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Exploring Postgraduate Students' Perspectives on First-Year English-Medium Instruction in Aeronautical Engineering

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Abstract

English-medium instruction (EMI) has become a popular teaching strategy in higher education to raise the attractiveness of programmes for foreign and domestic students. At the author's institution, EMI is practised at the postgraduate level, with the aim of promoting the internationalisation of education and meeting the demands of global business and industry.

This action research presents the results of an explorative survey on the first-year student experience in a two-year engineering master's programme. The programme is technical in nature but also incorporates aviation management and social skills subjects. The whole degree programme is taught through the medium of English. The first year consists of lectures, seminars and projects at the institute, whereas the second year releases students to internships at companies and requires them to complete their masters' theses. For this reason, the first year of the programme became the focus of interest for exploring students' perspectives on EMI.

The first cohort of master's students (N = 21) was surveyed by means of a structured questionnaire. The questionnaire contained ten items on content learning and ten items on language learning that had to be rated on a 5-point Likert scale (Not at all = 0; Very much = 4). Even though this is a small-scale case study, the results reveal interesting insights into the effects of EMI as perceived by postgraduate engineering students.

Keywords: English-medium instruction, English for specific purposes, engineering, content and language learning, postgraduate programme

1. Introduction

English-Medium Instruction (EMI) and Integrating Content and Language in Higher Education (ICLHE) have become widespread teaching strategies to raise the attractiveness of tertiary programmes for foreign and domestic students. As a consequence, "university-level students are expected to have a high level of English language proficiency and, given the increase in international mobility, tend to find themselves in linguistically and culturally heterogeneous groups" [1, p.3]. Even if learners do not study abroad, they may attend courses together with visiting exchange students, who share English as the *lingua franca*. This heterogeneity of formerly rather homogeneous student groups is raised, which poses a range of challenges for teachers. Among other things, teachers need to cope with different levels of content and language knowledge, as entrance examinations cannot fully predict whether candidates will meet the complex cognitive demands of a specialist field such as aeronautics that is taught through a foreign language.

In order to explore potential learning gains from EMI, this contribution presents the results of practitioner case research on students' first-year experience in an engineering master's programme. A survey was designed to answer two explorative research questions: first, what are students' perceived content learning outcomes; and second, what are students' perceived language learning outcomes as a consequence of EMI?

At the author's institution, EMI is practised at the postgraduate level, with the aim of promoting the internationalisation of education and meeting the demands of global business and industry. The programme is technical in nature but contains aviation management and operations contents in order to satisfy diverse student interests. The first year consists of lectures, seminars and projects at the institute, whereas the second year releases students to internships at companies and requires them to complete their master's thesis. The first year therefore represents a traditional academic university setting with well-known instructional formats and course types. For this reason, it became the focus of interest for investigating students' experiences with EMI.

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2. Methods

In order to answer the two explorative research questions stipulated above, the first cohort of master's students was surveyed by means of a structured questionnaire. The questionnaire contained ten items on content learning and ten items on language learning that had to be rated on a 5-point Likert scale (*Not at all* = 0; *Slighty* = 1; *Noticeably* = 2; *Greatly* = 3; *Very much* = 4). In the third section, students were asked to provide free verbal comments on *the impact of EMI on learning*. The survey was administered to students in paper form at the end of the second semester of study. This period enabled students to gather a year of experiences and ensured that the full year group was still available in person before they would start their professional internships in the third semester. The statements from the survey were rank-ordered according to the arithmetic averages of the frequencies with which each item had been weighted by the respondents.

3. Results

The student sample consisted of the complete year group (*N = 21*), which lay slightly below the regular number of 25 places per year. As Table 1 shows, the average age of students was 24.1 years (*M*); they had gone through 12.6 years (*M*) of formal English language training prior to their enrolment in the master's programme; and the group comprised predominantly male (*n = 18*), Austrian (*n = 18*), German-native speaking (*n = 16*) students who had graduated from the institute's three-year Bachelor of Science in Engineering programme (*n = 18*). Nevertheless, the group included students with an international background and a different mother tongue, which provided an authentic reason for lecturers to teach the curriculum through English. Students' further first languages in the sample were Slovak, English, Turkish and French.

Table 1. Descriptive statistics for biographical variables of the sample

VARIABLE		*M*	*Mdn*	*SD*	*MIN*	*MAX*
Age (years)		24.1	24	1.9	22	31
Formal English Language Training (years)[a]		12.6	13	1.8	8	16

VARIABLE	LEVEL	SAMPLE FREQUENCIES
Gender	male	18
	female	3
Nationality	Austrian	18
	Australian/Austrian	1
	Slovak	1
	French	1
First language	German	16
	Slovak	2
	English	1
	Turkish	1
	French	1
Higher education institution awarding bachelor's degree	FH Joanneum, Austria	18
	University of Žilina, Slovakia	1
	University of Adelaide, Australia	1
	Ecole Supérieure des Technologies Industrielles Avancées (ESTIA), France / University of Salford, UK	1

Note. *N = 21*; *M* = arithmetic average; *Mdn* = Median; *SD* = Standard deviation; *MIN* = minimum in sample; *MAX* = maximum in sample; [a]missing values because of nonresponse: *n* = 1

As Table 2 shows for EMI-promoted content learning, students perceived a noticeable increase in the *Range of disciplinary perspectives on aviation*, in their *Awareness of aeronautical literature in English* and in their *Competence in project work* with an average of 2.05 points on the Likert scale for each of these items. This may be partly due to a second-semester project in aeronautical engineering. Moreover, EMI may invite the adoption of project-based learning in certain courses, as projects allow for a true integration of content and language learning goals [cf. 2]. Further gains were assigned to the *Competence in transferring skills to other settings* (1.95 points) and an *Understanding of the aviation industry* (1.86 points).

Table 2. Ranking of perceived increase in content and language learning as a result of English-medium instruction

RANKING	CONTENT LEARNING ITEMS RATED ON LIKERT SCALE (0–4)	*M*
1	Range of disciplinary perspectives on aviation[a]	2.05
2	Awareness of aeronautical literature in English	2.05
3	Competence in project work	2.05
4	Competence in transferring skills to other settings	1.95
5	Understanding of the aviation industry	1.86
6	Creative thinking	1.67
7	Aviation management skills	1.57
8	Technical problem-solving skills	1.29
9	Aeronautical engineering skills[b]	1.24
10	Autonomy as a learner	1.14
RANKING	**LANGUAGE LEARNING ITEMS RATED ON LIKERT SCALE (0–4)**	***M***
1	Spoken interaction skills (dialogue)	2.10
2	Speaking skills (monologue, such as presenting)	2.00
3	Listening skills in lectures and seminars	2.00
4	Technical vocabulary	1.95
5	Fluency in speaking	1.90
6	Subject-specific reading skills	1.76
7	Writing skills in examinations and assignments	1.62
8	Pronunciation and intonation[c]	1.43
9	Understanding of grammar	1.34
10	Accuracy in writing	1.19

Note. $N = 21$; M = arithmetic average
[a]missing values because of nonresponse: $n = 1$; [b]missing values: $n = 1$; [c]missing values: $n = 1$

Table 2 also presents the questionnaire results related to students' perceived increase in language learning as a consequence of EMI. The highest ranking items (above or at 2.00 points on average) focused on oral communication. Students thus perceived a noticeable increase in *Spoken interaction skills (dialogue)*, *Speaking skills (monologue, such as presenting)* and *Listening skills in lectures and seminars*. This may be explained by the predominance of oral communicative events in the first year of study. Spoken interaction, speaking and listening skills feature prominently in lectures, seminars, practicals and project supervision sessions. Learners reported further improvements with higher rankings in the area of *Technical vocabulary* (1.95 points) and *Fluency in speaking* (1.90 points).
Students' clustered free verbal feedback on the impact of EMI on learning added a qualitative perspective to the quantitative questionnaire results. The comments were categorised according to

students' general approval or disapproval of EMI in the programme. Students predominantly identified beneficial effects of EMI on learning, with several instances underscoring linguistic oral improvement and aviation industry links. Achieving linguistic improvement through EMI may be possible under certain circumstances, as the following statements imply: "the continuous english speaking has improved my english very much", "[o]ne gets used to use english as everyday English" and the "[d]aily training of the English language is the most important thing to improve the own skills". Nevertheless, EMI/ICLHE needs to be accompanied by parallel English language courses for learners, as even proficient students "still need support to be able to cope with the academic demands put on them" [3, p.167; see also 4, p.83; 5, p.225; 6, p.264; 7, p.20; 8, p.13]. Professional linguistic support is essential, as only expert instruction, guidance and scaffolding will place a substantial emphasis on appropriate and accurate language use. With a view to workplace requirements, one student remarked that the "[a]viation industry is English language related, that's why I think it is good to have all lectures in English". This comment underscores that students in the sample were well aware of the significance of English for their future careers.

4. Conclusions

The initial research questions in this small-scale practitioner investigation could be answered for the given setting of a tertiary EMI engineering programme. Students discerned a noticeable increase in both content as well as language learning as a consequence of the English-medium master's programme. Whereas students' perceived content learning outcomes centred on the range and variety of disciplinary knowledge acquired, their perceived language learning outcomes comprised oral communication and vocabulary acquisition.

References

[1] Smit, U., & Dafouz, E. "Integrating content and language in higher education: An introduction to English-medium policies, conceptual issues and research practices across Europe", *AILA Review, 25*, 2012, pp. 1–12. DOI: 10.1075/aila.25.01smi

[2] Tatzl, D., Hassler, W., Messnarz, B., & Flühr, H. "The development of a project-based collaborative technical writing model founded on learner feedback in a tertiary aeronautical engineering program", *Journal of Technical Writing and Communication, 42*(3), 2012, pp. 279–304. doi:http://dx.doi.org/10.2190/TW.42.3.f

[3] Mežek, Š. "Multilingual reading proficiency in an emerging parallel-language environment", *Journal of English for Academic Purposes, 12*(3), 2013, pp. 166–179. DOI: http://dx.doi.org/10.1016/j.jeap.2013.02.001

[4] Hellekjær, G. O., & Wilkinson, R. "Trends in content learning through English at universities: A critical reflection", in C. Van Leeuwen & R. Wilkinson (Eds.), *Multilingual approaches in university education: Challenges and practices* (pp. 81–102). Nijmegen, The Netherlands: Uitgeverij Valkhof Pers & Talencentrum Universiteit Maastricht, 2003.

[5] Mellion, M. "The challenge of changing tongues in business university education", in R. Wilkinson & V. Zegers (Eds.), *Realizing content and language integration in higher education* (pp. 212–227). Integrating Content and Language. Maastricht, The Netherlands: Maastricht University Language Centre, 2008 [e-book]. Retrieved from http://arno.unimaas.nl/show.cgi?fid =12521

[6] Tatzl, D. "English-medium masters' programmes at an Austrian university of applied sciences: Attitudes, experiences and challenges", *Journal of English for Academic Purposes, 10*(4), 2011, pp. 252–270. doi:10.1016/j.jeap.2011.08.003

[7] Van Leeuwen, C. "Feasibility of policy in university language teaching today", in C. Van Leeuwen & R. Wilkinson (Eds.), *Multilingual approaches in university education: Challenges and practices* (pp. 19–45). Nijmegen, The Netherlands: Uitgeverij Valkhof Pers & Talencentrum Universiteit Maastricht, 2003.

[8] Van Leeuwen, C., & Wilkinson, R. "Introduction", in C. Van Leeuwen & R. Wilkinson (Eds.), *Multilingual approaches in university education: Challenges and practices* (pp. 11–17). Nijmegen, The Netherlands: Uitgeverij Valkhof Pers & Talencentrum Universiteit Maastricht, 2003.