Linguistic Challenges in Global Software Development: Lessons Learned in an International SW Development Division

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Abstract

In multinational companies, English is used more and more as a "lingua franca" for international collaboration. This is for example true for a unit like Siemens' Program and System Engineering Division SIS PSE, with headquarters in Austria and subsidiary units in many European countries and China.

This article will initially present the concept of ELF (English as a lingua franca), which is steadily gaining importance in applied linguistics research.

The main part of this article will outline the practical challenges of using English as a non-native language in international collaboration, including examples of oral and written communication (such as meetings, meeting minutes, training, and requirements specifications). It will be argued that these linguistic challenges are closely connected with intercultural ones. Dealing professionally with these topics is a key asset for project success, especially in project management and requirements engineering.

1. Introduction

To make this analysis easier to understand, I would first of all like to briefly describe the position of PSE within Siemens IT Solutions and Services.

PSE serves all Siemens entities and selected external partners such as Nokia Siemens Networks when it comes to finding a highly innovative R&D partner, both at the corporate and regional levels.

In Austria, about 2,400 employees, more than 50% of whom hold a university degree, work for PSE in Vienna, Graz, Linz, and Salzburg. PSE's subsidiaries abroad – PSE China, PSE Croatia, PSE Germany, PSE Romania, PSE Slovakia, ANF DATA in Prague and Brno, PSE Turkey, PSE Hungary – have a headcount of about 3,200 (starting with April 2009, a Siemens internal reorganization takes place, in which the unit PSE will be merged into the new global units SIS SDE and CT DC).

These basic facts alone define key requirements for what PSE has to be able to achieve – highly distributed development combined with the implementation and maintenance of uniform quality standards as well as the roll-out of suitable processes and methodologies for implementing efficient technology and knowledge management.

The author of this article studied applied linguistics, but has been working as a software engineer in various positions for more than 20 years. Currently he is heading the *Learning Network*, a training institution based on international trainer communities (see [4]). In writing this article, I am trying to combine the worlds of applied linguistics and software development, which may be fruitful for both disciplines.

2. The concept of ELF (English as a lingua franca)

2.1. Universal Languages

The desire for a common language which everyone can understand goes back as far as the ancient Tower of Babel myth. Throughout the course of history there have been many attempts to develop and disseminate universal languages, such as Volapük, latino sine flexione, Interlingua, and of course the most famous and successful one, Esperanto, with probably more than a hundred thousand fluent speakers. Most of these artificially constructed universal languages are based on (simplified) natural languages, but none of them were successful (apart from Esperanto, to some extent) because they did not *live* (lack of native speakers, no adaptability to real life social interaction, too much formalism). There is an interesting parallel to be found in Information Science in the acceptance of formal languages like UML in requirements engineering.

In ancient times and in the Middle Ages, Latin served as *lingua franca* for the Roman Empire and the Christian religion. A *lingua franca* (from Italian, literally meaning Frankish language) is a language used to communicate between persons who do not have the same mother tongue. This worked very well for centuries in international communications, especially among scholars: Experts learned and shared a common foreign language, which was well defined and adaptable enough for communication.

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In the 1920ies, the linguists Ogden and Richards developed an interesting concept of *Basic English* as a lingua franca, based on a reduced set of words and rules of grammar. Although this approach remained mainly academic, it had an important influence on concepts for technical writing and machine translation (for the impact of ELF concepts, see Seidlhofer [7]).

2.2. Global English

Due to historical, political and economic reasons, English has become the most important language used in international communication. Globalization of economy accelerated this trend enormously. It can therefore be said that English really serves as *the* lingua franca of our modern world. David Graddol shows this in detail in his report for the British Council about the current state and future development of the English language (see [2] for the data shown below).

We are currently witnessing interesting demographic developments: The percentage of *English native speakers* is *falling*: Currently, about 5% of the world population are native speakers of English (in 1950 this was about 7%), and the growing community of Spanish and Hindi/Urdu speakers has already grown to approximately the same proportion (Mandarin is the most widely spoken language at currently about 19%, but is expecting to decrease to less than 15% until 2050; Arabic is the fastest growing language, at currently about 3%).

On the other hand, the number of people learning English as a second language is *increasing enormously*. Currently *more than one billion people are learning English* (most importantly, the implementation in 2001 of compulsory English training in primary schools in China – in a few years' time, there will be more English speakers in China than in India).

This leads to *native speakers of English becoming a minority* in the worldwide English-speaking community, and they are gradually losing control over the use of their own language. New *Englishes* are developing fast, and classical standards (such as Oxford English) are challenged or simply neglected by non-native speakers.

2.3. Communicative success first

For the international communities of non-native speakers, the goal is not native language proficiency, but merely being able to understand and to be understood. Lingua franca English is just a tool for exchange with other people, if needed.

However, what is even worse news for native speakers – mother tongue proficiency is bad for communicative success in lingua franca settings. Idioms and elaborate style are hard to understand and prone to intercultural misunderstandings. ELF communication should be restricted to a core vocabulary and simple grammatical constructions.

2.4. Basic results of ELF research

A lot of research has been done on the *ELF core* in recent years to find out what is really important for communicative success in lingua franca communication; see e.g. the comprehensive approach in the VOICE-project (Vienna-Oxford International Corpus of English, http://www.univie.ac.at/voice/).

On the phonetic level, typical "errors" of ELF are e.g. the pronunciation of *th* (as d- or s-like sounds) or *v* (as bilabial instead of labiodental). Both are strong signals of *foreigner talk* for native speakers.

On the level of grammar there are "errors" such as

- the absence of *third person -s*,
- treating *who* and *which* as interchangeable relative pronouns,
- not placing an *article* in front of nouns,
- the mixing of *present perfect* and *past tense*
- the *if-part* of conditional clauses with *would*.

More examples and details are shown in [3]. The findings of ELF research in a nutshell: Most of the difficult grammar issues we were tormented with in school are not really necessary for communicative success, and other topics are more important (e.g. active knowledge of a differentiated lexicon, vowel quantity, aspiration of voiceless consonants).

The consequences for the *teaching of English* are currently the subject of intense discussion (see [2]). The ELF approach is of course a major challenge to the traditional ideal of reaching native-level fluency, with a strong impact on the role and self-perception of teachers: Where should the line be drawn between grammatical correctness and acceptability? Constructions with "wrong" tenses or progressive forms may be acceptable for open-minded teachers, if the sense is clarified by adverbs, but how should a teacher react to utterances like "The mozer love her childs"?

In Asian countries in particular, it is reported that there is a preference for non-native English trainers like Dutch, Germans or Belgians, because – from their own experience – they know better than native speakers what their clients really need to communicate successfully with other foreigners, and questions of correctness and style are not that much in focus [2].

3. Practical challenges for SIS PSE

3.1. English communication as a must

Siemens as one of the best-known German companies naturally has a long tradition in the use of German as its corporate language. Although the "official" company language was changed to English years ago, it is still clear that German remains important, especially for PSE´s subsidiaries in Central and Eastern European countries which historically have a strong German-speaking tradition (Czech Republic, Slovakia, Hungary, Croatia and Romania). The ultimate breakthrough of English as corporate language was marked by the opening of a new subsidiary in China (almost all of our Eastern European colleagues have a basic knowledge of German, which cannot be expected of our Chinese colleagues).

In this context, the historical perspective is also quite interesting to observe: In the early 90ies, knowledge of German played an integral part in the recruitment of employees in Eastern Europe, which of course had effects on project-internal communication. However this has changed in recent years as emphasis has shifted from German to English in language learning both in schools and universities in most Eastern European countries.

Therefore it is clear nowadays in our internationally distributed projects that at least written documentation is in English, and meetings and conference calls are held in English where necessary. For the Austrians in particular (and many of our internal customers in Germany, too), the changeover to English is not easy, and this is of course accompanied by a lot of intercultural challenges and – generally speaking – by a "loss of power" (you are simply "weaker" if you do not communicate in your mother tongue).

Although we speak English, our communication is full of (German) corporate language and PSE-specific terminology. Here is an example: In our software development methodology, we defined the role of a quality manager on the project level (German: *QSV – Qualitätssicherungsverantwortlicher*), who has to be nominated in each project. We translated this term into English as *QAM – Quality Assurance Manager* (in contrast to the role of a *QM = Quality Manager* on the organizational hierarchy level). In practice, the acronym *QAM* was not widely accepted, because everybody used the already well established term *QSV* (pronounced as a "word" qu-es-vau). So we decided to stick to the German name *QSV-Seminar* for the English version of our introductory seminar, for the sake of better international comprehensibility.

With regard to terminology, we observed a lot of other interesting tendencies. Due to the cultural and linguistic similarities of Eastern European languages to German, sometimes linguistic *false friends* (words in different languages that sound similar, but differ in meaning) become really *good friends*: In Slavic languages as well as in Hungarian and German, the English concept of *"meeting minutes"* is denoted and pronounced as something like *"protocol"*, which is perfectly understandable in all of these languages. In Central and Eastern European languages, *protocol* is just a better word for communication purposes than the "strange" English word *minutes* (we only became aware that this does not work everywhere in the world when our Chinese colleagues looked rather confused when hearing it). Similar examples include *beamer* (for video projector) or *handy* (for cell phone).

On the other hand, there are many false friends, which may still endanger communicative success: *to become* (German "bekommen" means "to get"), *actual* (German "aktuell" means "current(ly)") or *must not* (German "muss nicht" means "need not", English "must not" means "darf nicht"), which is a common source of major misunderstandings in requirements engineering.

In the following chapters I would like to share some of the experiences and findings we discovered in different communicative situations.

3.2. Meetings and meeting minutes

Meetings are the most common type of project-internal communication, be it in the form of physical attendance or conference calls (in everyday practice, it is often a mixture of both: sub-teams meeting face to face while talking on the phone to other groups abroad). Meetings really are the backbone of project communication, especially when it comes to explanations and/or clarifications.

I do not want to refer here to meetings with sales or upper management, where predominant goals for participants are to act strategically, sell something to someone, convince or persuade someone, etc. In such scenarios, language really seems to equal power, and a better command of language provides better opportunities for steering communication and "winning the game" (unless the linguistically weaker partner does not feel suppressed or tricked by the stronger one).

In project-internal communication, however, where the main focus is on mutual understanding and solving problems, we have to deal with different phenomena.

In this case, communication works best if there is no asymmetry in power among the participants.

When people with a relatively poor command of English are driven by the wish to understand one another, they have a surprisingly high rate of error tolerance in such meetings (ELF really seems to work well as means of communication in such situations). Interestingly enough, the presence of native speakers in such meetings is often counter-productive for communicative success (people with poor language command feel ashamed, and native speakers are not well aware of what non-natives are able to understand, e.g. in using idioms and culture-specific expressions).

In project-internal meetings we often observed that *misunderstanding* is even worse than *non-understanding*: When people do not understand, they become aware that there is a problem (which may be clarified later on), but when a misunderstanding occurs, they will usually think that they have understood correctly. In both cases it is very important to encourage people to draw attention to such situations by initiating *clarification dialogues,* and rephrasing statements in their own words: "Am I right if I interpret your statement as follows:…"

Initially, in international collaboration with Eastern European colleagues, this did not work well. Austrian project managers often reported that their international colleagues always said yes, but a lot of tasks were not carried out or misunderstood. It seems that admitting not to knowing something and asking for clarification is a difficult hurdle to take, similar to losing one's face.

Therefore it is extremely important for project success to build up *mutual trust* in order to make it acceptable to criticize your interlocutor's statements or to admit that you did not fully understand (which in fact is a challenge for both sides).

Finally some remarks on the importance of meeting minutes for international teams: Written language is easier to understand than oral communication, and there is less time pressure when reading. Minutes can be used as explicit means of documentation to ensure that common ground is reached for comprehension, interpretation and controlling. In our experience it is really worth making an effort to achieve this, which is also true for documented reviews of deliverables such as project plans and requirements specifications.

3.3. Personal and informal communication

The best way to foster communication is to know each other personally. It is much easier to use any form of communication (be it via e-mail, phone, video conferencing tools or instant messaging) if you have a concrete picture of your dialog partner in your mind's eye. That is why, in our SW development method, we strongly recommend holding a kickoff meeting that is physically attended by all international team members (of course this is expensive, but apparently it pays off).

In later stages of a project, collaborative tools that support distributed communication (such as Microsoft OCS) seem to help a lot – this was an important finding of a research project performed for us by Prof. Damian: Team members in Austria, Romania and Slovakia really liked to use the integrated videoconferencing tool and claimed that internal communication was enhanced significantly with such a tool, see [1].

Situations that leave room for informal communication also foster inter-personal relationships. In our projects, we are used to including social activities such as evening events in kickoff meetings and project experience workshops. In the above-mentioned research project there were weekly 15-minute meetings scheduled where it was explicitly forbidden to speak about work-related topics.

All such activities also promote informal communication on work-related issues. They simply reduce the barriers between people. For example, it is much easier for a young colleague in Romania to phone the project manager in Austria immediately, instead of waiting until he is officially asked questions some days later. Instant messaging technologies probably have a similar function in supporting semi-formal communication in teams by providing a constant flow of work-related information, but we still have too little experience in the workplace to come up with clear conclusions yet (the use and acceptance of instant messaging tools seems to be highly age-dependent).

3.4. English as language of training

For internal training, we have built up trainer communities in a so-called *Learning Network* (see [4]) to provide training internationally. Furthermore, we have standardized all of our (centrally managed) training material for seminars to a monolingual English basis. Only this English material will be updated centrally in the future. We are also using spoken English more and more in specific subject and methodology training programs, something that comes naturally to international trainers. When it comes to *personal skills training*, being able to use one's native language seems to remain an important issue – especially where sensitive matters such as emotions are concerned, where your own language offers you a much broader and much more varied range of expression and understanding.

Our experience concerning the use of English in international subject-matter training strongly supports the findings of ELF research: For the sake of learning success, it is important that the trainers speak robust and simple English without emphasis on native fluency.

For the presentation of training material, an interesting phenomenon can be observed, which I want to call *double channeling*: If the trainer uses similar linguistic material in his oral presentation as in the (simultaneously) presented Powerpoint slides, the comprehension rate of the participants is much higher than when the trainer departs significantly from written text (the participants can better grasp the content, like in movies with subtitles in the same language as the sound). This is in contradiction to *good practice* for teaching in native languages, where close similarity of written and spoken channels is perceived as boring.

For trainers and participants, group exercises (including discussions and presentations of results) are linguistically more challenging than presentations, but these situations provide a good opportunity to practice and improve English negotiation and consulting skills in a *protected setting*. We appreciate this as a valuable side effect of content-based training.

In pedagogical approaches for foreign language learning, the concept of *CLIL* (Content and Language Integrated Learning) is steadily gaining importance in classroom teaching in schools (pupils learn new subject-matter in a foreign language, see [2]). In my opinion and as an experienced international trainer, this concept fits well into our approach of training.

3.5. Requirements communication

Requirements engineers at SIS PSE often assume the role of a *double interpreter:* On the one hand, we have to communicate with customers (mostly Siemens in-house ones) with the aim of getting a sufficiently detailed requirements specification (thus translating business into SW requirements), and on the other hand we have to communicate these requirements internally (from SW requirements to architecture, design, code and test cases). This internal task of translating and refining requirements into different levels of abstraction down to the code level is very challenging and – in addition to all more or less formalized SW engineering tools – highly dependent on mutual understanding in natural language.

We often experienced that in distributed projects with differing languages and cultures, successful requirements communication is a key element of project success. This communication process, which in development projects often works almost on the subconscious level, is in fact highly dependent on the *inquiry culture* applied by all the people involved in this process (see [5, 6]).

4. Conclusion

The deliberate use of English as a lingua franca is important for the success or failure of GSD projects. This has been exemplified in this paper by different types of written and oral discourse. For further (highly desirable) in-depth research methodological issues will be central: Currently there is still a gap between interpretive-hermeneutic methods of social science / linguistics and formal methods, which impedes mutual understanding of the disciplines involved.

5. References

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