

AUTOMATION TECHNOLOGY AND GERMAN AS AN ONLINE COURSE (ADOK)

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Abstract

In light of the fact that there is a shortage of engineers with specific German language skills, universities and companies from the Czech Republic, Estonia, Finland and Germany developed a curriculum and teaching material for an interdisciplinary online course which combines the fields of Automation Technology and German as a Foreign Language.

The course material produced is a combination of problem-based instruction in the field of Control Engineering and active learning of the German language. The tasks are embedded in Moodle.

For language learning purposes, we adapted an existing reading strategy which clarifies, for example, keywords.

The target groups for the course are engineering students working towards a bachelor's degree at European institutions of higher education, and also qualified employees of companies in technical industries who can use the material in continuing training.

The course simulates the fulfilment of an order from the enquiry stage through to delivery. In international teams students act both as customers and distributors. The product ordered is the programming of a light signalling system.

Within the poster presentation we will also give an overview of the course structure, the course contents and some practical information which will be helpful when implementing the course in different environments (e.g.: interdisciplinary course for international students in Germany, German course for students in their home country,...).

1. Introduction

In this paper we will describe our EU-project (Lifelong Learning Programme) ADOK and the resulting course we have developed. The paper is structured as follows: we will start with a short insight into the project itself and we will then concentrate on the course contents, structure, and usability. To conclude, we will present some of our experiences with the course in practice, seen from both a teacher's and a student's point of view.

In 2009, the EU-project started with specialists for Programmable Logic Controller (PLC) and German as a Foreign Language from four countries to develop an interdisciplinary course which combines the two fields on an equal level in an online format.

By the beginning of 2013, the course and teaching material will be finished and ready for use. You will be able to find all the relevant material as it becomes available at the following website: www.adok-projekt.eu

2. Course

2.1 Contents

ADOK, Automation Technology and German as an Online Course, is an interdisciplinary course where two totally different subject areas, one of them technical and one a foreign language, are linked. The foreign language is no longer just a teaching medium, but a subject itself.

The course is planned to be taught by a team of two teachers as a blended learning course. We therefore also prepare a teacher's handbook and additional material for the online course.

Within the course, the students should gain the skills they need to take part in international projects and in a multi-lingual environment, gain the language skills needed and technical knowledge to deal with tasks in automation projects in German, and learn how to work in international teams whether real or simulated.

The students acquire basic knowledge of PLC-systems, get to know a range of methods for the systematic solution of automation tasks, and can develop, write, and test simple programs with STEP 7.

The course is designed for engineering students at the bachelor level who have some knowledge of German (A 2); either students in their home countries or international students in Germany. It can also be used as a training course in companies on an optional basis.

In order to ensure that the course remains practice oriented, we use simplified authentic material as a basis for our online tasks. Within the course, students learn the relevant technical knowledge and skills to programme a traffic light system. Simultaneously, they acquire the language skills they need to conduct the project from the initial order until the final hand over. Taking over the roles of distributors and purchasers, the students work together in international teams to fulfil their duties. As a purchasing-team, students place an order with the distributing-team to program a control system. As a distributing-team, they find a solution to meet the purchaser's wishes. This is the programming assignment. The written and oral communication between the purchaser and distributor will take place in German. Communication within the team can be multilingual.

Ideally, the course would be conducted using different phases. The length, intensity, and order can be chosen by the teachers according to the needs of the students, their individual circumstances and previous knowledge. We would recommend using face-to-face trainings to teach programming with Step 7, the software we used, and to give students understanding of technical texts in German and the basis for project communication. In the laboratory phases, Step 7 is utilised for computer programming, the testing of the programme on the control unit, and finally, the simulation of the traffic light system.

We would also recommend complementing the course with company visits, either virtually or in reality, and additional skype meetings when working together with students from different universities or to train oral communication skills. In the online phases using the moodle online platform, the students can independently use and improve communication skills, teamwork abilities, vocabulary, and test their knowledge.

To make it easier for the participants of the course to understand technical texts, we developed a reading strategy which will be described in more detail under 2.6.

2.2 Structure

Using a variety of exercises accessible via moodle such as forum, chat, cloze, glossary, flashcards, crosswords, wiki, videos, listening exercises and many more, we developed ten modules for the online course. The modules 1-6 and 8 build continuously upon previous knowledge, whereas the modules 7, 9, and 10 can be treated independently. Teachers decide to continually use the contained tasks parallel to the preceding modules, or to use the whole modules as an intensive training.

To give an impression of the course structure, we would like to give a short overview of the modules as well as a description of their contents.

Module 1: Getting to Know Each Other

Here students introduce themselves and international teams are built.

Module 2: Task Introduction

All participants are acquainted with the requirements and procedures. The different project phases are presented starting with a definition of the project and a description of its implementations.

Module 3: Planning of Automation Systems

Module 4: PLC Application

Module 5: Introduction to Programming with Step 7 - Visualization of Software and Hardware

Module 6: Programming of Traffic Light System

These four modules are the main modules where students act within the roles mentioned above and gain the relevant technical and language skills to do so.

Module 7: Company Visits

The students visit companies, virtually or in reality, and write short reports.

Module 8: Project Hand Over

The students prepare a presentation for the customer and need to make a hand-over protocol.

Module 9: Intercultural Aspects

Here various intercultural aspects of international project work are analysed in different exercises.

Module 10: Reading Strategies – 7 Steps to Step 7

Based on the method "Sieben Siebe" [1] the project team developed a reading strategy for technical texts and corresponding exercises. Students learn to recognise and understand structures in the German language.

- Step 1: Look for pictures, graphics, numbers, and names
- Step 2: Look for internationalisms
- Step 3: Use the word list for technical texts
- Step 4: Mark the verb in the sentence
- Step 5: Look for verbs that consist of two parts
- Step 6: Look for structures which are typical for technical texts (structures are given and explained)
- Step 7: Look up the remaining words in the dictionary

3. Proceedings and Results

Since the start of the project in 2009, the project team developed the online course and teaching material for classroom teaching. After the first year when two modules were ready, a short test run was carried out at the four participating universities. The results showed that students are interested in blended learning and the combination of the two subjects, Automation and German as a Foreign Language. In the 2012 Summer Semester, all of the course modules were taught as a blended learning course in Estonia, Finland, Germany, and the Czech Republic. Even though the user interface was not finished by this time, students gave positive feedback about the course. What they especially liked was the language part, because the many different types of exercises varied greatly from one another. We are currently using the last months of the project duration to make final improvements in content, technical aspects, and design.

In Germany the course was conducted with international exchange students, whereas in Finland and Estonia the courses were taught parallel to one another with the Finnish and Estonian participants working together in international teams. In both cases, ADOK was used as an interdisciplinary course. Our partner in the Czech Republic used the course as a German language course with a focus on automation, which is also possible when there are no specialists for automation at the university.

International cooperation, as conducted between the Finnish and the Estonian university, is very time consuming but also very effective, especially in terms of international teamwork aspects. Student exchange during the course was also an incentive for students to carry on.

4. Conclusion

At the time of writing this article, ADOK had just been awarded the European Language Label 2012 in Estonia.

For the participating students, the project team and the teachers, the course is an interesting chance to learn more about the two relevant subjects as well as eLearning. ADOK is especially interesting because there are not many courses for German as a Foreign Language at the A2 level with a focus on engineering. Another advantage is that the course allows teachers and students to work quite flexibly. The three phases and some of the modules can be arranged by the teachers however they prefer and students can work online or at the laboratory independently.

We hope that many teachers will use our material to conduct their own ADOK courses and work together with international partners. As mentioned before, the course and the additional material will be available free of charge on our website (www.adok-projekt.eu) as soon as the project period has ended in spring 2013.

5. Acknowledgements

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References

- [1] Hufeisen, Britta, Marx, Nicole (Hrsg.), *EuroComGerm - Die sieben Siebe: Germanische Sprachen lesen lernen*, Shaker Verlag, Aachen 2007