

## Applied linguistics project: student-led computer assisted research in high school EAL / EAP

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**Abstract.** The Applied Linguistics Project (ALP) started at the International School of Prague (ISP) in 2013. Every year, Grade 9 English as an Additional Language (EAL) students identify an area of learning in need of improvement and design a research method followed by data collection and analysis using basic computer software tools or online corpora. Mimicking authentic research, they write a research paper and present it in front of a panel of experts at Charles University in Prague. The papers are collected in a proceedings book. This research project confirms that high school students – with appropriate scaffolding – are capable of academic research, meta-cognition, and applying data-driven critical thinking to academic language learning with a responsible application of Computer-Assisted Language Learning (CALL).

**Keywords:** inquiry learning, student-led research, applied linguistics, EAL, English as an additional language.

### 1. Introduction

For more and more students worldwide, the language of their schooling is not their Mother Tongue (MT). These students learn the new language, as well as in it, through it and about it, facing a double challenge: unlike their native speaker schoolmates who learn unknown concepts through a known language (their MT), EAL students' learning is an equation of two *unknowns* – learning an *unknown*

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concept in a *partially known* language. Thus, much of their school experience is not based on fully comprehensible input (Krashen, 2003).

Arguing the crucial role of language in learning, Postman (1980) says that “every teacher, regardless of level or subject, must be a language educator” (p. 28). Halliday (1993) adds: “When children learn language... they are learning the foundation of learning itself” (p. 93). In other words, almost all learning is a form of language learning, meaning making through language. As a time-tested biblical proverb says: “Learning comes easily to someone who understands” (Proverbs 14:6 New International Version). Therefore, if students understand better how language works and how their MT and academic language interact, they will be in a position to understand better how learning works – and how to make it easier and more effective. We suggest that a combination of introspection, CALL and a data-driven discovery approach will allow for more engaged, meaningful and efficient learning for all students.

That was the goal of the ALP at the ISP, in which 32 Grade 9 EAL students identified an area where they needed to improve their learning of and through academic English. Each student chose a topic and an appropriate linguistic research method to find out how their learning in academic English works in comparison with learning in their Mother Tongue, how the two languages interact or differ, etc.

The researched topics were: bilingual reading speed and comprehension comparison, basic lexicography, translation, an analysis of academic vocabulary use in context (such as assume, believe, conceive, etc.), or a comparative study of a paremiological minimum (100 most frequently used proverbs) between two languages. Students analyzed their results in a short paper presented at a student linguistic conference held at Charles University in Prague. At the end of the project, the student papers were bound into a proceedings book, in imitation of the real academic research process.

## **2. Methodologies**

### **2.1. The general pedagogical methodology**

Short instructional videos explaining basic data collection and analytical methods were used to train the students in basic applied linguistics methodology (“flipped classroom” approach). A template of the final paper provided a rubric and a list of requirements. For bilingual reading speed and comprehension studies, a minimum

of five different texts in each language was required for analysis in bilingual reading speed and comprehension studies. After reading an academic text in MT for at least three minutes, students took a small comprehension test prepared by another speaker of the MT and calculated the reading speed in words or syllables per minute. The same procedure was repeated with texts in English.

The CALL element of the research involved using appropriate software for recording their reading, word count and other quantification tools, as well as data processing in calculating the ratios in words per minute or syllables per minute. They also used graphing software to visualize the results. Another CALL dimension was the use of online corpora, either the parallel multilingual InterCorp by the Institute of the Czech National Corpus or the British National Corpus (BNC).

Corpus based studies produced much larger sets of data, bringing these high school students even closer to authentic academic research. Concordances, collocations, relative frequency and distribution, as well as randomization of large samples were among the most frequently used software tools employed in corpus research. Students conducting these studies also used lexical density, percentages and an analysis of trends to evaluate their results.

### **3. Discussion**

#### **3.1. Data collection, processing and evaluation encouraged through questions**

The research paper template is also a springboard for critical thinking in their analysis and interpretation. If a proposal for improved learning is presented, the young researchers need to explain whether there are possible alternative interpretations and their implications for learning strategies or for future research.

Additionally, the conclusion of a student's paper and presentation needs to connect his or her analysis of results to the research question/topic and show how their research answers the question (or not) and why. Further help is provided with questions such as, what are the limitations of your method or results? What counter-arguments can be used against your interpretation? Do the results harmonize with your background research? etc.

As in all academic research, a bibliography has to be included in the paper (MLA style). In the second year of ALP, some of the previous student papers were cited and referenced in new research that expanded on their methodology and findings –

again, imitating the actual research process. In keeping with the concept of additive bilingualism, each paper has an abstract in the student's MT and English.

### **3.2. Life-long skills and interdisciplinary overlap of ALP**

ALP is a multi-modal, meta-cognitive and interdisciplinary discovery learning activity. Students are required to use printed as well as electronic sources to keep their research skills balanced. They also need to combine methodologies of various disciplines: mathematics, language, social studies, and statistics. Interestingly, a Russian student who realized that processing raw data through relative frequency completely changed the seeming implications of the results commented: "This is the first time in my life that I've seen mathematics being useful". A Belgian student's feedback form said: "This project helped me to improve my linguistic skills for both languages [MT and English]... I learned a new study method, now I know what to do if I don't understand a topic at school...". A Japanese native speaker wrote: "Throughout the ALP project, I found out the useful studying techniques which I have been using for four or five months. It is apparent that my grades are ameliorating so much from the first term. I also learned how to write an academic paper". A Czech student who in 2013 conducted a corpus-based study plans to use corpus methods in mass media analysis for his final International Baccalaureate research paper.

## **4. Conclusions**

Students who have done this small-scale linguistic research benefit from the meta-cognitive approach to language learning because it empowers them to become producers of knowledge, not just its passive consumers. The experience of having one's own ideas confirmed or "disproved" by experimental data gave them a deeper understanding of both learning and the limitations of the scientific methodology. Their findings also support the claim that MT inclusion in EAL students' learning makes learning more effective as it removes one of the "unknowns" (i.e. unknown language element) and makes the input more comprehensible. It also demonstrates that high school students are fully capable of academic research, meta-cognition, analysis and critical thinking, with appropriate scaffolding.

An added benefit of working with quantitative data is the valuable practice students received in distinguishing better quality data from lower quality data, and the importance of the sample size. This is indeed a "lifeworthy" skill – the ability to deal with a flood of data, sifting through the information, separating the useful from the useless, and drawing their own conclusions based on (un)observed patterns

(Perkins, 2014). Even students who were less than enthusiastic benefited, as became evident during the feedback collection. One student claimed that he “hasn’t learned anything from this project”. When asked about the pattern he had mentioned in his presentation, he answered: “Yes, but that was such a small sample!”. Thus, this student demonstrated that if nothing else, he learned that small sets of data have limited value when it comes to generalizations and pattern identification – a valuable life skill indeed.

Naturally, there is much room for improving the pedagogical and research value of ALP. For this reason we have also built a specialized Corpus of High School Academic Texts (COHAT – more details in our paper on COHAT, Bohát, Rödlingová, & Horáková, 2015, in this volume). Yet the first two years’ worth of preliminary data show that ALP engenders critical thinking and meta-cognition in teenage students, as evidenced by their presentations, papers, and feedback. This harmonizes with Postman’s (1980) description of language learning “as a form of metaeducation. That is, one learns a subject and, at the same time, learns what the subject is made of. One learns to talk the subject, but also learns to talk about the talk...” (p. 37). ALP allows the aspiring young researchers to think about their thinking, talk about their talk and learning in their oral presentation to the panel of experts as well as in their papers. This approach has a great potential. “For it is not education to teach students to repeat sentences they do not understand so that they may pass examinations. That is the way of the computer. I prefer the student to be a programmer” (Postman, 1980, p. 37).

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