ANTARCTICA: Going places with ESP for Science

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Abstract: This paper introduces a new interdisciplinary project titled "Antarctica", conducted at the Faculty of Science, Masaryk University. Within this project, a team of language teachers collaborated to integrate a series of lessons into their English for Specific Purposes (ESP) courses. These lessons centred around the captivating research subject matter of Antarctica, aiming to foster autonomous learning capacities of students across three distinct disciplines: life science, geology, and geography. The authors describe the design process which began with students immersing themselves in the subject matter, followed by the exploration of the research proposal genre and presentation skills. Finally, students showcased their work at an interdisciplinary mini-conference. Students in their feedback appreciated the format of the mini-conference, especially the fact that external experts were invited to provide insights and commentary on student work. In the paper, the authors highlight the transferable moments for teaching that emerged during the project and share the valuable lessons learned.

Key words: Task-based learning, English for Specific Purposes, tertiary language education, syllabus design

Abstrakt: Autorky v tomto článku představují nový mezioborový projekt s názvem "Antarktida", který proběhl na Přírodovědecké fakultě Masarykovy univerzity. V rámci tohoto projektu spolupracoval tým učitelů cizích jazyků na sérii lekcí v kurzech angličtiny pro specifické účely (ESP). Tyto lekce se soustředily na výzkum o Antarktidě a jejich cílem bylo podpořit autonomii a jazykové dovednosti studentů ze třech různých oborů: biologie, geologie a geografie. Autorky v článku popisují postup, který začal seznámením studentů s tématem, a poté pokračoval přípravou studentských prezentací. Vrcholem projektu byla mezioborové minikonference, kde studenti předvedli své výzkumné projekty o Antarktidě. Studenti ve své zpětné vazbě ocenili formát minikonference, zejména skutečnost, že byli přizváni externí odborníci, aby poskytli své postřehy a komentáře ke studentské práci. V článku autorky zdůrazňují užitečné momenty z projektu a sdílejí své zkušenosti.

Klíčová slova: Task-based výuka, angličtina pro specifické účely, jazyková výuka na univerzitě, tvorba učebních materiálů

Introduction

Current tertiary English for Specific Purposes (ESP) courses must navigate a complex landscape of challenges, including the rising proficiency levels of students, the increasing demands of industry-specific language competencies, and the necessity for innovative pedagogical approaches to meet diverse learner needs (Woodrow, 2018). This is certainly also the case of teaching English for Scientists, where the challenges include not only mastering specialised vocabulary, comprehending and producing scientific literature, but also soft skills such as effective communication of complex ideas. The Language Centre unit at the Faculty of

Science (Masaryk University Brno) had already achieved success with involving subject specialists and interdisciplinary collaboration into their English language courses (Helán, Němcová & Kovaříková, 2016), therefore, it seemed only natural to build on this foundation and seek topics that call for further integration of scientific expertise, innovative teaching methodologies and real-world applications to enhance the learning experience.

Traditionally, the English for Specific Purposes (ESP) language courses offered by the Language Centre at the Faculty of Science are discipline-specific, i.e. they target students of specific science disciplines, such as mathematics, geology or life science. This gives the teachers and students an opportunity to explore subject-specific topics in more depth and tailor the language learning process to the specialized vocabulary, genres, and communication styles unique to each field. On the other hand, this discipline-specific focus can sometimes limit the opportunity for cross-disciplinary communication and broader language exposure. Students may miss out on learning how to adapt their language skills to different scientific contexts or engage with peers from other fields, which is increasingly important in today's interdisciplinary scientific landscape. As we believe that balancing subject-specific depth with opportunities for more general scientific communication could enhance the effectiveness of our ESP courses, we decided to set up a project that would connect our students across disciplines and prepare them better for diverse professional environments.

It is important to note that all our foreign language courses at the Faculty of Science are elective, i.e. students only opt to enroll in them if they perceive them as relevant and attractive. The only external incentive the teachers might employ to motivate students to sign up is the fact that the courses are generally designed in such a way that they prepare students for their compulsory language exams in bachelor and master programmes, which are on B1 and B2 level respectively. Therefore, the proposed innovation of our existing courses needed to bolster and enhance the overall objectives of the courses, rather than bring in extra objectives. It also needed to be smoothly incorporated into the syllabi and last but not least, one of our aims was to help make our lessons more relevant and enjoyable.

The topic "Antarctica" was chosen for the project as our aim was to foster interdisciplinary communication and the continent presents a unique and still rather uncharted arena for scientific research with diverse foci. The relevance of the topic is further heightened by the presence of the Czech polar station (The Johann Gregor Mendel Czech Antarctic Station), a popular target of the adventurous members of the scientific community including aspiring student researchers. In this article, we describe the process of implementing the individual activities into our existing English language courses for Geologists, Geographers and Life Scientists and the final mini-conference where they presented their research ideas in front of their peers, language teachers and invited specialists.

Task-Based Learning in ESP for Science

Our Antarctica project was designed in line with the principles of task-based learning (TBL). This methodology prioritizes communication, problem-solving, and collaboration, making it highly suitable for ESP courses in science, where the need for language learning is closely linked to practical and professional contexts. In a tertiary ESP for science setting, students are not merely learning English as a general subject but as a tool to communicate and operate within their specific academic and professional domains. TBL allows students to engage with tasks that are authentic and aligned with their future careers in science. These tasks may include preparing lab reports, participating in scientific discussions, or presenting research findings – activities they are likely to encounter in their professional lives.

By focusing on tasks that focus on meaning and are directly related to students' future roles, TBL provides immediate relevance and motivation (Ellis & Shintani, 2014). It allows students to bridge the gap between theoretical knowledge and practical application, enabling them to see the direct benefits of improving their language skills. For example, completing a task such as delivering a scientific presentation in English helps students practice specialized vocabulary, technical explanations, and public speaking skills. This engagement with meaningful, context-specific tasks leads to more effective learning outcomes than traditional, abstract language instruction.

The collaborative nature of TBL makes it especially useful in ESP for science, where teamwork and problem-solving are integral to scientific research and practice. In a typical science classroom, whether in a lab setting or a lecture hall, students are often required to work in groups, analyze data, and come up with solutions. TBL mirrors these real-world dynamics, encouraging students to engage in group tasks such as discussing scientific experiments, interpreting research papers, or solving hypothetical problems related to their field of study (Ellis, 2003).

Through this collaborative problem-solving, students not only improve their language proficiency but also develop critical thinking skills. In our context, the outcome of the project was a mini-conference where each team was required to explain, justify, and negotiate their ideas in English. This interaction mirrors the types of communication scientists use in professional environments, making TBL an invaluable method for preparing science students for their careers. The language practiced in these tasks becomes more than just linguistic knowledge; it becomes an active tool for academic and professional success.

One of the most significant benefits of TBL is its learner-centered nature, which aligns well with the needs of tertiary science students. In our TBL framework, students took an active role in the learning process and engaged with the topic of Antarctica to explore and identify the "research gap". This way, our aim was to empower students to take ownership of their learning by giving them the opportunity to solve problems, make decisions, and use language in practical ways (Long, 2015).

This shift toward active learning is crucial in a tertiary ESP context because science students are already accustomed to inquiry-based learning in their scientific studies. TBL builds on this foundation by promoting active language learning, where students experiment with language in a way that mimics their scientific inquiry processes. This synergy between language learning and scientific inquiry fosters deeper engagement and retention, as students are more likely to internalize language skills when they see them as tools for solving real-world problems.

Lesson Design

In the following sections, we describe the activities we used within the project to scaffold the main outcome, in this case the "research idea pitch" at a mini-conference. Each of the three teachers responsible for one group of either geologists, life scientists or geographers, was free to adapt the activities and offer extra guidance where needed. We also need to point out that apart from the specially designed activities described below, we helped our students with their presentation skills extensively, however, we do not go into great detail here as we do not consider presentation skills to be the primary focus of our text.

Activity 1: Understanding Antarctica Through Video Exploration

The basic structure of the Antarctica project was a series of lessons scheduled around the middle of the semester; this gave our students time to grasp foundational concepts early on while leaving room for evaluation and assessment at the end of the term. In the first lesson of the series the students worked in their existing discipline-specific classes with their teacher to familiarize themselves with the topic through the lens of natural sciences to gain a better insight into its research potential. As ESP teachers with only a layperson's understanding of the subject matter and no science expertise we needed to ensure we drew on reliable materials and facilitated the development of a strong knowledge foundation. Therefore, to kickstart the learning process, we used a video from the TED-ed (see the link in the list of references). In the video, a clear distinction is made between phenomena associated with the Arctic and Antarctica. Our students' task was to categorize information into three columns: one for the Arctic, one for Antarctica, and one for points that applied to both. This way, they were either reminded of the basic phenomena or learned about them. It could be argued that the material used is aimed at younger or less academically advanced learners compared to our graduate students. However, the nature of the task in the context of an ESP class (listening for detail) was such that the task was challenging and engaging enough.

The aim of a follow-up task building on the knowledge acquired from the video was for the students to draft a script for a more advanced, discipline-specific educational video on the same subject (Antarctica). They were encouraged to ask more in-depth, exploratory questions appropriate for an academic audience. The activity then resulted in a sharing session, with each group presenting their ideas in front of the class.

The final step of this activity was to connect the students between the groups and disciplines. For that purpose, we set up a discussion forum in our information system. The students' task was to think outside their specialism and think of three questions they believe their peers with different discipline backgrounds should cover in their version of the video. The interaction online was both informative as regards specialized knowledge and engaging in terms of the social contact that was thus established between the students (see Ex. 1, 2 and 3)

Examples from the discussion forum.

Ex. 1. One of the questions geologists asked geographers:

2. What impact does the ozone hole have on Antarctica?

- The ozone hole means that there is less ozone in the atmosphere. It lets more harmful radiation reach the surface of the Earth which affects human health. It does not affect only Antarctica but the whole Earth.

Ex. 2. One of the questions geologists asked life scientists:

Can we domesticate penguins and seals?
We think we can domesticate penguins because they live in communities and are used to communicating with each other. On the other hand, the seal is a solitary animal and is not used to living in a contact with other species. It is adapted to life in water, and on land, it primarily relaxes. So it would be hard and would take a lot of time.
Both of these animals would take lots of time like the domestication process of wolves into dogs, which took about 300 years or more.

Ex. 3 One of the questions from life scientists to geologists:

Have any fossils or evidence been found in Antarctica suggesting that there was a warmer climate there at one point?

Yes, definitely. There have been certain discoveries of fossilised plant leaves which have also been found in Australia or South America (it means they were once connected together).

To summarize, the objective of the first activity was to lay the knowledge foundation, kindle our students' curiosity about the subject and connect them online where they were encouraged to explore some more specific questions in collaboration with their peers.

Activity 2: Select Your Antarctica Team

In the first lesson of the Antarctica project, we introduced another activity designed to get students interested in the topic. While capturing their interest in Antarctica was important, the primary aim was to emphasize the interdisciplinary nature of Antarctic research, or any research for that matter. One of our goals was to reflect the collaborative spirit of the Czech Antarctic research program, where interdisciplinarity is a defining feature. To achieve this, we prepared a set of 14 cards with various professions, including scientific specializations like chemist and geologist, as well as non-scientific roles such as carpenter, journalist, and influencer. The selection of these professions was largely based on the actual composition of the Czech Antarctic research team, which we followed closely through their social media platforms. Additionally, we drew inspiration from scientific papers published by the team, which gave us a clear understanding of the key roles and in-demand specializations required for conducting research in such an extreme environment. This activity not only introduced students to the wide range of skills necessary for Antarctic expeditions but also mirrored the real-world collaborative dynamics of the research program.

Each picture in the activity is accompanied by a brief text explaining the role of the researcher and how their specific knowledge or expertise would contribute to the team's overall mission. For instance, the card for a botanist describes how the scientist would research plants, lichens, and algae, thus contributing to the program by studying how these organisms adapt to extreme cold (see Ex. 4). By including these descriptions, we aimed to emphasize the interdisciplinary nature of the project and the crucial role of collaboration among experts from various fields. In terms of language, the students, through selecting the cards, learned Antarctica-specific vocabulary – either related to the local fauna, flora, and landscape (e.g., seals, mosses, ice cores, glaciers, and others) or to scientific specializations, such as zoologist, environmental scientist, or astrophysicist.

Ex. 4

Botanist

- would study the unique flora, including mosses, lichens, and algae.
- would contribute by identifying and cataloging plant species, studying their adaptations to extreme conditions

In the classroom, the students worked in groups, each group responsible for forming their own Antarctica research team. They had to decide which seven professions would be part of their team, and which roles would be left out. Importantly, the entire group had to agree unanimously on their selections, which led to a lot of negotiation, collaboration, and argumentation (see Ex. 5). Interestingly, none of the teams chose to include the journalist, unlike the real Czech Antarctica expedition, which took a journalist along to report on their research and document their activities through social media, podcasts, and TV programs. Our students often argued that a journalist was not necessary, believing they could handle that role themselves by taking photographs and writing about their work, as they are already proficient at writing scientific papers. This revealed to us how the importance of science communication and the need to reach a broader, non-scientific, audience is still underappreciated by a large number of science students. Nevertheless, the students approached the activity with enthusiasm, sharing thoughtful ideas and engaging in lively discussions and negotiations, which made the activity both dynamic and informative.

Ex. 5

Students' enthusiastic participation led us to reflect on why the activity was successful and effective. First, its visual appeal played a significant role – it was visually stimulating and engaging, which resonated strongly with the students. The visual elements helped capture their attention and maintained their interest throughout the task.

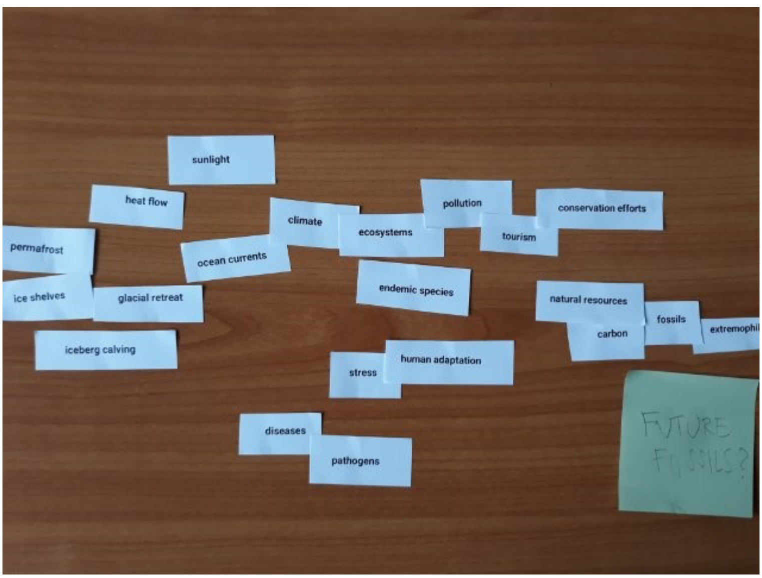
Secondly, this was a first-person activity in which the Antarctica expedition was framed as a game. By adopting this format, students were positioned in the role of decision-makers, responsible for selecting their own team. This gave them a sense of control over the process. This setup mirrors the core experience of playing games, where players have the power to make decisions and influence the direction of the game. We believe that the sense of autonomy and decision-making helped students become more engaged, as they felt empowered and thus took part actively.

Last but not least, the activity emphasizes cooperation, collaboration, and community-building. This activity naturally encourages teamwork, as the students have to work together to build their fictional Antarctica team. In addition to the practical skills of negotiation and collaboration, the heart of the activity is about nurturing a sense of belonging – belonging to a team, and by extension, belonging to the classroom community. Our hope is that the team spirit and the sense of connection developed through this fictional exercise would extend to the real-life interactions in the class. We believe that activities like this, particularly when conducted at the start of a semester, can effectively create a positive class environment and encourage community-building, which are essential for cultivating a collaborative and supportive learning atmosphere.

Activity 3 Mindmap

The last activity leading to the mini-conference was a mindmap of concepts related to the topic of Antarctica. It was designed to help our students come up with possibly underresearched, relevant and interesting questions that they could use in their preparation for the "research idea pitch". The students received a set of concepts on separate pieces of paper and their task was to arrange them into clusters or hierarchies, depending on the relationships between them. We also provided some blank pieces of paper. In this stage, we believe it was important that the students were given sufficient time to look up and discuss less familiar scientific concepts. Finally, each group presented their mind map design including whether or not some of the links in their mindmap give rise to interesting research questions. This activity allowed the students to think critically, engage with the topics as well as enjoy autonomy in their decision and further research.

Example of a mindmap with a suggested research idea.



The Final Mini-Conference

The format of the final mini-conference was once again designed to mimic a standard science conference experience. The event included a structured program with time slots for each student's presentation, ensuring everyone had an opportunity to share their work. We set up the venue with rows of chairs, just like in professional conferences, and used a projector for visual presentations. To add to the authentic atmosphere, we arranged for small refreshments like snacks and drinks during breaks, which also helped create a casual networking environment. The students were encouraged to engage as both presenters and audience members to give them a sense of participation and collaboration.

To further heighten the sense of authenticity, we invited two experts to be on the jury: one of them is a former student of the Faculty of Science currently working for the Czech Antarctic Research Programme. As he has been a member of an Antarctica research expedition in the past, he was able to share valuable insights and motivate the students to become involved in Antarctica research. The second expert was a colleague of ours – an experienced botanist and professor from Mendel University, who gave very useful feedback on the presentations both in terms of content and delivery. After the presentation, the jury (the language teachers and experts) voted for the best research idea and the winning team received a small prize. The second prize was given for the most captivating presentation and in this category, each student had a vote. This, we believe, made the event not only competitive but also collaborative and inspiring.

The prizes were donated by the Masaryk University Language Center (CJV), for which we are very grateful. Additionally, the Czech Antarctica Research Program itself also provided additional prizes. Later, we were thrilled to see that the Czech Antarctica Research Program shared news of our project and mini-conference on their social media. This recognition was a great encouragement for us, and it motivates us to continue the project next year.

Conclusion

In the context of ESP for science in a tertiary setting, the Antarctica project proved to be a highly relevant and effective pedagogical approach. Its emphasis on interdisciplinary, real-world tasks, collaboration, specialized language skills, and learner-centeredness aligned closely with the needs of our science students. From the feedback provided by our students after the course, it implies that they appreciated the novelty of the project as well as the authenticity and extra challenge it posed. To quote from one of the responses we received at the end of the course: "I was not confident at first but then I found the experience really useful." It is also noteworthy that the element of external experts participating in the discussion at the conference was a welcome addition to the usual round of presentations we do with our students in traditional ESP classes: "I was a bit scared when I learned there would be experts judging our performance, but they were really nice and made it more real."

Overall, we believe that by focusing our ESP classes on meaningful, discipline-specific tasks, the activities not only enhanced language acquisition but also helped prepare students for the professional communication challenges they will face in their future careers. In this way, we find that our task-based interdisciplinary project might offer a new and engaging method for bridging the gap between language learning and scientific practice, which is perhaps the ultimate aim of all our ESP endeavors.

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