Master Programme “Information and Electrical Engineering” for International Students at Hochschule Wismar: Theoretical Framework

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ABSTRACT

Hochschule Wismar, Germany, has been implementing Master programmes for international students since 1992. However, for most European universities, it is a rather new phenomenon. The purpose of the work is to analyse scientific literature on European higher education programmes for international students and to outline a theoretical framework of European higher education programmes for international students underpinning elaboration of new research question on master programmes for international engineering students. The research methodology comprises the study of the meaning of the key concepts of “framework”, “theoretical framework” and “international students”. Moreover, the logical chain of analysis is shown: theoretical framework → empirical study within a multicultural environment → conclusions. The case study research is applied. The empirical study was carried out at Hochschule Wismar, Germany in March 2017. Semi-structured interview served as the basis for data collection. The empirical findings allow complementing the elaborated theoretical framework consisting of the concepts on reasons for, language and impact of Master programme for international students with such a concept as European Credit Transfer System (ECTS). Directions of further research are proposed. The novel contribution of the paper is the newly formulated research question on master programmes for international students.

Keywords: Framework, Theoretical framework, International students, European Credit Transfer System (ECTS).
INTRODUCTION

European universities have recently introduced higher education programmes for international students. European universities identify international students as “a third-country national accepted by an establishment of higher education and admitted to the territory of a Member State to pursue as his/her main activity a full-time course of study leading to a higher education qualification recognized by the Member State, (...) which may cover a preparatory course prior to such education according to its national legislation” (Mayer, Yamamura, Schneider, & Müller, 2012). For comparison, foreign students are those students who are registered at a higher education institution outside the country of their nationality (Mayer, Yamamura, Schneider, & Müller, 2012). In Germany this includes both third-country nationals and nationals of EU and EFTA States (Mayer, Yamamura, Schneider, & Müller, 2012). Figure 1 demonstrates the relationship between the terms of students, foreign students and international students.

![Figure 1: The relationship between students, foreign students and international students.](image)

For international students, European higher education programmes in English are of particular interest. Table 1 shows a numerical availability of European higher education programmes in English in different years indicated by Wächtter and Maiworm (Wächtter, & Maiworm, 2014). It should be noted that in 2014, Germany offered 1030 higher education programmes taught in English.

| Year | Number of European higher education programmes in English |
|------|-----------------------------------------------------------|
| 2001 | 725                                                       |
| 2007 | 2389                                                      |
| 2014 | 8089                                                      |

80% of all higher education programmes taught in English in Europe are predominantly offered in the second cycle (Master level) (Wächtter, & Maiworm, 2014). Only 18% of master programmes taught in English in Europe are offered in the field of engineering, manufacturing and construction despite that demand in engineers is permanently growing as engineers play an important role in sustainability of knowledge-based economies. However, master programmes for international engineering students are a rather new phenomenon for most European universities that deliver engineering education. The purpose of the work is to analyse scientific literature on European higher education programmes for international students and to shape a theoretical framework of European higher education programmes for international students underpinning elaboration of new research question on master programmes for international engineering students. The methodology comprises the study of the meaning of the key concepts of “theoretical framework” and “international students”. Moreover, the logical chain of analysis is shown: theoretical framework → empirical study within a multicultural environment → conclusions. The case study research has
been applied as "case studies [...] are generalizable to theoretical propositions and not to populations or universes In doing a case study, your goal will be to generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization)" (Yin, 2003, p.10). Case study research is a qualitative research design (Kohlbacher, 2005). The empirical study was carried out at Hochschule Wismar, Germany in March 2017. The semi-structured interview was used for data collection. The collected data were processed via structuring and summarizing content analysis.

THEORETICAL FRAMEWORK

A framework means the specific viewpoint (Ahrens & Zaščeriniksa, 2014) on a phenomenon. In research, frameworks are differentiated into theoretical and conceptual as illustrated in Figure 2.

![Figure 2: Types of frameworks in research.](image)

A theoretical framework includes the combination of concepts together with their definitions as well as existing theory. In turn, as a concept is defined to be a verbal abstraction drawn from observation of a number of specific cases (Watt & van den Berg, 2002), a conceptual framework means the unity of concepts that are used for a particular study (Ahrens & Zaščeriniksa, 2014). Analysis of scientific works allow outlining such concepts in the field of European higher education programmes for international students as shown in Figure 3 as

- Reasons for emergence of European higher education programmes for international students (Mayer, Yamamura, Schneider, & Müller, 2012; Wächter & Maiworm, 2014; University of Oxford, 2015),
- Language proficiency and problems (Wächter & Maiworm, 2014),
- Impact of European higher education programmes for international students (Wächter & Maiworm, 2014).

![Figure 2: Concepts of theoretical framework on master programme for international students.](image)

Table 2 summarizes the results of theoretical analysis of concepts in the field of European higher education programmes for international students.

EMPIRICAL STUDY

The present part of the contribution demonstrates the design of the empirical study, results of the empirical study and findings of the study.
Table 2: Summary of theoretical analysis of concepts of European higher education programmes for international students

| Concept | Short summary of theoretical analysis |
|---------|-------------------------------------|
| Reasons | - Immigration to Germany for study purposes has increased in recent years (Mayer, Yamamura, Schneider, & Müller, 2012).  
- Germany aims to increase the number of international students studying at German universities by 17% over the next few years in order to increase their competitive advantage in business, science and industry, and to “gain long-term friends of Germany throughout the world”. (University of Oxford, 2015).  
- International engagement is increasingly research-focused (University of Oxford, 2015).  
- International students constitute a potential as highly qualified persons, both for Germany and for their countries of origin. Firstly, they aim to graduate in Germany and have prospects to constitute valuable human capital. Secondly, they learn German, obtain country-specific specialist knowledge and work experience making it easier for them to integrate into the German labour market. In addition, with their international contacts, knowledge of foreign languages and intercultural skills, they also help internationalise German industry and society. On the other hand, their qualifications and sociocultural skills are valuable for the economic, technological and social development of the countries of origin (Mayer, Yamamura, Schneider, & Müller, 2012).  
- Sharpening of the international profile of the institution (Wächter, & Maiworm, 2014). |
| Language | - The two most frequently stated reasons for European higher education programmes in English are student-oriented: a) to remove language obstacles for the enrolment of foreign students and b) to improve the international competences of domestic students (Wächter, & Maiworm, 2014).  
1. Language proficiency:  
- The English proficiency of students differs by subject area and study level. Students in engineering, manufacturing and construction as well as in sciences have some problems in learning in English. By level of study, the English proficiency of Master-level foreign students was reported to be higher than those in Bachelor programmes (Wächter, & Maiworm, 2014).  
- The English proficiency of academic staff involved in European higher education programmes in English continues to be perceived positively across Europe (Wächter, & Maiworm, 2014).  
2. Language problems:  
- The ‘heterogeneity’ in the command of English of the students in the classroom was viewed as a problem (Wächter, & Maiworm, 2014).  
- The main language-related challenge encountered by teaching staff is their ability (or the lack of it) to deal with such diversity in addition to their mastery of the language itself (Wächter, & Maiworm, 2014). |
| Impact | - An improved international profile/awareness of the institutions, the strengthening of cooperation with foreign partner universities/institutions (81%) and the improvement of assistance/guidance/advice for foreign students (71%) which includes the provision of information and services in English (Wächter, & Maiworm, 2014).  
- International students enhance the international exchange of knowledge, as well as intercultural skills and tolerance, this also increases the quality of the education on offer in Germany (Mayer, Yamamura, Schneider, & Müller, 2012). |
Design of the Case Study

The design of the empirical study comprises the purpose and question, sample and methodology of the present empirical study.

The guiding research question is as follows: What is theoretical framework applied to the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students?

The purpose of the empirical study is to analyze the theoretical framework of the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students. The empirical study was carried out in March 2017. It should be noted that the Master programme “Information and Electrical Engineering” at Hochschule Wismar involves the students from India only. However, the Master programme “Information and Electrical Engineering” is open for all the interested international students.

The exploratory type of the case study research has been applied (Zainal, 2007) in the present empirical study as case studies have an important function in generating new research questions, hypotheses and building theory (Kohlbacher, 2005). Exploratory case studies set to explore any phenomenon in the data which serves as a point of interest to the researcher (Zainal, 2007). The interpretive paradigm was used in the empirical study. The interpretive paradigm aims to understand other cultures, from the inside, and establishment of ethically sound relationships (Taylor & Medina, 2013). Interpretative paradigm is characterized by the researcher’s practical interest in the research question (Cohen, Manion & Morrison, 2003). The researcher is the interpreter.

The sample of the present empirical study was composed of one educator of the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students. The respondent was involved in the establishment, preparation and implementation of the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students from the very beginning. Only one respondent as a case for the study participated in the empirical study as a qualitative research design has been employed (Kohlbacher, 2005). The qualitatively oriented empirical study allows the construction of only few cases (Mayring, 2004). Moreover, the cases themselves are not of interest, only the conclusions and transfers we can draw from these respondents (Flyvbjerg, 2006). Selecting the cases for the case study comprises use of information-oriented sampling, as opposed to random sampling (Flyvbjerg, 2006). This is because an average case is often not the richest in information. In addition, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur (Flyvbjerg, 2006). Random samples emphasizing representativeness will seldom be able to produce this kind of insight; it is more appropriate to select some few cases chosen for their validity (Flyvbjerg, 2006). The semi-structured interview implied the following question: What for is the Master programme “Information and Electrical Engineering” for international students needed at Hochschule Wismar? The collected data were processed via structuring and summarizing content analysis focused on the concepts of theoretical framework on master programme for international students such as reasons, language and impact.

Results of the Case Study

First, the respondent disclosed the reasons for the emergence of the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students. The respondent highlighted that both sides, namely Hochschule Wismar and Indian students, had reasons for their engagement with the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students. The respondent outlined such reasons of Hochschule Wismar to establish the Master programme “Information and Electrical Engineering” for international students as lack of domestic students interested in engineering studies. In turn, in
India there is a discrepancy between universities’ capacities in admitting students and total number of prospective students’ applications: the number of prospective students’ applications is much higher than universities’ capacities in admitting students. The rest prospective students are deprived of having access to higher education. Then, the respondent revealed that English is the second official language in India and, consequently, language of instruction in universities in India. Therefore, English proficiency of prospective students from India was appropriate for starting the Master programme “Information and Electrical Engineering” in English at Hochschule Wismar. However, there was a requirement of proof of English language knowledge such as IELTS with 6.0 or TOEFL with 550 scores or PTE Academic test with 50 scores. Considering the issue of impact of European higher education programmes for international students on the development of university, the respondent emphasized that the Master programme promotes cooperation between Germany and India in general, and Hochschule Wismar and partner universities in India in particular. The Master programme strengthens the awareness and profile of Hochschule Wismar by attracting the attention of a wider public: students, their parents, friends, employers, etc. The presence of Indian students at Hochschule Wismar promotes also mutual understanding as well as educational and cultural exchange between the Indian and German students. Finally, the respondent pointed that the Master degree programme “Information and Electrical Engineering” at Hochschule Wismar for international students have a standard period of 1.5 years. However, due to the different systems of qualification recognition (European Credit Transfer System (ECTS) in Europe including Germany and point system in India) in higher education, during the conversion of points the students received in India into the ECTS grade, Indian students discover that they lack an appropriate number of European Credit Transfer System (ECTS) for starting the Master programme “Information and Electrical Engineering” in English at Hochschule Wismar.

Findings of the Case Study

Summarizing content analysis (Mayring, 2004) of the data demonstrates that the respondent described a theoretical framework applied to the Master programme “Information and Electrical Engineering” at Hochschule Wismar for international students that consists of such concepts as
- Reasons for emergence of European higher education programmes for international students (Mayer, Yamamura, Schneider, & Müller, 2012; Wächter & Maiworm, 2014; University of Oxford, 2015),
- Language proficiency and problems (Wächter & Maiworm, 2014),
- Impact of European higher education programmes for international students (Wächter & Maiworm, 2014) and
- Qualification recognition (European Credit Transfer System (ECTS) in Europe.

The finding of the systems of qualification recognition (European Credit Transfer System (ECTS) in Europe including Germany complements the theoretical framework on master programme for international students with the concept of European Credit Transfer System (ECTS) as reflected in Figure 3.

![Figure 3: Complemented concepts of theoretical framework on Master programme for international students.](image_url)
CONCLUSIONS

The theoretical findings allow outlining the theoretical framework on master programme for international students that includes such concepts as
- Reasons for emergence of European higher education programmes for international students (Mayer, Yamamura, Schneider, & Müller, 2012; Wächter & Maiworm, 2014; University of Oxford, 2015),
- Language proficiency and problems (Wächter & Maiworm, 2014),
- Impact of European higher education programmes for international students (Wächter & Maiworm, 2014).

The findings of the empirical study allow complementing the elaborated theoretical framework on master programme for international students with the concept of Qualification recognition (European Credit Transfer System (ECTS) in Europe including Germany (European Commission, 2015).

The findings of the present research allow drawing conclusions that the theoretical framework on master programme for international students comprises such concepts as
- Reasons for emergence of European higher education programmes for international students (Mayer, Yamamura, Schneider, & Müller, 2012; Wächter & Maiworm, 2014; University of Oxford, 2015),
- Language proficiency and problems (Wächter & Maiworm, 2014),
- Impact of European higher education programmes for international students (Wächter & Maiworm, 2014), and
- Qualification recognition (European Credit Transfer System (ECTS) in Europe including Germany (European Commission, 2015).

Further on, validity and reliability of the research results have been provided by involving other researchers into several stages of the conducted research. External validity has been revealed by international co-operation such as
- working out the present contribution in co-operation with international colleagues,
- assessment of the present research by international colleagues on the basis of co-operation between universities, and
- use of individual consultations given by the Western researchers.

Therein, the researchers’ positive external evaluation of the research of the present contribution validates the findings of the present research.

The following new research question has been formulated: What is conceptual framework of Master programmes for international students?

The present research has limitations. The inter-connections framework and theoretical framework have been set. Another limitation is the empirical study conducted by involving only one respondent. Nevertheless, the results of the research, namely the elaborated theoretical framework on master programme for international students, may be used as a basis of design and implementation of master programmes for international students in other institutions. If the results of other institutions had been available for analysis, different results could have been attained. There is a possibility to continue the study.

Further research tends to analyse conceptual framework of Master programmes for international students. The search for relevant methods, tools and techniques for evaluation of both theoretical and conceptual frameworks on Master programmes for international students is proposed. Further research tends to implement empirical studies in other respondents’ groups. A comparative research and studies of other countries could be carried out.
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