies:

- Faculty of Science and Technology, University of Plymouth: Opportunity to acquire the skills required to operate in the offshore surveying industry and the offshore seismic industry.
- Antwerp Maritime Academy: Offers, in response to the growing demand from maritime companies (e.g. merchant marine, towing and dredging companies) and official authorities (e.g. pilotage services) for external nautical training, modules including: “All the Principles Concerning ‘Salvage’”, “Introduction to Hydrography” and “Flags Etiquette”.
- Netherlands Maritime University, Rotterdam: Offers “Inland Waterways and Water Transport” and “The Business of Shipbuilding Sale and Purchase”. This expansion of the educational frame is a reaction to the fact that mariners often change their profession and search for employment ashore.

### 3. MARKET REQUIREMENTS

#### 3.1 *Maritime Cluster Interests*

##### 3.1.1 *Ship Owners*

In 2010 German ship-owners owned some 1.742 containerships of more than 1.000 gross tons (GT) representing 37% of the world's containership fleet. With an average age of approximately 10 years, containerships represent the youngest segment of the shipping industry. During spring 2010 a German ship owner, the Hamburg based Reederei Offen, assumed ownership of CPO Savona with a capacity of more than 14.000 TEU [2]. These examples demonstrate that German ship owners operate a fleet of state of the art vessels.

In addition to having competent masters able to manage complex operations on board sophisticated ships, highly qualified professionals are also required in shore management positions. Consequently, from a ship owner's point of view nautical study programmes have to exceed minimum STCW standards. Competences in leadership of intercultural teams, commercial thinking, complex thinking, decision making in critical situations, legal understanding and others are expected from successful applicants.

##### 3.1.2 *Maritime Administration*

Some maritime administrations and authorities operate vessels in order to fulfill their duties. Consequently, competent personnel are recruited from the pool of available seafarers. While special skills are often a part of on the job training, the educational foundation is supplied by Nautical Studies. Maritime authorities are not able to maintain their own training programmes on the scale of that being provided by Universities. The legal background regarding shipping is also part of Nautical Studies and the base for further specialization in administration matters. Authorities save large amounts of educational time and costs when they employ seafarers possessing an academic maritime background. Seafarers possessing advanced knowledge that students of other fields of studies cannot compete with. The understanding of the party on the opposite side is implemented in advance and has not to be trained and learnt.

##### 3.1.3 *Maritime Insurance*

Like maritime authorities, insurance companies are also motivated to have staff with maritime experience. Even if during the sea-going period one might not have experienced all the different areas of the shipping industry, the graduates of maritime universities are prepared for professional ship operations. Thus, the insurance sector expects nautical graduates to have broad maritime competence. This broad competence needs to be based on the practical experience of ship operations at sea and in port and is difficult to substitute with only theoretical studies. In order to save costs for external experts like surveyors in the area of maritime casualty investigation, maritime insurance companies expect employees to have sufficient understanding of maritime operations.

#### 3.2 *Potential students*

Numerous attempts have been made in Germany to systematically research the average time graduates from nautical study programmes serve onboard ships before they shift from ship to shore based occupations. While no valid results have been presented, it appears that the majority of students who join nautical degree programmes will stop sailing approximately four years after graduation.

Thus, students aim to qualify themselves not only as master mariners according to the provisions of the STCW Convention but also in those subject areas they deem appropriate for their future shore based field of occupation. Generally these are subjects providing knowledge and competences in maritime economics, maritime law, maritime insurance, maritime technology, maritime management and maritime technology.

Since within the nautical study programmes offered by the various universities and colleges there is hardly any variation possible on the contents of the STCW A II/2 related modules the future students will base their decision for their future place of study among others on criteria such as quality of the programmes, potential for specialization and of course available master programmes.

## 4. ADMINISTRATIVE REQUIREMENTS

In addition to the market requirements also a number of administrative requirements have to be taken into account. This section depicts the present situation from an international, a European and the German perspective.

### 4.1 *Supranational Framework*

#### 4.1.1 *STCW*

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (the STCW Convention) consists of general requirements and detailed regulations which are contained in its Annex 1, the so-called “STCW-Code”. “Part A of the Code is mandatory. The minimum standards of competence required for seagoing personnel are given in detail in a series of tables” [3]. The aim of the STCW Convention is the standardization of training and education of seafarers worldwide. All flag-states being party to the convention have to comply with its provisions. To reach this, they have to establish and maintain an administration for the supervision of training and educational facilities and certification systems and offices. “Parties are required to provide detailed information to IMO concerning administrative measures taken to ensure compliance with the Convention, education and training courses, certification procedures and other factors relevant to implementation” [4]. The latest update of the convention will enter into force on 1st January 2012. Major changes resulting from the so called “Manila amendments to the STCW Convention and Code” include, among others, a stronger focus on leadership and training, an enlargement of technical navigation, and clear obligations of the shipping company and senior personnel onboard for the proper conduct of practical training [5]. Germany is party to the STCW Convention and therefore the training and education of seafarers at “Hochschule Bremen” is determined by the regulations of STCW.

#### 4.1.2 *Quality Certification*

The 1995 revision of the STCW Convention introduced, for the first time, the necessity for IMO member states to introduce a quality assurance scheme within their MET (Maritime Education and Training) and certification system. Within the European Union, *Article 9* of the “DIRECTIVE 2001/25/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4th April 2001 on the minimum level of training of seafarers” obliges member states to ensure that standards of education and training required under the STCW Convention are achieved. For that reason, a continuous monitoring of training facilities and

personnel has to take place by means of a quality standards system. The application of those standards underlies internal quality assurance reviews. Member states have to carry out independent evaluations at least every five years. Independent means that persons without involvement in the delivery of education at that institution are assessing knowledge, understanding, skills and competence acquisition. The thereto related documentation has to be passed to the responsible institution inside the member state with the aim to correct deficiencies within a short period of time. No later than six months after evaluation the report has to be passed to the European Commission [6]. By means of regular EMSA inspections the European Commission supervises the enforcement of the respective EU directive. Also, the STCW requirements ask member states to deliver the same information to IMO.

#### 4.2 *European Framework: Bologna Requirements*

As a result of the so-called “Bologna Process”, the European Higher Education Area (EHEA) was officially launched in March 2010. The key elements of the EHEA are summarized in table 1.

**Table 1.** Areas of action of the Bologna Process on the path to the European Higher Education Area [7]

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|---|
| <ol style="list-style-type: none"><li>1. Adoption of a system of easily readable and comparable degrees, including the implementation of the European Diploma Supplement.</li><li>2. Adoption of a system essentially based on three cycles, undergraduate, graduate and doctoral.</li><li>3. Establishment of a system of credits.</li><li>4. Promotion of mobility.</li><li>5. Focus on Lifelong Learning.</li><li>6. Promotion of European co-operation in quality assurance.</li><li>7. Promotion of the European dimensions in Higher Education.</li><li>8. Inclusion of Higher Education Institutions and Students.</li><li>9. Promotion of the attractiveness of the European Higher Education Area.</li><li>10. Doctoral Studies and the synergy between the EHEA and the European Research Area (ERA).</li></ol> |
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For developing the new Bachelor programme in Nautical Studies at Hochschule Bremen, the first five areas of action mentioned in table 1 had to be especially considered: 1) The German Degree “Diplom-Wirtschaftsingenieur für Seeverkehr” was well established on the German labour market but not very well known outside the country. Nevertheless, this was never a big issue as all graduates received their STCW-management level certificate issued by the Federal department of transport in addition to the German university degree. It has to be mentioned that from the point of view of some applicants, for a certain period of time Bremen even attained a unique selling proposition for delivering the degree “Diplom-Wirtschaftsingenieur für Seeverkehr” after Leer, Elsfleth, Flensburg and Warnemünde had implemented their BSc-programmes. 2) In developing the new Bachelor programme it was important to enable the compatibility to consecutive Master programmes such as Maritime Management or Logistics. 3) Credit points in accordance with the European Credit Transfer System had to be allocated to all modules of the new Bachelor programme. 4) With more than 300 cooperation agreements with partner

universities all over the world and more than 60 international study courses, Hochschule Bremen as a whole is recognized for its international profile. However, in the past only a minority of nautical students opted for one or more semesters abroad. Thus, the task to enhance students' mobility was also high on the agenda of the curriculum developers. 5) Lifelong learning was also an issue in designing the curriculum as quite regularly graduates from nautical colleges ("Seefahrtsschulen") have to be integrated in the course of studies as they wish to achieve higher academic qualifications.

### **4.3 National Framework**

#### **4.3.1 "StAK"**

In Germany all aspects of STCW related maritime education and training is coordinated and harmonized by the "Ständige Arbeitsgemeinschaft der Küstenländer für das Seefahrtswesen" (StAK). Members of StAK are the Federal Government (party to the STCW Convention), the German Coastal States (Bremen, Hamburg, Lower-Saxony, Mecklenburg-Pomerania and Schleswig-Holstein) and the social partners (ship-owners association (VDR) and trade union (ver.di)). Since the end of 2010 the universities and colleges offering nautical and/or technical STCW related education can participate by means of one delegate from the "Bundesarbeitsgemeinschaft der Leiter der Ausbildungsstätten Seefahrt" (BALAS) with an observer status at the various StAK-meetings.

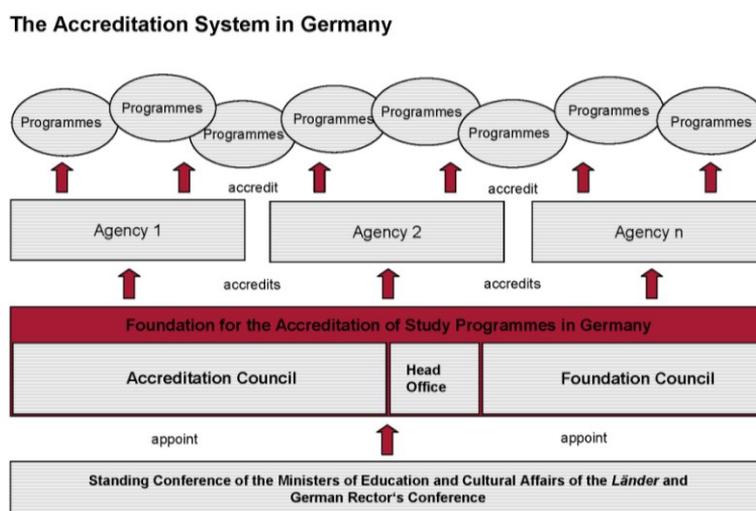
Due to the German Federal Constitution, where the Federal Government bears responsibility for foreign affairs and the State Governments have the principal responsibility for education (primary, secondary and higher education) [8], the introduction of the StAK became necessary in order to ensure a) that in Germany the different STCW related educational programmes meet the STCW requirements (Federal Governments interests) and b) that the STCW related programmes offered in the different German National States (Länder) do not vary much in quality and content in order to have an equal contribution of students and hence an equal share of public spending (State Governments interests).

#### **4.3.2 Ministry of Transport and Federal Maritime Agency**

On maritime transport matters at an international level and inside the European Union, the Federal Ministry of Transport, Building and Urban Development formulates and represents the position of the German government. Towards the International Maritime Organization (IMO), Germany seeks to play a major role in developing and updating international standards for the maritime shipping industry. Additionally, with respect to multilateral agreements, Germany has signed a number of bilateral shipping agreements facilitating maritime transport with selected countries of partnership [9]. The Ministry is the designated authority in Germany for the supervision of the entire maritime administration including MET. Many tasks are delegated to subordinated federal authorities such as the Federal Maritime Agency ("Bundesamt für Seeschifffahrt und Hydrographie"/BSH). Under the provisions of STCW it has several responsibilities. In addition to issuing certificates of competency the BSH assesses and certifies non-public training institutes offering training courses leading to certificates of proficiency (such as ship security officer or training according to STCW chapter 5).

### 4.3.3 Academic Accreditation

As a rule, all study programmes have to be accredited. The German accreditation system follows a decentralized approach (see figure 1) legally based on the Law for the establishment of the Foundation for the Accreditation of study programmes in Germany. Universities apply for the accreditation of their programmes directly to approved accreditation agencies. The programme to be accredited has to be in line with the criteria for the accreditation of study programmes, issued by the Accreditation Council and it has to follow the common structural guidelines of the Länder (federal states) in the Federal Republic of Germany. The peer-review principle is quite important in the process of accreditation and at least one site visit is conducted by a group of evaluators.



**Figure 1.** The Accreditation System in Germany [10].

### 4.4 Federal State Level Framework

Within the federal structure of Germany, educational tasks are primarily the responsibility of the federal states [11]. Since 1982 Hochschule Bremen has been one of four universities owned by the Federal State of Bremen. All sixteen German Federal States are keen to transform the study programmes of their universities into Bachelor-/Master structures in accordance with the Bologna requirements. The German Rectors' Conference regularly reports on the progress in implementing the two-tier study system in Germany. As per 1 September 2010, on average 81.9 percent of all study courses had been transformed, ranging from 98 percent in the Federal State of Niedersachsen to 64 percent in the Federal State of Saarland. The Federal State of Bremen, with a transformation rate of 89.5 percent, ranked seventh in that comparison [12].

The Bremen State Ministry of Education and Science allocates a certain fraction of the universities' budgets depending on the extent to which set objectives have been reached by the universities. The set of objectives embraces indicators such as number of graduates, number of international students, number of students graduating after the allotted number of semesters, third-party funds, and the number of study programmes in line with the Bologna system [13]. Thus, it becomes clear that the question to transform a study programme is not

mainly market driven, but also particularly influenced by controlling measures in the relation between the university and the State Ministry of Education and Science.

#### 4.5 University Requirements

When the two-tier study system was introduced at Hochschule Bremen, the relevant bodies decided to use this externally driven change as an internal opportunity to harmonize all study programmes at the university in terms of length of study, number of modules per semester, allocated credit points and related workload etc.. The main objectives of this harmonization were to enable more internal and external mobility of the students and to generate synergies between the different faculties, e.g. in order to encourage more interdisciplinary programmes. Figure 2 illustrates the result of the harmonization process. As a rule, the length of all Bachelor study courses has to be seven semesters with five modules per semester. Each module has a work load of 180 hours per semester divided into one third of contact hours and two thirds of students' self-learning time. Only in special cases will the presidential committee of the university accept Bachelor courses with a length of eight semesters, all other elements of the harmonized system are more or less unchangeable.

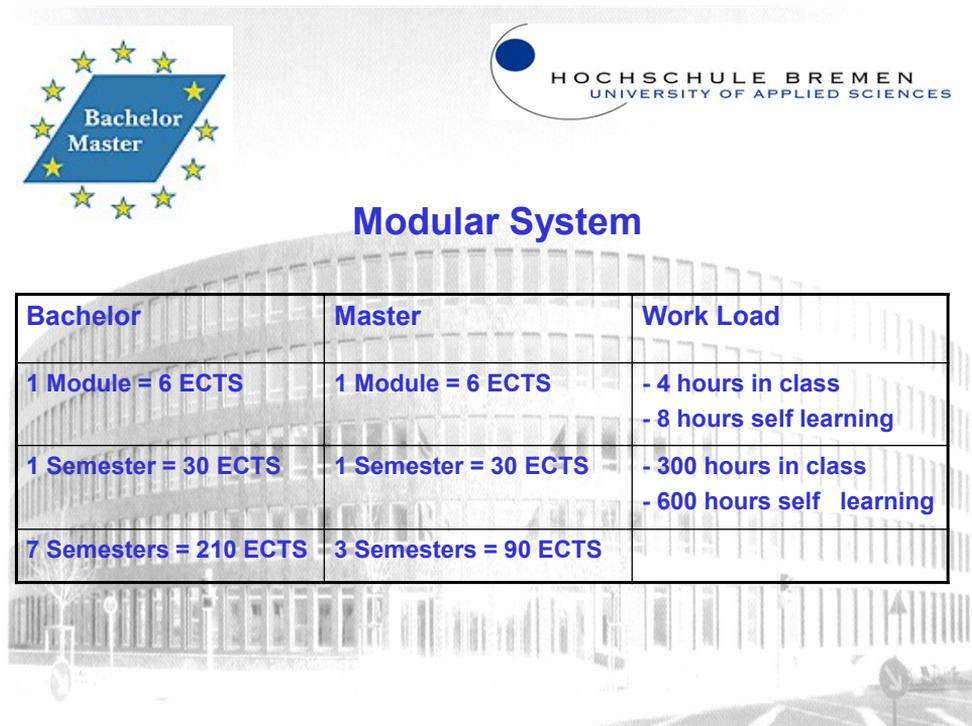


Figure 2. Two-tier study system at Hochschule Bremen [14].

Other challenges in developing the new study programme were the consideration of gender justice as well as the integration of diversity topics into the curriculum. Furthermore, the new programme in Nautical Studies was not allowed to need more

resources in terms of staff, simulator capacity, lecture rooms etc. than the existing programme.

## 5. ACCREDITATION

Programme accreditations aim to assess three interlinked levels: 1) educational objectives and learning outcomes, 2) input criteria such as resources, support processes or quality assurance and 3) outcome orientation, incl. feedback loops from employers and alumni. According to ASIIN (Akkreditierungsagentur für Studiengänge der Ingenieurwissenschaften, der Informatik, der Naturwissenschaften und der Mathematik e.V.), one of the German accreditation agencies “the accreditation procedure evaluates the logic and effectiveness of the educational process in a degree programme. The combination of the elements in the individual phases of the process and the relationship between the three phases – and especially between the objectives and their implementation – play a key role in the overall assessment of the accreditation procedure.” [15]. In the process of accreditation numerous criteria are checked. For example the appropriate name of the degree programme, entry requirements, accessibility for disabled students, qualifications of the teaching staff, research and publication record of the relevant university unit, the framework for examinations etc. The modular structure of the programme to be assessed is crucial. Thus, the description of modules require special attention and should among other criteria clearly specify the contents and target qualifications, the teaching formats, admission requirements, usability outside the study programme, students’ workload, credits and conditions for their award [16].

## 6. CONCLUSION

It has become evident that a wide range of different interests and market requirements as described in this paper lead to the necessity of making appropriate concessions in designing a study programme in Nautical Studies. Due to external constraints the freedom to develop a well differentiated curriculum is comparatively limited. Consequently, it was not possible to integrate some innovative approaches into the new programme in Nautical Studies at Hochschule Bremen. For example, it was discussed to facilitate the second practical semester for distance learning by means of computer based training. Furthermore, it was proposed to entirely restructure the existing German MET system where a Nautical Bachelor programme would lead to STCW operational level and a Nautical Master programme to the respective STCW management level certificate of competency.

Finally, it was decided to put special emphasis on: 1) A slot for students’ international mobility. 2) The ability for students to receive the certificate of competency for ratings forming part of the navigational watch prior to the second practical study period. 3) The introduction of a specialized module covering the assessment of the competences achieved over the course of the programme. 4) An STCW enrichment in maritime management. The stakeholders’ interests were among others reflected in permanent discussion with members of the advisory board of the Centre of Maritime Studies at Hochschule Bremen. The advisory board includes executives from shipping companies, port operators, ship owners’ associations, classification societies and MET.

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