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Writing for Architecture and Civil Engineering: Comparing Czech and Italian Students' Needs in ESP

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Abstract

This study is an investigation into the perceived ESP writing needs of students of architecture and civil engineering in two European Universities where English has become the language to promote internationalization, namely, the University of Pavia and Brno University of Technology. The research presented is done in the framework of an EU-funded project – Becoming A Digital Global Engineer, BADGE, aimed at improving the quality of language and communication skills of engineering students in Europe. It is also done with reference to the Global Engineers Language Skills Framework, GELS, an adapted version of CEFR language proficiency levels for engineers. Results contributed information about written genres and the digital technology used by students for writing, pointing to preferred genres in the engineering/architecture fields and the impact of digital tools on students' writing habits. The results are discussed as an opportunity to reflect on the students' needs, both specific to the individual teaching contexts and across them, and make suggestions for ESP writing pedagogy.

Introduction

English academic writing presents a challenge for almost all writers and particularly for English as an additional language (henceforth L2 English) students of architecture and civil engineering, who usually claim that they mainly design, and thus communicate via visual materials (Spector & Damron, 2013/2017, Conrad, 2017). Until recently the Bachelors and Masters students of architecture and civil engineering at Pavia University and Brno University of Technology (BUT) had not been offered formal instruction on writing in their first language (henceforth L1), and only sporadically in L2 English. Within their curricula at Pavia University and BUT, the dominant languages of instruction are Italian and Czech respectively. In view of curriculum innovations driven by increasingly internationalized academic and work environments, we were asked by our faculties to include more soft skills, such as discipline-specific writing, into elective and/or compulsory courses of English for Specific Purposes (ESP). However, the respective faculties provided minimum input regarding the content and learning objectives of the newly designed courses. As ESP teachers with no engineering background, we therefore decided to explore the students' needs by asking them directly. This engagement with students' needs forms the basis of this paper.

This research is grounded in our collaboration via an Erasmus+ staff exchange held over the past 7 years. This collaboration also involved joining the Global Engineers Language Skills network (see https://www.clic.eng.cam.ac.uk/news/GELS), an offspring of which is the 3-year

EU-funded research project Becoming A Digital Global Engineer (BADGE), aimed at designing teaching and learning material for enhancing engineering students' language and communication skills (see https://www.thebadgeproject.eu). It is a common experience of GELS and BADGE that language and communication teachers in engineering schools must prepare their students to have global competence, meaning that students need to be able to engage in appropriate and effective interactions with people from different cultures and language backgrounds, in the interest of sustainable development on a global scale. It is also a common experience that ESP teachers usually have a language and linguistics background while engineering students possess discipline-specific knowledge. Therefore, it is in the interest of ESP curriculum and materials development to tap into the learners' experiences and perspectives (e.g., Anthony, 2018, Koenig & Guertler, 2018). When identifying what the learners need, ESP teachers may ask the discipline specialists to provide topics and materials, running the risk that the materials suggested may be 'overspecialized' and not accessible to the (under)graduate students nor to their language instructors (see Butt, 2015). When it comes to writing practices, discipline specialists acknowledge the importance of communication in engineering, but formal writing instruction is missing in the engineering curriculum.

Despite this evident gap, there is a striking lack of information in the literature on writing skills for students in the architecture and civil engineering construction sector, with only a few exceptions: Heidenreich (2019) has information on e-mail writing, but no explicit genre-specific writing, Swales & Feak (2012) focus on the genre of research papers from the wider angle of writing across the disciplines, but without any specific focus on architecture or civil engineering. Two more focused works are Spector & Damron (2013/2017), whose book is organized into chapters each corresponding to a genre that is said to be unique to architectural writing, and the research results and materials from the Civil Engineering Writing Project conducted by Susan Conrad (http://www.cewriting.org/research-results). Moreover, the language needs of architecture and civil engineering students differ in many ways from the other engineering specializations (Tluková, 2019), especially when it comes to writing instruction and genre-based writing (Freddi, 2019). Thus, when delineating an ESP educational scenario for engineering students, we relied on students' needs analysis, genre-based pedagogy, and on the GELS Framework.

The GELS Framework

The GELS Framework seemed to offer the ideal reference for the needs analysis. The GELS Framework is a project of the GELS network (https://www.clic.eng.cam.ac.uk/news/GELS) the aim of which was to adapt the six CEFR levels of language proficiency (A1 through C2) to the language and communication needs of engineering students (see Tual et al. 2016). This mapping is premised on the view that "there is distinct progression from communication with or for a lay audience towards an expert audience" (Rinder et al., 2016, p. 11). The GELS Framework was first published in 2016 (Rinder et al., 2020) and is currently being discussed and reviewed as one of the results of the BADGE project, which aimed to integrate the descriptors with an e-communications layer and describe communication skills aided by Information and Communication Technologies (ICT).

Both at Pavia University and at BUT, engineering undergraduate programmes are required to have a B1 CEFR competence level in English, while Masters need B2 as curricular requisites. The current version of the GELS Framework is available here, https://www.clic.eng.cam.ac.uk/files/gels_framework_june_2022.pdf, however, for the sake of the present argument, we report here the B1 and B2 descriptors for writing skills in engineering, which apply to writing that is "individual & collaborative in synchronous and asynchronous scenarios" (Figure 1.):

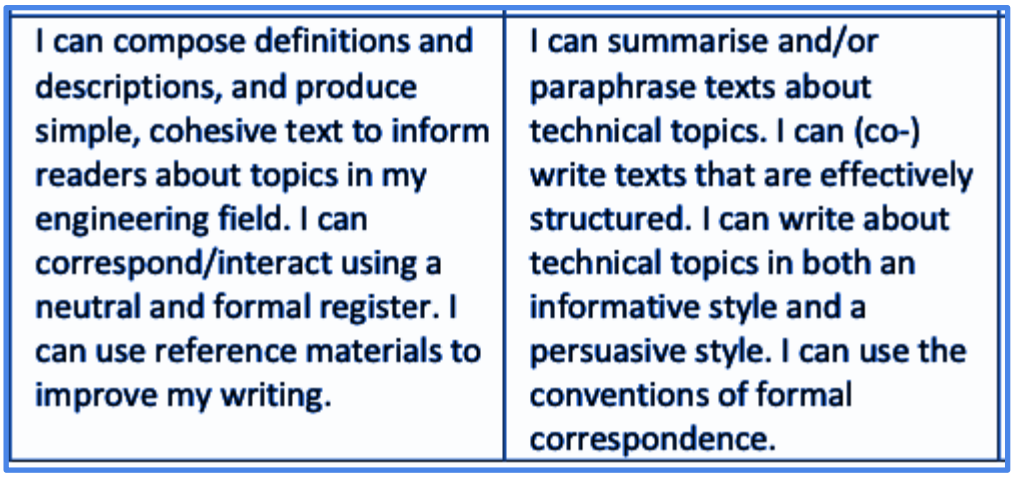

Figure 1. B1 (left) and B2 (right) descriptors for writing skills (The GELS Framework, 2022)

On one hand, B1 focuses on descriptive genres, such as definitions and descriptions of topics in engineering and on formal correspondence. It also mentions the active use of resources ("reference materials") to support writing. B2 on the other hand, introduces summaries as a genre and paraphrasing as a writing skill. Interestingly, it also includes co-writing as a desirable competence and refers to structure ("texts that are effectively structured"), a concept central to genre analysis. Both the informative and persuasive communicative functions are highlighted to distinguish descriptive from argumentative genres.

Research Aims

The aim of the research presented here is to elicit information about how often students write in their L1 and L2 English, what kinds of genres they write and what digital tools they use. This has been done in order to be able to make pedagogical suggestions for ESP courses that can help improve the development of written language and writing skills.

As a result of the digital shift of our society and educational systems, digital technologies have become integral to interaction, learning and writing development (Chappelle & Sauro, 2017). Automated self-editing tools like spellcheckers, collaborative platforms like Google Docs and communications through social media can all be used to support and enhance students' writing skills (see Li et al., 2017). With the coronavirus pandemic, digital tools have become even more pervasive. The research, therefore, explores genre preferences and use of digital tools as crucial indicators of the students' writing needs. A related aim is to explore whether the needs of architecture and civil engineering students align with the writing skills in the GELS Framework (2022) described in the previous subsection. Thus, this study is primarily aimed at rethinking ESP in two universities, based on the input from the students, as the faculty did not provide sufficient input.

Methodology

The questionnaire was chosen as the most suitable data collection technique to survey the students' needs. Basturkmen (2010) and Liu et al. (2011) offered a model, already adapted by Freddi (2015) in the context of language needs analysis of humanities students. Compared to interviews, questionnaires have the clear advantage of getting information from a potentially large number of respondents, they guarantee anonymity and therefore encourage genuine responses, and they are less time-consuming to administer (Basturkmen 2010: pp. 30-32). Despite being aware of the limitations of the questionnaire technique (e.g., self-selecting bias as discussed in Basturkmen 2010, Gollin-Kies et al. 2015, and Malhotra 2009 on biases in online surveys), we thought it important to reach out to as many students as possible at both institutions and give them a chance to express their opinions on language and communication education. The questionnaire (in English) was administered online via Google Forms and through institutional mailing lists, thus implying a voluntary response sample, to comply with ethical principles of data collection in anonymised form.

Online questionnaire overview

To design the survey and online questionnaire, we drew especially from Bryman (2012), Krosnick and Presser (2010), Schaeffer and Presser (2003) and Vannette and Krosnick (2018). After ample discussion of the types and format of questions (e.g., open versus closed), we started to design the questionnaire, keeping in mind our target student populations. Notably, the only key difference between the two sample populations from the two institutions, which could impact the results in a meaningful way, is that, unlike BUT, Pavia University does not have a programme for pure architecture, rather a 5-year Master's degree in architectural engineering that integrates engineering and the principles and practice of architecture.

The core of the questionnaire was to ask students how often they write in both their L1 and L2 English, the range of genres in which they write the most, and which digital tools they used before and during the pandemic to support their studies. After piloting the questionnaire with a small convenience sample of colleagues and students, an anonymous online questionnaire created in Google Forms was distributed via e-mail to 600 students in Brno (450 students of architecture and 150 students of civil engineering) and 550 in Pavia (250 students of architecture and 300 students of civil engineering), with a first run performed during March-May 2021 and subsequent collections sent out throughout the first term of the academic year 2021-2022.

The questionnaire consists of 21 questions divided into 3 parts. The first part collects socio-demographic information (i.e., degree programme name, year of enrolment, work experience) so that we could assess the students' experience in their fields and (future) professions. The second part focuses on how frequently students write the selected genres and what other genres they write, in order to map their writing needs. The third part asks about digital tools used for study or work purposes as the coronavirus outbreak has intensified their use in all aspects of university studies (see Radič et al. 2021). Overall, 51 participants from Brno responded (29 architects and 22 civil engineers), hence an 8% response rate, and 55 participants from Pavia (28 architectural engineering students and 27 civil engineers), with a 10% response rate. We are aware that the response rate is not high. However, considering the size of the student populations that we approached, we believe, like Krosnik (1999), that 'achieving higher response rates or correcting for sample composition bias do not necessarily translate into more accurate results' (and see also Krosnick & Presser 2010). Instead, the questionnaire output offers a representative cross-section of both student populations that serves the purposes of a more refined qualitative analysis informed by a relatively high number of open questions. Also, both the scale of the questionnaire and response sample is strikingly similar to Arnó-Macià et al.'s (2020) study of engineering students' perceptions of ESP courses in internationalized universities.

Genre labelling

A methodological challenge we encountered when phrasing the multiple-choice questions concerned the identification and labelling of genres to elicit the students' opinions and experience with writing. This built on our understanding of genre both as a theoretical construct and a pedagogical tool for writing development, drawing from Swales (1990, 2004) and Bhatia (2004)'s notion of highly conventionalised forms of communication that members of the community use to communicate the specialist knowledge they produce to their peers and transmit it to novices. Our understanding is also informed by Hyland's (2019, p. 273) definition of genre as a "set of texts that share the same socially recognised purpose and so often have similar rhetorical and structural elements to achieve this purpose". Both definitions imply that learning the conventions of relevant genres may help students better communicate specialist knowledge to their respective academic and professional communities.

Our selection of genres was based on past ESP teaching practice and shared experience with the students' types of writing (for coursework, design studio, internships, etc.), as there are not many studies on genre-based writing in the engineering context. For example, in the report on genres indicated by students at Portuguese universities (Álvares Pereira et al., 2016), the most frequent genres are: in-class note-taking, research papers/assignments, summaries, and in-

class written tests, though only 16.5% of the respondents were students of engineering courses.

Moreover, our experience was very similar to that described by Nesi and Gardner (2018, p. 52) in that disciplinary staff tend to describe many different types of writing as either 'reports' (in the sciences) or 'essays' (in the arts and humanities and social sciences) 'often interchangeably and … with the same descriptor' when instead the text genres 'might require different uses of language and different organisational patterns' (ibid.). Indeed 'report' and its national equivalents (namely, 'relazione' in Italian and 'zpráva' in Czech are used as superordinate terms to refer to different writing tasks.

We were also helped by published research on genre families classification and sampling issues with corpora of written academic English, specifically BAWE (The corpus of British Academic Written English), which is a large cross-disciplinary collection of text genres produced by university students of different levels of study (Nesi & Gardner, 2012 and 2018: 52). We coupled this research driven approach with extensive discussion among the two of us of the genres that we expected the students would need the most in their academic and professional paths. The labels also had to be agreed upon and we chose what we thought would be widely used labels, more easily recognisable by the students. Although the list is by no means exhaustive, the final selection consists of 8 different genres: lecture notes, lab reports, seminar papers, project reports, CV/online professional profiles, e-mails to professors, field trip reports, and research proposals.

Some of them are "student coursework genres… which are written in university departments to be assessed as part of a university degree course" (Nesi & Gardner 2012, p. 23), such as the lab report and the project report. Others, like lecture notes and e-mails to professors, are genres that serve the students' academic life at home and which they need to write in English before and throughout a study period abroad. The CV/online professional profile is a genre that they will need once they finish their degree and start looking for a job (as in Nesi & Gardner, 2018, p. 53). For all the selected genres, we also thought it would be useful to make a distinction between genre-specific writing in the students' L1 and in L2 English to get a fuller picture of their writing habits. To compensate for the limited list of genres, we also included two open questions asking respectively to specify any other texts that students need to write for study/ work in English and list what types of texts they would like to focus on in a writing course in their language/ English.

Results

The responses collected allowed us to compare student populations relative to their writing habits and preferences. In what follows, the results of the comparisons (absolute numbers) are presented across institutions, i.e., Pavia University and BUT, and, where relevant, across types of student-respondents, i.e., contrasting architects and civil engineers.

Students' profiles based on the questionnaire

The questionnaire yielded the following students' profiles in terms of years of study/seniority, additional languages and jobs. As regards the year of study of the respondents, of the civil engineers who responded in Pavia University, most are 1st year (17 out of 27), the others are 2nd and 3rd year, all being undergraduates except for two 5th and 7th year Master's students. In the architectural engineering sample, however, practically all of the respondents are 5th year students, i.e., enrolled in their last year of a single cycle Masters' study, except for a couple of 3rd and 1st year students. In BUT, the civil engineering students were in their 2nd-5th year of study, while the architects were slightly older students as they indicated their 3rd-6th year of study, much like in the Pavia sample. The group includes 3 PhD students (in their 4th PhD year), who are absent from the Pavia University response sample.

The majority of the students claimed that they can communicate in two or more languages. In Pavia, students mostly reported L2 English and L2 Italian (in these cases the students' L1 was either Arabic, Albanian, or French). Spanish and French were the most popular L3, although

for a small number of students, and two respondents also mentioned Chinese. In BUT, all students reported L2 English, 31 also specified an L3 (mostly German and French) and 9 an L4 (Italian, Russian, Chinese). Overall, the students of architecture seem to have a wider range of languages compared to their engineering counterparts at both institutions. This piece of information might help understand the responses obtained on the use of shared digital platforms in the next section, where it becomes apparent that architecture students are more used to having to create an online presence for the international market (see Figure 6.).

As for work experience, at BUT, most of the students (46 out of a total 51) have work experience in a variety of occasional jobs, e.g., waiter, salesperson, receptionist, organizer, tour guide and IT support, whereas 32 reported some work experience in their fields, such as an architectural or design studio. At Pavia University, the number is lower, but the types of jobs are similar and include sales assistant, delivery, waiting tables, and also some tutoring and private school tuition. A few students at Pavia University also claim field-related experience such as mason, assistant surveyor, web manager, and even work for a construction firm.

In sum, this first part of the questionnaire helped us to collect concrete data on the students' backgrounds, returning a diverse cross-section of the respondents represented. The information derived, i.e., seniority and work experience distributions, can help understand why students have responded the way they have relative to the genre profile and the digital tools in the next subsection.

Genre profile based on the questionnaire

The next set of questions was aimed at comparing genres in L1 and L2 English across institutions. Figures 2. and 3. show the distribution of the genre preferences in the students' L1 and in L2 English at Pavia University and BUT, respectively.

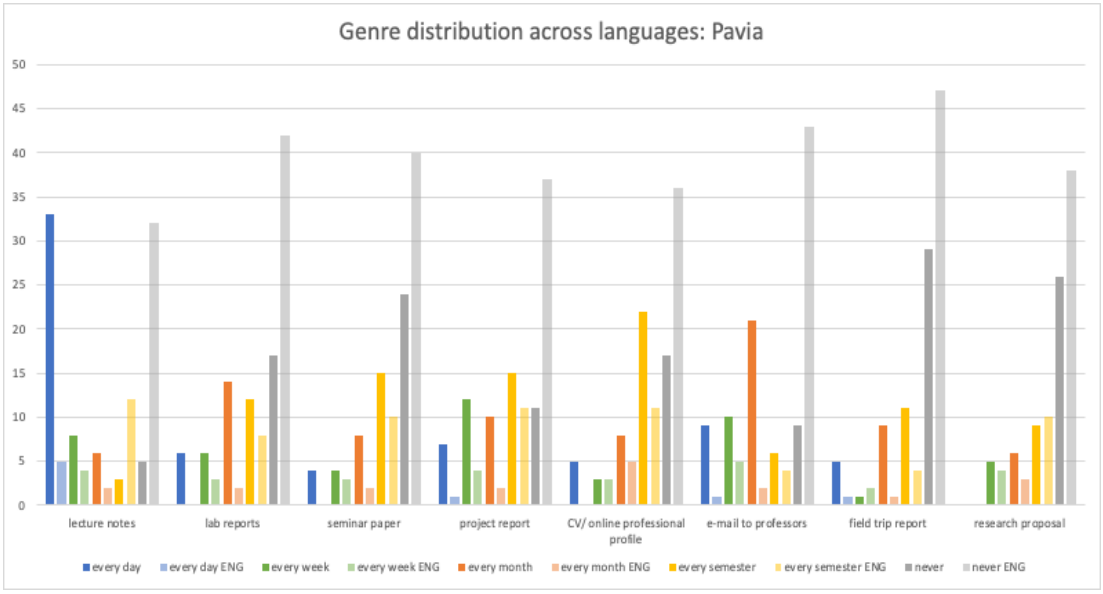

Figure 2. Genre distribution across languages: Pavia University

As can be seen in Figure 2., the genres in which Pavia University students declare they write the least in their own language are the field trip report, the research proposal, and the seminar paper. Conversely, the genres in which they say they write most often are lecture notes, e-mails to their professors, lab reports (every month) and the project report (12 students claim to write it weekly and 10 only every month).

These results partly reflect the seniority of the respondents, who, for the most part, are undergraduate students who might not be required to write genres that are more typical of later years in the curriculum. Partly, they show that the research proposal in particular is a genre that appears late in their course of study and is recognised as such only by the senior students who

might have to put in a research proposal for their Master's Thesis or PhD. On the other hand, the responses also show that lecture notes and e-mails in the L1 are part of the students' daily routine, lab reports are typical genres of science and engineering, and project reports might be understood by the students as a rather general term covering a variety of assignments, thus a frequent genre that they are required to produce. As far as the CV/online professional profile is concerned, it is interesting to notice that most of the responses point to an update once a semester, showing a need on the part of the students to track their professional progress, some of whom might work while they study. Compared to the L1, the genre distribution in L2 English is rather different (as represented by the light-colour bars in the histogram). The students hardly ever write in English with about 11 students who will write the occasional project report or update their CV in English once a semester. This is likely owing to the fact that the general language of instruction is Italian.

When looking at the responses given by BUT students (Figure 3.), the picture is remarkably similar as regards genres in the L1, with the seminar paper acquiring more prominence, and a very similar distribution also characterizes the use of L2 English, reflecting the similar context where English is not used as the primary language of instruction.

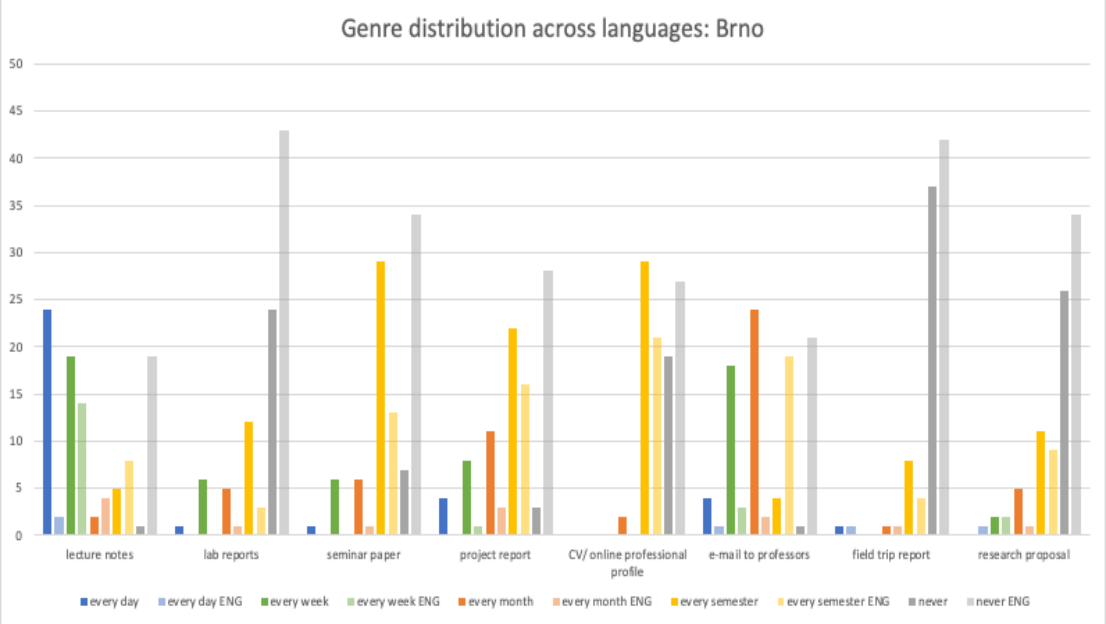

Figure 3. Genre distribution across languages: BUT

Some differences emerge when comparing BUT and Pavia University. For example, when asked whether there were any other genres in which they needed/ wanted to write, the responses of Pavia University were rather sparse and introduced the 'research essay' as a label for seminar papers covering course contents. This response partly contradicts the low frequency associated with the seminar paper option in the multiple choice question, and shows the vague reference to the 'essay' genre label. This may explain why 'seminar paper' was more frequent among BUT students. The 'essay' was also present in the BUT's responses (4 respondents), so too were 'project description' (5 respondents and both in L1 and English), 'technical report/documentation' (4 respondents) and 'journal article' (2 of the 3 PhD students). Finally, we found that BUT students call many texts 'protocol', possibly as a result of interference of the genre names in their L1.

Some BUT students' quotes on this questionnaire item are worth mentioning, as they suggest future professional needs, e.g., writing contracts and writing one's CV:

> Quote 1: *briefs for architectural designs + any text which will help to improve my writting skills in the formal communication (e-mails, etc.) + supply/order/invoice (the language for the official bussiness papres)* (quoted verbatim).

> Quote 2: *I would like to focus mostly on my CV - well prepared CV is important for my future career.* (quoted verbatim).

The first quote also contains a specific reference to formal communication through e-mails, so it can also be interpreted in light of the can-do statements of the GELS Framework, 2022 in Figure 1. Not only is using the conventions of formal correspondence an identified B2 objective, but it also corresponds to some students' declared desires.

Use of technology based on the questionnaire

The third set of questions was aimed at comparing institutions and types of students to find out if the digital tools and shared platforms they use for writing are similar. The questions that we asked were:

- *Which digital tools do you use the most for written communication for study/work purposes in L1 and English (e.g., e-mails, chat)?*
- *Which shared platforms do you use for writing and posting texts for study/work purposes in L1 and English (e.g., Linkedin, Issuu, …)?*

Being phrased as open-ended questions, the responses yielded a variety of results that should be valued for the suggestions they make of at least one tool that each student says they use rather than for its quantitative accuracy. We grouped the most chosen tools and platforms into histograms representing the proportion of students who suggested each tool (Figure 4.) and platform (Figure 5.) at each institution. The comparisons are shown across languages, i.e., L1 and L2 English.

As can be seen in Figure 4., the distribution of digital tools across languages is very similar when comparing Pavia University and BUT. Students at both universities mentioned e-mails and chats as the tools they use the most to write in either their own language or in English, and only a few of them suggested they do not use any digital tools to write in English for study/work (the none bar in the histogram). The overall tendency is to write less in English than in the L1 (except for chats in the Pavia University sample). However, the wording of this and of the next item, with examples of digital tools provided, might have led to a response bias.

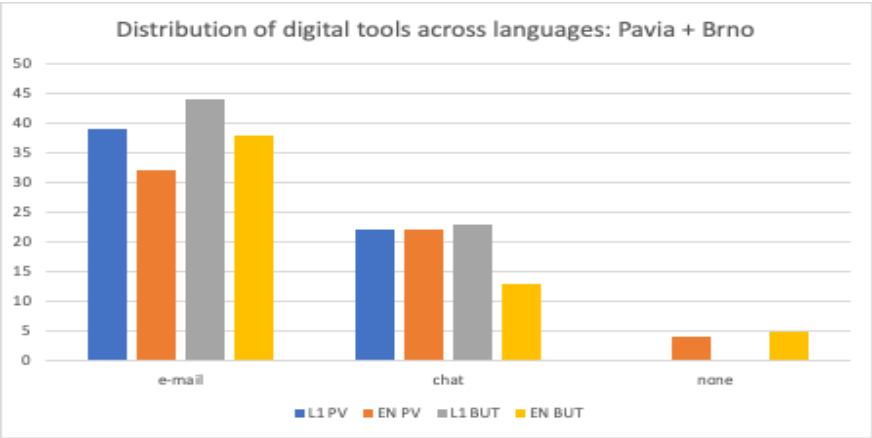

Figure 4. Distribution of digital tools across languages: Pavia University and BUT

Fig. 5 shows that the distribution of shared platforms across languages is also very similar in the two universities. The responses mentioned Linkedin, Issuu, Google Docs and Moodle and the tendency is to use them mostly for writing in the L1 (Issuu and Google Docs). Moodle has a reverse tendency in the BUT sample as it is used more in L2 English than in L1. Given the low number of responses, this might be due to the fact that the English course is one of the few courses taught in L2 English on Moodle. As for Linkedin, both student samples use it more in L2 English than in their L1, an indication of the international reach of this social media. One student suggested Academia and Researchgate and some other responses were discarded

because they showed that the question was misunderstood. The majority of respondents, however, do not use any shared platform for writing in either their L1 or L2 English.

A result worth noticing is the number of students at BUT who said they use Issuu in both languages, which prompts a further comparison between architects and civil engineers (Figure 6.). Without making any distinction between L1 and L2 English (EN), the results in Figure 6. show that, although both student populations do not make use of these platforms very much (the 'none' bars in Pavia University and BUT), shared platforms such as Linkedin are more typical of architects than civil engineers and Issuu is exclusively used by architects. A slightly different trend is observable regarding Google Docs and the customised version of Moodle that the university is using as a Virtual Learning Environment. At Pavia University, both are used slightly more by civil engineers than architectural engineering students, while at BUT, they are still more typical of architects.

There is a difference in the trend concerning Issuu at BUT. Issuu is prevalent among the architects, though not exclusive to them. The local version of Moodle is also more used by civil engineers than architects. Google docs and Linkedin present an inverse tendency compared to Pavia University. The reason for these more mixed preferences might be due to the composition of the student populations addressed, BUT samples being made of pure architecture and a mixed group of civil and architectural engineering students, respectively. In other words, the responses from the civil engineering group contain some architectural engineers' choices that might suggest why they seem closer to the architectural engineers at Pavia University.

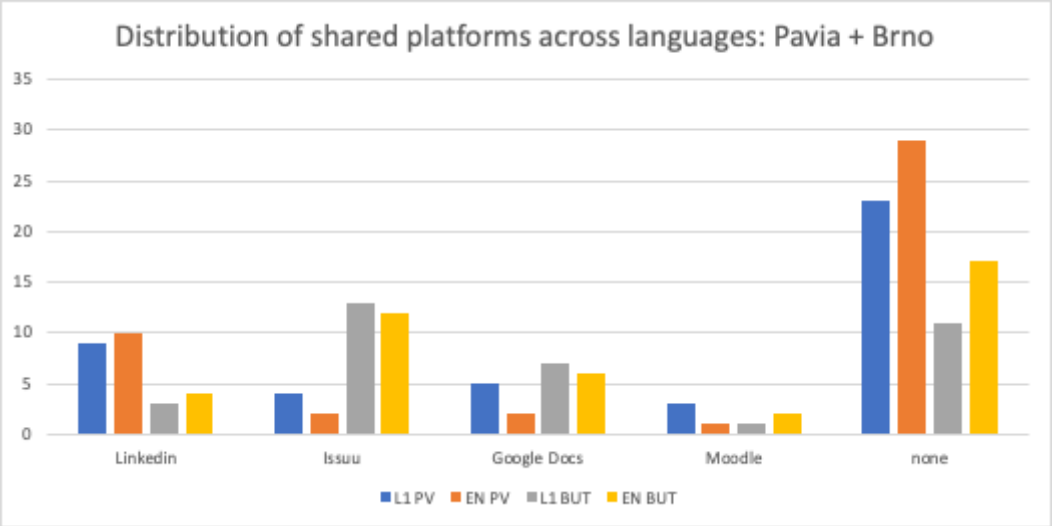

Figure 5. Distribution of shared platforms across languages: Pavia University and BUT

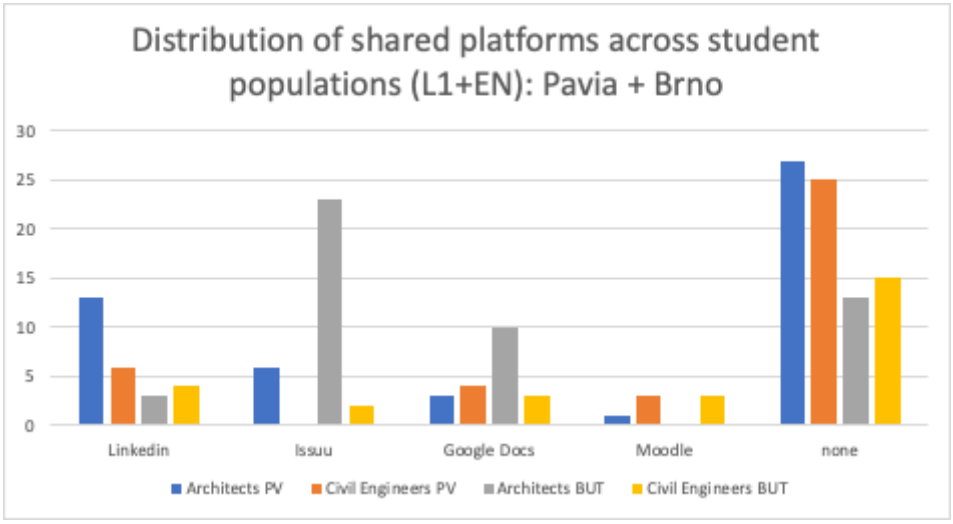

Figure 6. Distribution of shared platforms across student populations (L1 + EN): Pavia University and BUT

One question focuses on remote online language teaching and the tools that the students perceive as commonly used following the coronavirus outbreak and lockdown, which enforced widespread remote (language) learning. The question asked:

- *Which digital tools and shared platforms have you used more often since the COVID-19 pandemic started?*

The results are shown in the pie chart in Figure 7. for Pavia University and just commented on for BUT. As can be seen, students chose a variety of videoconferencing tools, Zoom being the prevalent one over Google Meet, Teams, and Skype as it is the one chosen at the institutional level. Interestingly, however, some of the students also mentioned an increased use of e-mail, Google Docs and social media. This data can be interpreted together with the previous information on digital tools and shared platforms to show the increased students' familiarization with the ICT widely used at the university level.

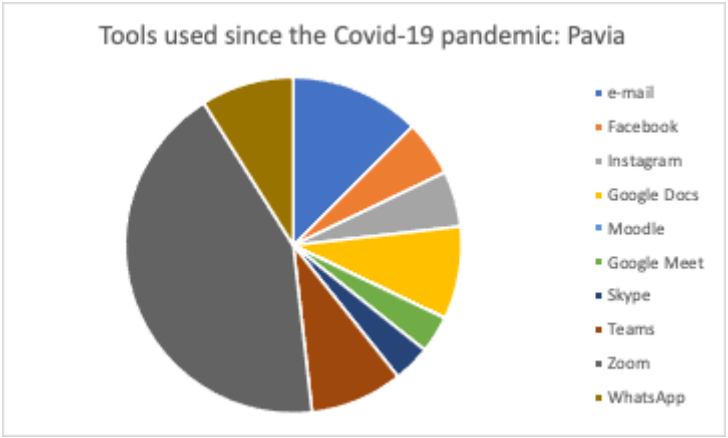

Figure 7. Distribution of remote online tools: Pavia University

A similar situation can be observed for BUT students who mentioned the same variety of videoconferencing tools, although MS Teams was the institutional one and therefore proportionally replaces Zoom when compared to Pavia University.

Finally, as far as translation tools and spell-checks are concerned, students' perspectives were elicited through the following questions:

- *How often do you use translation tools for writing in English?*
- *Do you use spell-checks when you write in English?*

The responses show that the majority of the students at both institutions declared that they very rarely use spell-checks and only resort to translation tools when they do not know a term.

To conclude, the last open-ended question posed to students was:

- *Would you like to take a writing course in English?*

This question aimed at investigating the students' attitude towards writing tuition, and their answers all pointed to an overall positive attitude towards the opportunity for a writing course. Some reservations emerged concerning lack of time, as visible in some of the comments of Pavia's students e.g.:

> Quote 1: *sarebbe bello ma a ingegneria non c'è il tempo "giusto" da potergli dedicare... La trovo comunque una cosa utile* (back-translation: *it would be good, but at engineering there is not enough time to devote to it… I still find it something useful"*).

Discussion

The students' profiling helped us to better define the target of a potential writing module and the kind of language background that the module could build upon, while the multiple choice and open questions helped us identify the genres and the digital tools that the target students use and need most. Overall, the comparison across institutions returned similar results on all three counts, target, genre needs and use of digital tools for writing purposes, thus indicating which genres might be salient for ESP courses (i.e., e-mail, project report and CV/professional profile). However, the comparison across student populations returned a less monolithic picture that allows for some refinements in our understanding and choice of genres. Although we tried to use labels that are widely used in academic curricula, the questionnaire has shown that the students of architecture and civil engineering have a different experience of genres and use other labels (e.g., 'documentation for civil engineering', 'technical text' mentioned by civil engineers at BUT). Furthermore, the results also showed ambiguity in the way engineering students perceive genres, as evident by the fact that at Pavia University, the general label 'essay' was suggested for course-related genres, while at BUT students call many texts 'protocol', possibly as a result of interference of the genre names in their L1. Similarly, 'report', which appeared together with the qualifier 'technical' in the open-ended questions, seems to require reaching shared understanding and negotiation of meaning between students and ESP teachers. The variety of meanings is confirmed by the publicly available online Construction Wiki, Designing Buildings, where we may see that 'report' denotes a wide spectrum of text types and the label seems to be problematic for professionals (see https://www.designingbuildings.co.uk/wiki/Construction_reports). This might mean that if we focus on project report writing, we need to better specify its contents and communicative functions by using, for example, 'design report', or 'design project report'.

As regards the students' exposure to digital tools and the opportunity for ESP teachers to incorporate them in writing tuition, the questionnaire has shown that the changed global context has increased exposure to such tools and therefore it might be easier for the teachers to have students work with digital tools for writing purposes. Google Docs has gained popularity as a collaborative writing platform, shared platforms like Issuu have become the place for architects in our data to share their design projects, and social media websites such as Linkedin might be exploited to focus on online genres. In general, they can be integrated more and more to help learners with their professional writing.

These results can be combined with those concerning their use of translation tools and spell-checks, which are indicative of their writing processes in both languages. What we learn from the answers is that students should be encouraged to actively use spell-checks more with the help of some learning activities, focusing specifically on spelling and spell-checks and dictionaries embedded in writing software, as well as free online tools and add-ons. As translation tools are often used by students when they search for specialized terminology, some activities could also involve specific translation tasks that make use of the web to search

terminological databases (wikis, online dictionaries) or specialized corpora (architecture portals) to discuss technical jargon and equivalences in two or more languages. The results, and the spelling mistakes in the students' answers, point to the need for writing tuition that makes students use as many online resources as possible for improving the quality of their writings. This argument is in line with recent research on automated writing evaluation systems which has shown how these "tools can be implemented to achieve a variety of purposes, ranging from fostering student autonomy and motivation, to enhancing students' metalinguistic knowledge." (Li et al. 2017, p. 87).

Furthermore, the questionnaire has shown that the needs of architecture and civil engineering students broadly align with the writing skills described in the GELS Framework, 2022. On one hand, the descriptors for B1 writing state that students can "compose definitions and descriptions … to inform the readers about engineering topics", something that can be found in project reports and lab reports, which were considered common and relevant genres by a significant number of students at both universities. Moreover, the active use of reference materials is a desirable writing skill that can be developed by employing the increased use of digital tools, e.g., by helping students query corpus data of published writings or retrieve and analyse search results using Google's Custom Search, thus strengthening the type of pedagogy illustrated, e.g., in Freddi (2019). On the other hand, the descriptors for B2 writing assert that students need to know how to "summarise and/or paraphrase texts about technical topics". These communicative functions can be found in the lab and field trip reports, which involve writing a reflective text on a technical topic and can be practised as part of the fuller genres.

Finally, the B2 descriptors include "conventions of formal correspondence", and the questionnaire has shown that more than half of the students declared they write e-mails in study/ work situations in English, and mentioned e-mails, together with the CV, as the genres they would like to focus on in a future course on writing or ESP. Overall, given the importance of genres that emerged from the questionnaire, we think that genre awareness should be raised to help students develop literacy in apprenticeship genres, as in Eriksson & Carlsson (2013), i.e., the notion that genre writing might have a role in the socialization into a discipline, its activities and the contexts associated with them, such as the lab.

Conclusions and Implications for Writing Pedagogy

The questionnaire captured the genre distribution in L1 and L2 English and highlighted commonalities and differences between student populations at both European institutions and between architects and civil engineers. From the responses obtained, the most needed genre in English for all students is the formal e-mail, followed by the CV/online professional profile, and the project report for architects specifically.

Another conclusion we can draw concerns the label 'project report', which means different things for the two communities of students. While clearly pointing to design for the architects, project report is more opaque for the civil engineers and therefore requires concept refining. These observations suggest that to support students of architecture and civil engineering in their writing, ESP teachers should incorporate genres that might have been overlooked (e.g., CV/online portfolio). Thus, further discussion with the faculty's subject specialists is necessary to clarify the textual properties of individual genres in the engineering context to help us develop the students' writing skills in the right direction.

Given the array of technologies that the responses mentioned, more digital tools and media should be included in ESP courses as well as in the GELS Framework e-communications layer (e.g., webpages, shared platforms) to incorporate genre-based writing for a broader audience (general public, fellow architects, etc.). Learning activities should be designed that can ultimately prepare students for the genre and the skills highlighted by the GELS Framework for the corresponding level (e.g., summarising / paraphrasing texts on technical topics). Along the same lines, formal e-mail writing (i.e., formal asymmetric interactions on campus or at work) should also be included in the syllabus. Finally, 'Writing for Online Genres' should become part

of the newly designed syllabus, especially genres which allow for more visual information usually used by architects (e.g., on Issuu and Instagram).

As for the generalisability of results and the representativeness of our sample relative to the broader scope of the Erasmus+ BADGE project, we believe that, even if the results of the study are primarily aimed at rethinking ESP in two universities, they can offer a valid basis for discussion of syllabus design, informed by questionnaire results, with colleagues from the larger GELS and BADGE networks, referred to in this paper. This is in line with the findings of other studies on writing needs, such as Arnó-Macià et al. (2020), in which a questionnaire is used to investigate two European Universities (in Spain and Austria) to support the claim for validating curriculum design with student needs on the larger scale of "an increasingly internationalized context" (2020: 72). Comparing two Universities from two different areas within Europe, one from Southern Europe (Italy), the other from Eastern Europe (Czech Rep.), with differing traditions of higher education in general (and engineering education in particular) means comparing two independent samples that might be revealing of needs that are common to a whole area of Europe where English has only recently become the language of internationalization. This might inspire ESP teachers around Europe to replicate the questionnaire and find out about engineering students' perceived needs in writing.

To conclude, the research has shown that a more detailed probe into writing practices in architecture and civil engineering degree programmes is necessary to inform the teaching of writing instructors. This view is also shown by Strauss and Grant who echo the claim that students "benefit the most when writing instruction is embedded in their specific discipline context" (Strauss & Grant, 2018, p. 8). Therefore, further research should be led in close cooperation between ESP teachers and engineering specialists to develop an L2 English writing module in the engineering curriculum.

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