

## Project Description

(Approx. length: 10-15 pages)

University: Heidelberg

Project (Challenge/Tool/Action): 4

### 1. Introduction:

The aim of the E-Lengua project is to devise potential solutions to the challenges involved in the use of ICT in foreign language teaching, by making use of learners' technological skills and increasing them at the same time. The project challenge assigned to Heidelberg University consists in facilitating independent language learning that is accessible at all times and in all places. Potential tools for meeting this challenge are referred to as *MLearning* (M for mobile) and *ULearning* (U for ubiquitous).

We build on the assumption that the new generation of foreign-language learners are fully accustomed to integrating technologies into their everyday lives and to having information on hand at all times, anywhere and without any further expense and material (such as textbooks, notepads etc.). Generally speaking, these learners do not expect to be restricted to certain rooms or places for study purposes i.e. when increasing their knowledge or practising certain skills. It also seems that these learners are, on the one hand, keen on autonomous learning, but on the other hand still expect professional feedback on their learning progress.

In the framework of the E-Lengua project, Heidelberg will be purposing solutions to the problems related to applying M- and ULearning tools to contexts in which German as a Foreign Language is studied at a very advanced level of language acquisition (for further information see point 3, *Target Groups*). Accordingly, we decided to build on an online learning tool called *ProGram* that was developed at Heidelberg University's Institute of German as a Foreign Language Philology a few years ago. Our goal is to update *ProGram* and adapt it to the requirements this kind of tool has to satisfy in autonomous language learning, and to use the advances in technological innovation to further develop students' language skills.

### 2. State of the art:

The Institute of German as a Foreign Language Philology offers an M.A. programme in German Linguistics and Literature that is designed to meet the

needs of students who are not native speakers of German and who intend to become German lecturers or teachers. A course of studies of this kind requires a very high level of language proficiency, particularly in writing academic texts. Specialised teaching and learning materials addressing the problem of how to achieve this level of competence are practically non-existent. Existing material focuses almost exclusively on German for beginners or at an intermediate level. The computer-based materials available commercially are often restricted to drag-and-drop exercises or to filling in gaps in isolated sentences. It goes without saying that tasks in which clicking takes the place of writing are of limited use for the group referred to above.

Given these poor resources for very advanced learners, a project group at the Institute of German as a Foreign Language Philology set out to develop an NLP (natural language processing) tool for the purposes outlined in the context of autonomous learning. The general goal was to achieve maximum integration between the didactic strategy, the way learners probably tackle the exercises and the potentials of NLP tools, in particular the *Utterance Evaluator*. The tool supports language learners in the following three areas:

- intelligent spell checking
- grammar checking
- distance evaluation between the learner's utterance and the correct solution.

Spelling and grammar checking are based on systems tested and used in, say, the *DUDEN Korrektor*. The innovative component was the intelligent evaluator of students' responses. It is based on a *comparison module* that monitors the learner's answers with respect to structural and lexical deviations such as deviant word order, errors in congruence, inadequate lexical choice, etc. The comparison module calculates the distance between the learner's choice and the correct answer. Subsequently detailed responses are given with respect to the different types of errors and deviations.

The tool *ProGram* covers five grammatical areas: word order, passive, nominalisation, verb valency and functional verb constructions. It has a glossary of important technical terms and a grammar component for the grammatical phenomena under scrutiny. Each of the five topics contains a number of different exercises. In the following, we will briefly demonstrate the operating mode of ProGram by presenting selected screenshots.

The following screenshot shows an exercise in the domain of *verb valency*. At the top of the screen you can see the path through the programme. The task in this case consists of a multiple choice procedure in which learners have to select the adequate form from a list of closely related verbs.

Wortstellung	Verbvalenz	Passiv	FV-Gefüge	Nominal	Gramm.-Hilfe	Glossar	Ihr Profil	<b>ProGram</b>
Inhalt	Übungen	Regeln						
Übung 1	Übung 2	Übung 3	Übung 4	Übung 5				



Logout

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#### 4. Übung zur Valenzgebundenheit der Präfixe und Verbpateikeln

Wählen Sie aus den vorgegebenen Möglichkeiten das passende Prädikat aus und fügen Sie es in die Lücke ein.

**Uni heißt Unterschied**

**Deutschlands Hochschulen müssen sich entscheiden: Spitzenforschung oder solide Lehre**

Die größte Entdeckung deutscher Wissenschaftler ist die moderne Universität selbst, die Forschung und Lehre miteinander *verbindet*. Erfunden in Berlin, *trat* sie ihren Siegeszug um die Welt *an*. Knapp 200 Jahre später  sich Humboldts Erben erneut, in die akademische Weltspitze . Gerade hat eine  hsten Universitäten im so genannten Exzellenzwettbewerb für die Forschung nominiert. Sie sollen den Welt Konkurrenz machen.  machen  diesen  dieser  auf

Die geadelten Hochschulen können nicht nur mit Fördermitteln von insgesamt knapp zwei Milliarden Euro . Der Titel "Eliteuniversität" wird auch ein gutes Argument sein beim Werben um hervorragende Professoren, talentierte Studenten und großzügige Sponsoren. So wird der Exzellenzwettbewerb die Hochschullandschaft kräftig umpflügen. Endlich werden mehr Vielfalt und Wettbewerb in die deutsche Universität  - aber damit auch mehr Ungleichheit: zwischen Hochschulen und Fachbereichen, Professoren wie Studenten.

Moderne Hochschulsysteme müssen zweierlei leisten, Spitzenforschung und Breitenbildung. Die deutschen Universitäten bewältigen beide Aufgaben nur unzureichend. In den internationalen Forschungsrankings  keine deutsche Hochschule auf den ersten vierzig Plätzen. Von Ausnahmen abgesehen, spielen nur die Max-Planck-Institute in der ersten Liga der Weltwissenschaft eine Rolle, nicht aber unsere Universitäten.



After completing the task, the learner presses the *bewerten* (evaluate) button. If the learner's answer does not correspond exactly to one of the anticipated answers, a sophisticated processing device is required. To guide the learner and generate helpful indications, three distinct processes are needed. First it is checked whether the learner's answer contains spelling errors. If so, the error is shown on the screen, together with several alternatives containing the right solution. If no spelling error is detected, the answer is checked for grammatical correctness. In a third step, the distance between the learner's utterance and the anticipated correct answer is computed. To calculate the distance between the learner's utterance and the correct answer, the following linguistic features are taken into consideration: lexemes selected, morpho-syntactic markers with respect to case, number and gender, and word order. The distance is calculated word by word. The distance value is then calculated as the weighted sum of the unified features of the answers produced in relation to the anticipated correct answers.

We illustrate this procedure with an example from the domain *functional verb constructions*. In this task, the learner has to construct and write a full sentence.

Wortstellung	Verbalenz	Passiv	FV-Gefüge	Nominal.	Gramm.-Hilfe	Glossar	Ihr Profil	<b>ProGram</b>
			Inhalt	Übungen	Regeln	FVG-Liste		
				Übung 1	Übung 2	Übung 3	Übung 4	Übung 5
							Übung 6	<b>Logout</b>

### 3. Übung zur Auflösung von Funktionsverbgefügen

Formen Sie die folgenden Sätze um, indem Sie die Funktionsverbgefüge durch Vollverben bzw. Adjektive und Kopula ersetzen. Nehmen Sie alle notwendigen syntaktischen Veränderungen vor.

- Die sprachlichen Anforderungen, die an die Schulanfänger gestellt werden, sind vielschichtig. [\(Hinweis\)](#)  
→
- Die Pädagogik schenkte diesen Anforderungen in den letzten Jahren vermehrte Aufmerksamkeit. [\(Hinweis\)](#)  
→ **Die Pädagogik war diesen Anforderungen gegenüber in den letzten Jahren aufmerksam.**
- Lag der traditionelle Schwerpunkt auf den Fähigkeiten des Lesens und Schreibens, so finden nun auch die Fähigkeiten des Sprechens und Zuhörens stärkere Beachtung.  
→

Ihre Eingabe entspricht nicht der vorgesehenen Lösung!  
Fehlerprognose: *aufmerksam*  
[mehr ...](#)  
[schließen](#)

Bewerten **Inkorrekt** Antwort Reset

🔊 🔊 🔊

*aufmerksam*  
**Fehlerbeschreibung:** Bitte die Steigerungsform des Adverbs beachten.  
[schließen](#)

The wrong answer is highlighted in red. A window shows up in which the type of error is diagnosed. The learner is then referred to the respective component of the reference grammar in order to learn more about the construction. On the basis of this information, the learner tries again and if he/she gets the answer right, it is marked in green.

Wortstellung	Verbalenz	Passiv	FV-Gefüge	Nominal.	Gramm.-Hilfe	Glossar	Ihr Profil	<b>ProGram</b>
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- Lag der traditionelle Schwerpunkt auf den Fähigkeiten des Lesens und Schreibens, so finden nun auch die Fähigkeiten des Sprechens und Zuhörens stärkere Beachtung.  
→

**Korrekt!**  
😊  
[schließen](#)

Bewerten **Korrekt** Antwort Reset

🔊 🔊 🔊

*ProGram* has been made available on the internet as an open access tool. For evaluation purposes the tool it has been used in classes at the Institute of German as a Foreign Language Philology for a number of years. The students

came from different language backgrounds. They all had very advanced knowledge of German. Systematic evaluation showed that the tool was successfully applied, helping learners to develop their language skills significantly towards very advanced competence in academic writing. The following figures show the results of evaluations conducted over several semesters.

Figure 1

The question was: To what extent did the comments help you to find the correct solution?

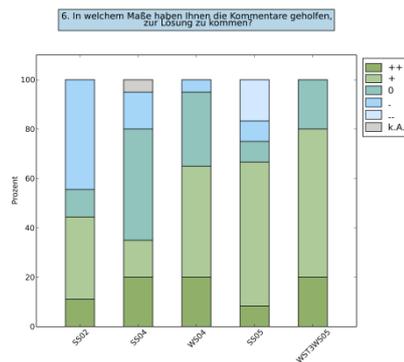


Figure 2

The question was: How do you evaluate the help functions?

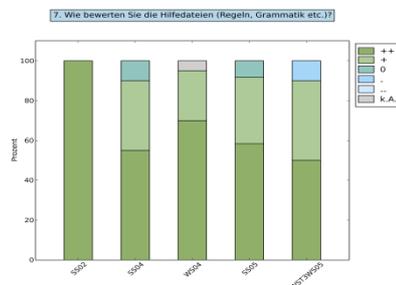
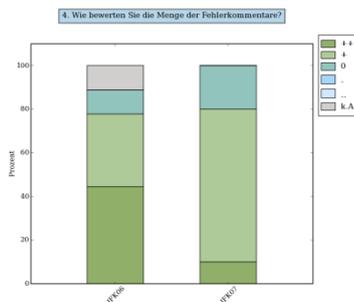


Figure 3

The question was: How do you evaluate the number of comments on errors?



On the basis of the learner data collected and evaluated over several learning

cycles, the intelligent corrector was adapted by integrating errors which had not been foreseen in the first place. We also discarded errors from the corrector template which had not been produced by the learners.

### 3. Target groups:

The tool we have decided to insert into the E-Lengua project to meet the challenge assigned to us – facilitating independent language learning accessible at all times and anywhere – will be available online. *ProGram* can be used by the type of learner referred to under point 1 (*Introduction*), very advanced students of German Studies at an institution of higher education, be it in Germany or other German speaking countries, or anywhere else in the world. These will be German L2 speakers of any L1 who are interested in a) autonomous learning; as autonomous learners they are used and trained to gather information that is relevant to their individual learning progress or to the fulfilment of specific assignments or tasks; they are also accustomed to preparing and following up learning content without being constantly supervised by a trainer or teacher; the potential beneficiaries of *ProGram* will also be interested in b) not being restricted to a certain room or place when it comes to perfecting their language skills, and in c) looking for professional feedback on their learning progress.

The very high level of German L2 skills that *ProGram* aims to train is required not only of advanced students of German Studies but also of international students in many other fields of the humanities in which, at least in the context of universities in Germany and other German-speaking countries, the German language is an indispensable component of the courses themselves.

As *ProGram* will be an open-access online tool, it can be used by German L2 speakers around the globe in preparing admission to a German university, admission to special programs offered by any other institutions of higher education in Germany, and in maintaining a high level of competence in German after completing their study programs in Germany and returning to their home countries.

Last, but certainly not least, *ProGram* can also be used free of charge by learners handicapped in their everyday lives by physical mobility limitations, regardless of where they live and/or work.

### 4. Methodology:

*ProGram* is a learning device that combines existing NLP tools with newly developed components. As outlined above, it combines and integrates existing software such as MPRO (programme for morphological analysis) and FRED (module for grammatical analysis) with the iK tool, the intelligent corrector.

We plan to adapt the current version of *ProGram* both to new technical standards and to the latest design requirements.

The following changes are planned:

- Adaptation to the new format of PHP version (5.6), which will make the programme available to a larger user group and the installation easier. Specific attention will be paid to security issues (such as SQL

injection, XSS)

- Adaptation of the frontend to the new html5 format.
- The application will be given a responsive design. This means that the programme can be used on tablets and smartphones.
- The design of the user interface will be changed to appeal to young people, the target group described under point 3.

The modified tool will be tested with specific learner groups differentiated according to their levels of competence and their language backgrounds. The aim is an electronic evaluation both of the learners' answers and the paths they have taken in coming up with the right answers.

##### **5. Development of the project:**

Several interdisciplinary meetings between experts on foreign language didactics, in information technology and second-language acquisition have been organised to discuss and decide on the changes to be made in *ProGram*. Work packages have been designed for the overall period of the project, starting with the adaptation of *ProGram* to new technical and design standards. Pilot testing is planned for the period April to June. This is the teaching period at Heidelberg University, which means that students can be recruited in larger numbers. It remains to be seen whether the new format will also contain a user management component. This is not so much a technical issue as a matter of support and maintenance.

Members of the Heidelberg project group participated in two meetings. The kick-off meeting was held on 26/27 November, 2015 in Salamanca, a follow-up meeting was hosted by the Trinity College project group in Dublin on 28-29 April, 2016. On both occasions, Heidelberg's project challenge and plans for solutions were presented and discussed. Within the framework of the E-Lengua staff mobility programme, two faculty members of the Institute of German as a Foreign Language Philology and of the School of Translation and Interpreting participated in the formative offer of the Universidade da Coimbra in December 2016. In January 2017, Heidelberg University has hosted formative events for two faculty members of Universidad de Salamanca and of Trinity College.

In the course of 2016, the project group could be extended by the acquisition of funding for an internationally renowned expert in the field of German as a Foreign Language, Dr. K. Haataja. His interests lie in the field of developing and producing video material for CLIL-based language training programmes (Content and Language Integrated Learning). The group has profited from his expertise both in methodology and content. Moreover, the international network of German schools and teachers of German around the globe will be used to disseminate the output of the E-Lengua project. First steps have been made in the context of a PASCH training course at the Institute of German as a Foreign Language Philology (German Educational Exchange Service and the German Ministry of Foreign Affairs, 18 teachers from different Latin American countries). The participants attended a course on computer aided language learning in which they used *ProGram*. Afterwards they were given a questionnaire in which they were asked to rate the efficiency and manageability of the programme.

In the course of the summer term 2017 a group of ERASMUS students (14

students ) attended courses on the German language. They used *ProGram* and were asked to keep a 'learning diary'. The results will be evaluated in August 2017 and will serve as input for the changes envisaged in the *ProGram* format.

## 6. Chronogram:

January 2017 following: documentation of work in progress

January 2017 – July 2018: monthly project meetings: specialists in didactics in German as a foreign and as a second language, linguistics (German) and information technologies

January 2017 – July 2018: virtual meetings with the coordinating institution (Universidad de Salamanca) every two months to discuss matters on all levels of project development (intellectual output, coordination, organization of events)

January 2017: actualization of work packages on all levels of project development (intellectual output, coordination, organization of events)

January - June 2017: appointment of Dr. K. Haataja, expert on computer-aided language learning and didactics of German as a foreign language as an associated member of the project group.

August 2017: analysis of test results (In the course of the summer term 2017 group of ERASMUS students (14 students ) were taught courses on the German language. They used ProGram and were asked to keep a 'learning diary'. The results will be evaluated and will serve as input for the envisaged changes in the format of ProGram. See point 5, development.)

April – July 2017 following: technical adaptation of *ProGram*

May – June 2017: testing interim desktop version of *ProGram* with subsequent participant questionnaire with a group of 14 very advanced L2 speakers/learners of German (students with up to 8 different L1 from 10 different countries studying at Heidelberg University's Faculty of Modern Languages)

August – September 2017: analysis of test results (grammatical error analysis, participant observation, participant questionnaire)

September 2017 following: technical adaptation of *ProGram*

October 2017: testing final desktop and mobile version of *ProGram* with a group of 14 very advanced L2 speakers of German

October – November 2017: analysis of test results (grammatical error analysis, participant observation, participant questionnaire)

November – December 2017: final technical adaptation of *ProGram* (if necessary)

October – February 2018: *ProGram* to be used in selected courses at Heidelberg University's Institute of German as a Foreign Language Philology and the School of Translation and Interpreting

January – February 2018: compilation of content for the E-Lengua handbook of best practices

March – May 2018: editing Heidelberg's chapter of the handbook of best practices

June – July 2018: research paper on E-Lengua and *ProGram*  
(for dissemination activities, see point 7)

## 7. Dissemination:

- July 2016: Participation of the PI in an international conference on video-aided language acquisition (German as a foreign language): opening lecture, brief presentation of the E-Lengua project
- June 2016: Announcement of the E-Lengua project member's formative offer at their respective universities and recruitment of staff suitable for and interested in participating in the mobility programme
- November 2016: The PI gave an interview on German national radio about language learning in the age of web 2.0 and automatic translation: brief presentation of the E-Lengua project
- November 2016: Creation of an E-Lengua website and establishment of hyperlinks to this website from other websites of Heidelberg University
- January – June 2017: Cooperation with a scholar specialized in new technological learning tools and receiving a six month scholarship at the Institute of German as a Foreign Language
- January 2017: Public lecture on novelties in foreign language teaching and learning as part of Heidelberg's formative offer
- January 2017: Cientific blog entry on E-lengua mobility programme and formative offer
- July 2017: Hosting of the E-Lengua multiplier event
- July and August 2017: Press releases on E-Lengua multiplier event (Pressestelle Universität Heidelberg ([http://www.uni-heidelberg.de/presse/news2017/pm20170704\\_tagung-zu-neuen-technologien-beim-erlernen-von-fremd-und-zweitsprachen.html](http://www.uni-heidelberg.de/presse/news2017/pm20170704_tagung-zu-neuen-technologien-beim-erlernen-von-fremd-und-zweitsprachen.html)), Twitter Universität Heidelberg (<https://twitter.com/UniHeidelberg/status/882200636007297024>), IWD Informationsdienst Wissenschaft (<https://idw-online.de/de/news677622>) → from there further dissemination, e.g. via <http://www.kooperation-international.de/aktuelles/nachrichten/detail/info/tagung-des-erasmus-projekts-e-lengua-zu-neuen-technologien-beim-erlernen-von-fremd-und-zweitsprach/>, Unispiegel Heidelberg.

### Future activities

- January 2018: Presentation of ProGram at Heidelberg University's School of Translation and Interpreting (IÜD), addressed to German L2 students
- October 2018: Video conference involving all E-Lengua project partners with brief presentations of outcomes, addressed to students of Heidelberg University's Faculty of Modern Languages and open to the public; simultaneous interpreting to/from German, English, Italian, French, Portuguese and Spanish; online live video-stream if possible

**8. Further achievements**

In May 2016, we linked the E-Lengua project to a recently formed project group consisting of scholars of Heidelberg University's Institute of German as a Foreign Language Philology (IDF) and Centre for Iberoamerican Studies (IAZ), Heidelberg University's Interdisciplinary Center for Scientific Computing (IWR) and the University of Education Heidelberg (PH Heidelberg). The group is designing a literacy web application for Arab speaking refugees in Germany. Project funding was approved in November 2016.