

Engineering Education and Language Training at a Technical University: A History of Friendship

Alexander Chuchalin

*Doctor of Sciences, Professor,
Advisor to Vice Rector for Academic Affairs,
Tomsk Polytechnic University
Russian Federation
chai@tpu.ru*

Svetlana Rybushkina

*Leading Expert, Tomsk Polytechnic University
Russian Federation*

Tomsk Polytechnic University (TPU) has a lot of experience in teaching technical fundamentals and English in an integrated manner, though such kind of collaboration is still rare in Russian technical universities. In this essay we would like to give a brief overview of the TPU case.

How It Started

When the Iron Curtain finally fell in the early 1990s and Russia suddenly realized the need for communication with other countries, the quality of language training in national universities was very low and did not meet the requirements of the new era. That was the time for diverse urgent attempts to make the society speak English in a wink of an eye. In the 1990s–2000s, Tomsk Polytechnic University pioneered many new approaches towards enhancing its graduates' communicative skills, and started implementing its new language strategy, which covered the period between 1998 and 2005 (Chuchalin et al).

In 2005, about 360 foreign language teachers worked at TPU, with the total faculty count reaching about 1,700. One of the main features of the new strategy was a significant increase of the language workload in non-linguistic programs (~800 academic hours for 4-year BSc programs, ~400 academic hours for 2-year MSc programs). This was the time when understanding between TPU linguists and technical instructors first originated.

From Collaboration to Friendship

Beyond doubt, one of the most valuable experiences in the history of aligning language and engineering training at TPU is the practice of collaborative teaching, known at the university as pedagogical partnerships, or 'tandems'. The experiment lasted 7 years. Engineering and linguistic faculty combined their efforts to deliver English for Specific

Purposes (ESP) courses tailored for particular engineering fields (e.g., English in Computer Science, English in Nuclear Physics, etc.).

It is important to note that both linguists and engineering faculty actively participated in the design and implementation of 'tandem' courses. The cooperation between linguists and the rest improved greatly after the 2010 TPU reorganization, when multiple departments and divisions were restructured into Institutes for Research and Education in line with the university's priority areas, each institute getting its own specialized foreign languages department.

On Intrinsic and Extrinsic Motivation

In 2001, TPU started developing joint MSc programs in cooperation with leading European universities. English as a medium of instruction in half of the courses of each double degree program became a powerful factor in motivating students to study the language. A special course of English for Academic Mobility immediately became popular.

In 2004, TPU introduced a system of elite engineering education (EEE) for the most talented and motivated students. The essence of EEE at TPU is that students who have successfully passed a special competitive selection process are offered in-depth courses in natural sciences and mathematics, economics, foreign language, and a number of other disciplines that develop creativity, communication, and leadership skills. The distinctive feature of training elite undergraduates is their R&D work commissioned by Russian and international enterprises with their subsequent employment by these companies. About 200 students are selected annually for the EEE program, which makes approximately 10% of the first-year engineering students cohort. For the time being, about 1,600 students have participated in EEE courses at TPU; 250 students have successfully completed the program, and 450 students are currently enrolled.

Another motivating factor appeared in the form of the final qualification paper. Since 2007 all TPU graduates in MSc programs must (and those graduating in BSc programs may) prepare at least 20% of their thesis (qualification paper) in English. This practice has seen some modifications but remains effective to the present day.

From Top-Down to Bottom-Up

Since TPU management initiated collaboration between linguists and engineering faculty at the university 20 years ago, this cooperation has acquired strong traditions and gained a lot of support. Today it can be illustrated by the fact language instructors started developing ESP courses on the basis of Massive Open Online Courses (MOOCs) in the 2013/14 spring semester. It became clear at early stages of the initiative already that its efficiency could be improved if the project addressed not only linguistic

aspects but engineering knowledge and skills too. The idea triggered great interest and was consistently supported by engineering departments. Thus a naturally integrated approach to teaching ESP based on MOOCs was created.

In this experiment, language training ceased being an isolated element of engineering programs and directly contributed towards common learning outcomes. The course was offered in weekly cycles when students learned new concepts and did assignments online, and then participated in in-class discussions and seminars followed by short reports. Teaching effort was shared in the following way: engineering faculty would shortlist courses with appropriate content, advise students on technical concepts, and later hold final tests, while language teachers would advise on the appropriate language level, hold weekly lessons on linguistic issues, and check the students' short reports. Noteworthy is the fact that support on behalf of engineering departments in the delivery of these MOOC-based ESP courses was requested by language teachers and did not require any administrative support. What was initially a top-down approach bore fruit.

Concluding Remarks

In 2015, TPU ranked among top-5 BRICS universities in terms of internationalization according to the QS University Rankings¹. Nowadays 100% of the students graduating from TPU MSc programs have to present part of their thesis in front of the state certification committee in English. Over the last 5 years TPU students have regularly won prizes in foreign language competitions for technical students of various levels². They also prepare research and conference papers in English and introduce projects at international fairs. About 600 TPU students took courses or had internships in 179 international universities and companies in 27 countries in 2014. TPU offers 13 double degree programs with European universities (based in Great Britain, Germany, France, and Czech Republic), with instruction languages being Russian and English. More than 200 individual courses taught in English are now available at TPU.

Just like in any team, TPU language and engineering faculty have different views on many issues. Although today the benefits of knowing foreign languages when building a career in engineering are obvious in the increasingly global world, it was not the case several decades ago. Even now technical instructors disagree with the fact that language courses are given extra time at the expense of engineering modules. They also insist that ESP courses should be arranged around discipline-specific vocabulary and grammar. Language departments constantly justify the need for additional workload and have an inclination towards skill-based (as opposed to knowledge-based) learning. These dilemmas stimulate new projects and experiments. Apparently, efficient solutions should result from joint effort.

References

- [1] QS University Rankings: BRICS 2015. <http://www.topuniversities.com/university-rankings/brics-rankings/2015#sorting=2407350+country=+stars=false+search=>
- [2] *Regional Business English Olympiad* (Krasnoyarsk, 2011, 2012, 2013); *International On-line ESP Olympiad among non-linguistic students of CIS countries* (2012); *International On-line Olympiad of English in Power Engineering* (2012); *ESP Olympiad of Tomsk Oblast* (Tomsk, 2013, 2015); *On-line English Olympiad* (2014); *Debate competition of the All-Russia Olympiad of English for Technical Students* (Moscow, 2015), *International Olympiad on Foreign Languages* (Krasnoyarsk, 2015), etc.

S. Rybushkina and A. Chuchalin. *Integrated approach to teaching ESP based on MOOCs/ Proceedings, 43th Annual SEFI Conference, Orleans, France, 2015.*

A. Chuchalin, L. Agafonova, N. Kachalov. *Multy-level program for foreign language training at a Russian technical university/ Proceedings, 4th UICEE Annual Conference on Engineering Education, Bangkok, 2001.*

.....