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I-BEE-VR

Immersive Business and Engineering English in Virtual Reality: A Tool for the Sustainable Mobility of the Skilled Workforce in the EU

WP 2: Analyses

O1: Evaluation of the existing curricula

Final Evaluation Report

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Table of Contents

1 Introduction

In general, engineering education in the partner states is offered in a range of higher education institutions, including general universities, technical and polytechnical universities, universities of applied science, state higher vocational schools or (grandes) écoles. Differences in institutions are related to the weighting of research and practice-oriented teaching, the latter featuring more strongly in universities of applied science and state higher vocational schools. There are further differences in prestige attached to certain institutions, such as the grandes écoles and the top-tier technical universities in Spain and Turkey. Both private and state-run institutions offer engineering education. All main types of engineering are reflected in the teaching in the member countries, with some local specifications (e.g. marine engineering).

Country	Technical University	General university	Ecole	Grande Ecole	University of Applied Science/ State Higher Vocational School	Overall number of institutions offering engineering education
Austria	Yes	Yes	N/A	N/A	Yes	18
France	No	Yes	Yes	Yes	N/A	205
Poland	Yes	Yes	N/A	N/A	Yes	98
Spain	Yes	Yes	N/A	N/A	N/A	Around 65
Turkey	Yes	Yes	N/A	N/A	N/A	193

Table 1: Provision of engineering education by country and type

With the exception of the system of 'écoles' and 'grandes écoles' in France, all other courses in Engineering are part of the Bologna system of Bachelor, Master and Doctorate levels of university study. Entrance requirements are typically in line with the overall practices in each country; there is a trend that more prestigious institutions (e.g. 'grandes écoles', top tier technical universities) are more competitive in their entrance requirements. High scores in the university entrance exam in Turkey give access to top-tier universities providing engineering education, which offer their teaching (partly) through the medium of English.

Specific English language requirements are, with the exception of Spain (requiring B1 or B2.2. depending on region), not stated. Given the required school-leaving exams, B1+ to B2 is also the expected level of undergraduate students at the start of their studies in Austria and Poland. In France, graduates with a Master's degree are expected to have achieved level B2+/C1.

The position of English within engineering degrees is generally not foregrounded at the entry stage of students, with the focus in entry qualifications typically in the areas of mathematics and science. The exception are English-taught degrees, which are generally a sign of more prestigious institutions, and require good English proficiency.

The institutions chosen for a more detailed analysis represent as far as possible regional and institutional variations in each member country. A full list of institutions analysed can be found in the Appendix.

2 Main Part

2.1 Brief Country Overviews

Austria

There is a differentiation between (Technical) Universities and Universities of Applied Sciences, with the former being more research-oriented and generally more prestigious. Degree levels are Bachelor, Master and both types of institution and Doctorate possible at (Technical) Universities. However, the Universities of Applied Sciences offer a systematic and compulsory programme of English language courses, which is in contrast to the optional offer at (Technical) Universities, which also offer English-Medium Instruction (EM). The courses on offer include general English, English fof Specific Purposes (ESP), English for Academic Purposes (EAP) and some Business English, with a clear focus on ESP. Courses are typically wide-angled and communicative. Organisationally, courses tend to be small- to medium-sized, run for 1 semester and cluster around level B2. Topics and genres focused on vary, but in addition to engineering-related genres, more general business-related topics are also represented, as is intercultural communication and language for socialisation in two institutions. Terminology is explicitly mentioned as a focus in some institutions. No clear regional differences could be observed

France

Accredited qualification for engineers is provided by public universities, or private 'écoles' and 'grandes écoles', which offer Bachelor, Master and Doctorate degrees. While for universities, no entrance exam is required, access to 'grandes écoles' is highly competitive. On graduating, students' are generally expected to have obtained CEFR level B2+ (levels vary in practice), which is certified by external examination (TOEFL, TOEIC, etc.). Courses are typically compulsory and communicative in orientation. Topics focus on general business-related genres (e.g. meetings, CVs, debates) and general technical topics and genres (e.g. reports, case studies), but EAP is represented strongly in terms of dealing with research literature. Terminology is not considered a focus. Intercultural awareness/communication and language for socialisation are mentioned in some institutions.

Poland

Technical universities, general universities and state higher vocational schools all offer qualification as engineer. Both technical and universities have a compulsory English language programme, including both general English and ESP classes (120 hours of general English and 180 to 240 hours of ESP). The courses are typically wide-angled, taught face-to-face and have a focus on EAP and general language skills, at times applied to specialised texts. In terms of ESP, the genres focused on are technical manuals and reports, process descriptions, and instructions. Business correspondence, including all areas related to job applications, are also featured. Terminology is specifically included as a learning objective.

Spain

In Spain, general as well as technical universities (including politécnicas) offer engineering degrees at all three levels of education, i.e. Bachelor, Master and Doctorate. Higher Education Institutes are both private and state-run. Courses vary in terms of being optional or compulsory and in length (incl. ECTS). Mostly, courses are wide-angled ESP, interactive and taught by language experts. Genres

focused on include technical ones (descriptions, instructions, reports, etc.) and business-related ones (job application/interviews).

Turkey

Engineers in Turkey are educated at both state and private general and technical universities, and overall the largest provision of engineering education of all partners is offered here. Access is by university entry exam. EMI is offered at high-ranking universities. In institutions without EMI, all students need to attend at least 2 semesters of English language courses. In addition, there is an offer of optional language education. Compulsory classes are typically standardised, whereas optional classes are less uniform. Group size varies dramatically from 20 to 120, as does CEFR level (ranging from A2 to B2), depending on institution and type of course. While larger EAP classes are often teacher-centred, the smaller optional ESP classes are communicative and learner-centred. The offer includes EAP and wide-angled ESP courses, both taught by language experts. Genres focused on include technical ones (e.g. reports), business-related ones (e.g. meeting agenda, presentations, job-skills) and academic ones (e.g. essays, research articles). There is a tendency to focus more on EAP than ESP.

2.2 Synthesis

English courses are an obligatory part of all engineering degrees in France, Poland and Turkey, but only obligatory at some institutions / degree courses in Austria and Spain. In general, even if obligatory courses exist, there tends to be an additional offer of optional English education. English courses are compulsory for at least two semesters in Turkey; Poland offers the most comprehensive English curriculum, covering a minimum of 120 hours English instruction in general and 180 hours in technical universities. In Austria, all Universities of Applied Sciences have a compulsory English programme, but the situation at general and technical universities is mixed. Spain also shows a mixture of compulsory and optional courses.

In terms of the courses offered, all institutions offer a mixture of ESP and EAP courses, sometimes combined in one course. The majority of ESP courses offered are wide-angled, with medium- and narrow-angled courses more typical of institutions with compulsory English programmes. There is some offer of general English courses (compulsory in Poland), and some institutions that integrate general English language proficiency in terms of consolidation into EAP/ESP courses.

Most courses are offered as semester courses (typical duration: 15 weeks) and in an interactive format. Additional online materials or blended learning are common, but no institution offered fully online English courses. Standardisation is not a core characteristic; it exists at course level with primarily teachers co-ordinating, but only in France is explicit reference made to the need to obtain external certification for English in terms of TOEFL, TOEIC, BULATS or other and the need for English courses.

Teaching is provided by ELT experts, and sometimes communicative language teaching/task-based language teaching and/or genre approach are used. It is, however, worth noting that frequently no reference is made to teaching methodology. The majority of courses offered are interactive and take place in small to medium-sized groups. Frequent use is made of role-plays, group work and presentations across all sites. Materials used reflect a mixture of in-house created materials (paper

and online) and some textbooks.[1] Assessment is frequently continuous or project-based; exams, where they exist, tend to be standardised only at the in-house level.

In terms of EAP, objectives relate to writing academic essays, papers, theses, abstracts, being able to read academic texts and to some extent general academic study skills, including those needed for EMI.

The objectives for ESP courses are more varied and cluster around the following areas, where both productive and receptive competence is targeted. The areas listed below are addressed in all partner countries:

- Terminology (learning and use of correct technical and semi-technical language items)
- Written genres (technical manuals, reports, meeting agendas, job application & CV; 'technical texts'; correspondence with customers/clients)
- Oral genres (meetings, presentations, interviews, interactions with customers/clients, telephone conversations)

Across some partner countries, the following two areas feature:

- Intercultural awareness/competence
- Language for socialising

The specific engineering topics vary and tend to be only specified in medium- or narrow-angled ESP courses (e.g. topics 'polymer processing, 3-D printers, logistics of polymer production' in course 'English for Engineers-Polymer Science' (Montanuniversität Leoben, AT)). More generally, we find a range of core areas in engineering mentioned and arguably much freedom for teachers in deciding the specific topics in relation to materials chosen.

[1] For a list of specific textbooks and online resources mentioned in the national reports, see Appendix B.

3 Conclusion and Implications

The curriculum analysis showed a considerable variation in offer across the partner countries. Nevertheless, some tendencies can be observed.

- Wide-angled ESP courses dominate
- Mixture of obligatory and optional courses
- Variety of proficiency levels, with some clustering at around B1+/B2
- Interactive formats (with on-line support)
- Teachers are language specialists, usually no (formal) team-teaching with engineering experts is provided
- Technical content areas are frequently combined with more business-oriented areas, and also with intercultural awareness and socialization skills
- EAP and/or general English courses are offered in addition or partly integrated into ESP courses
- Standardisation is typically in-house (exc. France)
- Diverse skills are addressed, depending on country and focus (general English, ESP, EAP)

Given the analysis of existing curricula, a new course integrating VR should share the following characteristics:

- Probably modular structure to allow in-house adaption for diverse programs
- Hybrid course structure integrating face-to-face teaching and online elements
- Focus on core areas of engineering and transferable genre-related competences
- Address both written and spoken genres, with a focus on receptive and productive skills
- Allow for differentiation according to level (variety of materials /difficulty)
- Integrate business communication aspects, such as communication with clients/ job application
- Integrate intercultural awareness and language for socialisation

In order to address the USP of our new course, I would argue against including EAP elements, but this is a point for discussion among partners.

Vienna, 30 May 2019

Appendix A: Institutions analysed

Austria:

- Universities of Technology (TU Vienna, TU Graz)
- University of Natural Resources and Life Sciences (BOKU Vienna)
- University of Mining (Montanuniversität Leoben)
- University of Social Sciences, Economics and Business (Johannes Kepler University Linz)
- FH Technikum
- FH Joanneum
- FH Joanneum (Campus Wels)

France:

- Centrale Lille
- IMT Lille Douai
- ENSIAME Valenciennes
- CentraleSupélec
- Centrale Marseille

Spain:

- Universitat Politècnica de Catalunya (UPC)
- Universidad Politécnica de Valencia (UPV)
- Universidad Politécnica de Madrid (UPM)
- Universidad de Cádiz (UCA)
- Universitat Ramon Llull (URL)

Poland:

- Pedagogical University in Kraków
- Natural University in Lublin
- Wrocław University
- Naval University in Gdynia
- Częstochowa Polytechnics
- Łódź Polytechnics
- Warszawa Polytechnics
- Technical University in Szczecin

- PLUS two schools of languages:
    - Profilingua
    - AGL Language School

Turkey:

- Balıkesir University (BU)
- Aydın A. Mend. Uni (AU)
- Kastamonu University (KU)
- Istanbul Technical University (ITU)
- Middle Eastern Technical University (METU)

Appendix B: Course materials mentioned

Textbooks

Buczkowska, W. (2003) *English across Marine Engineering*
Frendo, E. (2012) *English for Construction.* Pearson
van Kluiyven, P. *International Maritime Language Program*
Ossowska Neumann, M.; Żurawska, E. *English Course Materials for Marine Engineering Students*
Slaght, J.; Harben, P. / Pallant, A. (2012) *English for Academic Study.* Garnet

Published online resources

internet programme *MarEng*