

Towards a Pattern Language for Teaching in a Foreign Language

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Abstract. Teaching a technical subject in a foreign language involves more than just using a different language; there are specific problems related to the integration of content and learning. This paper begins with the mining of patterns which address these problems and intends to offer practical help to teachers by working towards a pattern language for technical instructors who teach students in a foreign language, and who are not trained in language pedagogy. We describe the background of teaching classes in a foreign language and propose the first two patterns which can be used when in this situation: LANGUAGE STATUS QUO and CONTENT-OBLIGATORY LANGUAGE.

1 Introduction

Education in different languages can serve different educational and social goals [7]. In today's competence-based educational systems, the focus is not on language learning as a separate subject, but on integrated learning with professional activities at its core, a so-called learning by doing approach. In such a context, teachers easily decide on the use of a foreign language as the medium of instruction, without giving the risks this may bring much further thought. Yet integrated learning can only be successful when sufficient attention is paid to both sides of the coin: language and core competences. So raising awareness among teachers to pay attention to both aspects is a first step and offering them a practical helping hand a second step. There are practices which can be used to implement these principles, but language pedagogy methodologies do not include the descriptions of these best practices detailed enough for subject-specific instructors to apply them without having had a language pedagogy training. Such teachers need a practical and easily applicable manual for a thorough integration of a foreign language in their courses.

This paper is part of a larger project for developing a pattern language for teaching in a foreign language. Along with this paper, which gives an introduction to the topic and describes the target group and the main focus of the patterns, two additional papers are available: one describing integrated language learning (helping technical instructors develop courses in a foreign language, using integrated language learning) and 4 patterns [5], and a second paper focusing on enhancing foreign language proficiency through integrated learning (how to improve advanced students' language proficiency while teaching in a foreign language) and three more patterns [6].

2 Target group

The proposed patterns are aimed at subject-specific teachers without any formal language pedagogy training who, as non-native speakers, occasionally teach a subject-specific class in a foreign language to non-native speakers of this foreign language. Without knowing the specifics of language teaching, content teachers are often not aware of any language barriers when switching to a foreign language as a teaching medium. As the foreign language to be used usually will not be his/her mother tongue, the teacher may have some difficulty in expressing him/herself properly as well. For this specific target group, most best practices advised in language pedagogy handbooks lack solid underpinning arguments, the proper context of use, or an exact description of the problems they address. Without specific modern language pedagogy training, they need more clear rules of thumb to properly apply the right strategies.

3 Main pattern focus

The main focus of this work is to help instructors teach their course in a foreign language without the risk of students falling behind due to low language proficiency. A crucial question for instructors when the course is finished, is: when students fail their tests, is it because of lack of understanding of the technical content or lack of understanding of the second language used? It is obvious that students already

have to know the foreign language at a certain level, otherwise the teaching would have to focus too much on language and not enough on the content. In higher education, these knowledge levels can be quite diverging due to various backgrounds. This diversity is the reason why there still are (or can be) language barriers. These barriers can lead to problems with comprehension of the technical content due to the language problems. To prevent failure due to language barriers, teachers can take precautionary measures. So the patterns aim to create awareness and help teachers design the right course for each audience on two levels: content as well as language.

This work therefore aims at reaching the following goals:

- Find and describe the common principles of existing methodologies and approaches in order to build a common vocabulary — a pattern language — which can be applied to generate the desired results.
- Provide teachers who are going to teach specific subjects in a foreign language with practical strategies to take language-related aspects into account without having to fully master a high-level language pedagogy methodology, such as Content Based Instruction (CBI) and Content Language Integrated Learning (CLIL).

4 Pattern language overview

The following list gives an overview of the patterns for teaching content in a foreign language¹. It can be also used as starting point for working with this language.

Patterns aimed at basic understanding of course content:

- Be aware that you are the TEACHER MODEL to students.
- Assess students' language proficiency in class room English — or another foreign language — as well as content specific jargon, this is the LANGUAGE STATUS QUO.
- Ensure that the material used for the course is at an appropriate language level by means of careful INPUT SELECTION.
- Define the CONTENT-OBLIGATORY LANGUAGE.
- Establish whether or not students indeed comprehend the course content and whether or not their command the foreign language improves by installing a LANGUAGE MONITOR.

Teachers who wish to enhance advanced students' proficiency in a foreign language are referred to the following patterns:

- Include speaking and listening as well as reading and writing during classes and in assignments, these are the four leaves of the LUCKY LANGUAGE CLOVER.
- Define the CONTENT-COMPATIBLE LANGUAGE (in addition to the CONTENT-OBLIGATORY LANGUAGE).
- Urge students to reflect on the way they talk and write by stimulating METATALK.
- Use enhanced language and synonyms when giving explanations using COMMENTED ACTION and the earlier defined CONTENT-COMPATIBLE LANGUAGE.

Table 1 provides an overview of the patterns and the impact their application has on a course. The patterns in layer A can easily be applied in a single lesson, whereas patterns in layer D need more consideration as they generally comprise a full course. Content focused patterns should be applied before attempting to use any language focused patterns.

5 The Patterns

These patterns were mainly mined in existing literature and experience reports. Therefore they often miss sufficient known uses and fail at this moment to follow the *rule of three*. However, we intend to include more known uses after these patterns have been applied and adjusted more broadly and make them available as a whole pattern language.

The patterns use a version of the Alexandrian pattern format, as described in [1]. The first part of each pattern is a short description of the context, followed by three diamonds. In the second part, the problem (in bold) and the forces are described, followed by another three diamonds. The third part offers

¹ As this pattern language is a work in progress, this list is not complete.

Layer	Layer Description	Content-Focused	Language-Focused
D	A part or unit of the curriculum as e.g. a course lasting one semester, time frame of all hours for that module (25 to 900 hours)	LANGUAGE STATUS QUO, INPUT SELECTION, CONTENT-OBLIGATORY LANGUAGE, LANGUAGE MONITOR, MODEL	CONTENT-COMPATIBLE LANGUAGE
C	A thematic unit, time frame of one to many hours		LUCKY LANGUAGE CLOVER
B	A pedagogical unit, or a learning/teaching situation, time frame of several minutes to few hours		METATALK
A	A direct (pedagogical) interaction, time frame of several seconds to minutes		COMMENTED ACTION

Table 1. The layers of educational actions as defined by Baumgartner [2] and the corresponding patterns.

the solution (again in bold), the (empirical) background, consequences of the pattern application — which are part of the resulting context — and a discussion of possible implementations. In the final part of each pattern, shown in *italics*, we present some known applications.

In the following sections we present the following patterns: LANGUAGE STATUS QUO and CONTENT-OBLIGATORY LANGUAGE. After that the short versions of the other patterns — the patlets — are presented, the full patterns are published in [5, 6].

LANGUAGE STATUS QUO

You assume that students are at a sufficient level of general foreign language competences, i.e. they have knowledge of basic common vocabulary and grammar and can use the language. You now want to start teaching a course in this foreign language, with a foreign language as a medium of instruction so as to improve the use of this language in a professional setting.



Without knowing the actual level of foreign language competences of the students it is likely that the language parts of the course design are either too difficult for the students which hinders them in grasping the content or are too simple for them which means that their language understanding probably does not improve.

In undergraduate or graduate programs, students will often have different levels of language proficiency due to their different backgrounds.

Cultural Background. Some courses are taught in a foreign language — often English — to attract students from abroad and enable them to take part. The level of language proficiency and the way these students have learned the language in their original countries affects the way the foreign language can be used in such a course. A second background issue may be the students' level of academic English which can vary greatly, depending on the type of education students have had before entering the course and their knowledge of academic language in their first language [3, 10].

Available Material. In many domains, like e.g. ICT related subjects, the written classroom materials used are often available in English only, making it harder for instructors to teach these subjects in their mother tongue, as it forces teachers and students to translate parts of the texts used into the mother tongue, e.g. when giving explanations or answering questions. This results in poor quality translations and negatively affects both the teaching and the learning process.

Educational Career. Many courses (or studies) define minimal language requirements, like language courses which have to be attended and finished. This just gives an indication of the minimum level a teacher can expect from the students and still does not say anything about the variety of language levels present among students.

Standard Language. Even though it shows that the understanding and general knowledge of the foreign language is at a sufficient level, it still can lead to problems. In technology courses, the content contains a lot of specific terms — jargon is used as well as language-structures with content-specific semantics. Knowledge of this vocabulary is not reflected by standard language certificates.

Context-specific pretests. Pretesting is often aimed at a narrow range of aspects: what do students know on the subject? What is their general language proficiency? What is needed for competence based learning or integrated learning, is a specific pretest on communication competences used while performing selected professional and educational tasks in a specific branch or sector you train students for. Context-specific pretests are often tailor-made, though their components may be selected from existing proficiency tests.



Therefore: Get to know the language level of all students at the start of a course to obtain a realistic overview for your specific professional and educational goals. Use appropriate tests that include both general language competences and context specific linguistic competences, such as class room language, formal academic language, and core professional activities in your field. This is the basis for an adequate language integration in the course design.

The LANGUAGE STATUS QUO is usually gathered by one or more tests and should cover the aspects relevant for the course at hand. These aspects can include:

1. *general language competences* — Grammar and general vocabulary, but also reading, listening, writing, and speaking.

2. *content-specific language competences* — Knowledge of the course domain language, like jargon or often used language constructs etc. The CONTENT-OBLIGATORY LANGUAGE and the CONTENT-COMPATIBLE LANGUAGE can be used for testing these aspects.
3. *language-related competences* — Like giving (or *daring* to give) presentations in the foreign language, discussing problems in the language, speaking the language in front of a group, or creating formal writings in the foreign language.

The first aspect can be covered by looking at which courses in the foreign language the students already followed or the language certificates the students own. It is helpful to use proficiency tests based on international standard frameworks for language examination, such as the International English Language Testing System (IELTS), Common European Framework of Reference for Languages (CEFR) or Association of Language Testers of Europe (ALTE). But, as described earlier, there are more aspects which are (usually) not covered by such tests.

In some cases it can be useful to determine the content-specific language competences of the students, if e.g. the students in a course have different educational backgrounds. If the students follow a fixed study scheme and it can be assumed that they have a more or less equivalent level of language knowledge, this aspect can be omitted.

Commonly used proficiency or placement tests (often) do not include the competences to use the language in different educational and professional contexts. Missing these competences can lead to situations where students are not able to give a presentation because they have trouble speaking in front of groups in the foreign language (and not because they don't understand the content). These tests (often self reflective) give a clearer picture on how students apply the language.

Knowing the students' current levels per aspect forms the basis for an appropriate set-up of language elements in a course. Depending on the relevant aspects the following consequences can be identified:

- Difficulties in grammar and general language competences can be improved by promoting METATALK and including the missing parts in the CONTENT-COMPATIBLE LANGUAGE.
- Depending on the strengths and weaknesses of the students' competences to read, listen, write or speak the foreign language, an accordingly balanced mix of the four leaves of the LUCKY LANGUAGE CLOVER should be included in student activities.
- If content-specific language competences already are present, then the CONTENT-OBLIGATORY LANGUAGE and the CONTENT-COMPATIBLE LANGUAGE can be adjusted to cover a broader or deeper range of language aspects. Another consequence could be that less exercises need to put the focus in both content and language aspects.
- If content-specific language competences are not (sufficiently) present, then the missing parts of the CONTENT-OBLIGATORY LANGUAGE and the CONTENT-COMPATIBLE LANGUAGE should be taken into account during course design or course adjustment. Exercises should expose the students repeatedly to these language aspects in different ways, e.g. by letting them research the meaning of different content-specific words, using COMMENTED ACTIONS during lectures and working groups, or let them give presentations which require the knowledge and usage of content language (and also makes use of the LUCKY LANGUAGE CLOVER.
- If the students have shortcomings in language-related competences then include exercises which let them develop and practice these competences.

De Graaf et al. suggest that students should be exposed to input at a (just) challenging level [4]. In order to determine this level, knowledge of the LANGUAGE STATUS QUO is required. This can also be used as the first check of the LANGUAGE MONITOR. The following checks can then be compared with the beginning situation.

One advantage of testing is that students will become more aware of their language proficiency and that they are able to determine themselves whether their language competences need further improvement. A disadvantage of applying this pattern is that it requires more work from the teacher and also extra time from the students.

The authors applied this pattern at the beginning of a course which was taught in English to students whose mother tongue was Dutch. They had to fill in a short survey stating their last followed courses in English and the grades received for those. The levels of these courses were known to the authors, making it easy to relate the grades for these courses to levels of international standard frameworks like the Common European Framework of Reference for Languages. Furthermore they were also asked to fill in a self-evaluation about their competences and ease of giving presentations, reading technical documentations, explaining technical problems, etc. The test showed the most students were afraid of giving presentations

in English at the beginning of the course, so the amount of exercises and assignments which required student presentations was increased, starting with just giving small presentations about a small-scoped problem and ending with a presentation of their final project result.

CONTENT-OBLIGATORY LANGUAGE

The content of a course is mostly focused on one domain, which often has specific terminology used in this domain. If students have a low general language proficiency, the chances of them failing to understand the real meaning of this terminology increases [9].



Some lexical items and terminology of the foreign language are so closely related to the content of a course that mastering them is crucial to students in order to achieve the course objectives.

Some students may get the wrong understanding of the domain of the course contents. When explaining this terminology in the foreign language, they use phrases in the foreign language without grasping their meaning.

Definition Repetition. Students know that it is sometimes sufficient to memorize definitions without understanding, as tests are often asking for memorized knowledge only. Not all things have to be understood more deeply and in the broader context.

False Friends. When reading a text in a foreign language there are often words which are unknown or the meaning is only vaguely known. Usually the meaning becomes somewhat clearer in the broader context and through the position of the words, but these are just assumptions. Especially terminology in specific domains can give a different meaning to common known words, which can lead to “false friends”.



Therefore: Define the content-obligatory language before and during course design. Expose the students to this language continuously in different ways with an emphasis at the beginning of the course. Let this language repeatedly come back during the whole course to improve assimilation and understanding of this language.

The content-obligatory language can consist of different parts:

- vocabulary - the terms used in, and specific for, the domain covered in the course. Example for mathematics would be the terms: Subtraction, Addition, Division, and Multiplication.
- language constructs - domain-specific ways of using the language, which are specific for the domain. Examples are the mathematical constructs: “x is subtracted from y” or “factor out the greatest common factor”.

The language specific for a domain often includes visuals as well, but these are mostly independent of the language used and should therefore already be included in the content-related material. However, these are also very helpful in language acquisition [4], as they help in relating knowledge structures to associated language expressions [7]. In some cases it therefore can be considered to be helpful if these visuals are also explicitly added to the content-obligatory language. The known uses section gives an example of this.

The defined language is a reference for the course design — the used materials, presentations, etc. It therefore also forms the basis for INPUT SELECTION.

Use different communication ways — as defined by the LUCKY LANGUAGE CLOVER — for explaining the language and exposing students to the language and letting students grasp, practice and apply the language.

To check whether they really understood the domain concepts, ask students to explain them in their own words. This way you will find out whether they’ve simply learned phrases or really grasped a deeper understanding of the concepts and terminology. Especially in the beginning these explanations can also be in the students’ mother tongue, which gives more insight into the deepness of understanding [8].

De Graaf et al. suggest the learners should be stimulated to request new vocabulary items [4]. However, in order to ensure that these items contribute to the content too, a list with the essential vocabulary items should be made in advance. This list could also contain the items of the CONTENT-COMPATIBLE LANGUAGE.

A serious risk when defining the CONTENT-OBLIGATORY LANGUAGE is that it costs the teacher a lot of preparation time, mainly for two reasons: (a) it is not always obvious which parts of the language are

really essential for understanding the course content, so determining these parts requires extra time and (b) the amount of relevant terms and constructs can be overwhelming, leading to excessive lists which are not easy to create and handle. To avoid this, select input texts of the appropriate level, using the INPUT SELECTION pattern or use visuals to explain domain language.

Köppe and Weber defined in a course on (Design) Patterns & Frameworks a list with the essential terms (and important visuals like UML class- and sequence-diagrams), which included: class, association, generalization, specialization, inheritance, interface, Pattern, Framework, sections (of a pattern), context, forces, abstraction, coupling etc. Even though some of these terms can be assumed as known to the students because of earlier programming and UML courses, they are included again here as they are essential for understanding the patterns but also the pattern solutions and their impact on the overall design. In the first lecture the students had to give short presentations in English about general design principles and techniques including examples. The use of some of the terms was implicitly required for this exercise, and the teachers emphasized the importance of these terms by immediately asking questions like "Why have you chosen a generalization and not an association" which requires deeper understanding of the terms in order to be answered correctly. This exercise gave a good overview of which terms the students already knew at a sufficient level and which terms did need more explanation and repetitive attention during the following lectures.

Nijsten designed an energizer exercise that took around 10 minutes. She made flash cards with an English expression — chosen from the CONTENT-OBLIGATORY LANGUAGE — on one side and its definition in English at the back side. Students walked around in class. Whenever they ran into another student, they showed their flash card with the definition up front and asked for a definition in English (or the mother tongue). The fellow student then returned the question using his flash card. Afterwards, they exchanged cards and walked on to have such language exchanges with other class mates. This exercised lifted spirits and improved students' mastery of the main course vocabulary as well.

The patlets of the other patterns

INPUT SELECTION

Most courses make use of material — literature, websites, tutorials etc. — which covers the content of the course. You have identified both the CONTENT-OBLIGATORY LANGUAGE and most parts of the CONTENT-COMPATIBLE LANGUAGE and you know the LANGUAGE STATUS QUO of the students' language levels. You now want to start to look for the material.



Available material often differs in both language levels and comprehensibility, and can be too difficult or too easy for students. Both cases will lead to problems during the course.



Therefore: select comprehensible course input that explains the subject matter in a way that matches students' language levels and interests.

CONTENT-COMPATIBLE LANGUAGE

Also known as: Content-Complementary Language.

You identified the CONTENT-OBLIGATORY LANGUAGE and included it in the course design opportunities so that the students can master it. However, most domains contain more elements of a specific language: synonyms, proverbs, expressions, phrases, metaphors, etc..



Only mastering the obligatory language of a course's content limits the students in their expressiveness and does not improve the overall quality of students' language skills, even though it might be sufficient to fulfill the course's requirements.



Therefore: Identify the language constructs and expressions of the course domain which are additional to the obligatory language. Create opportunities for learning these in your course design and course execution.

LUCKY LANGUAGE CLOVER

Also known as: The Four Skills.

You are thinking about the tasks you want to include in the course design and want to ensure that they also cover the CONTENT-OBLIGATORY LANGUAGE and the CONTENT-COMPATIBLE LANGUAGE aspects appropriately.



Exposing the students to language comprehension only — reading and listening — is not sufficient for creating a lasting effect in learning the foreign language. They might be able to understand content input, but unable to produce content output in the foreign language.



Therefore: Promote reading and listening, and let students write and speak in the foreign language as well. Include all four types of linguistic competences in your course design.

METATALK

Students understand the content and are using the foreign language, making use of all four leaves of the LUCKY LANGUAGE CLOVER, but the language competences of the students still vary.



Students are not aware of their foreign language shortcomings and keep using incorrect language constructs and terms.



Therefore: Stimulate foreign language learning by including exercises or other appropriate course parts which require a collaborative reflection on language usage.

LANGUAGE ROLE MODEL

You are asked to give a course in a foreign language.



Learning is also imitating, but imitating incorrect language usage of a teacher will affect the students' learning of the language negatively.



Therefore: make careful language preparations to ensure that you can instruct students using a foreign language in a correct way for all related language parts. Use the language during the course always as correct as possible.

COMMENTED ACTION

Also known as: Think Aloud Protocol, Show and Tell.

Often in courses or lectures you show or demonstrate some content-specific activities. You are aware that you are a LANGUAGE ROLE MODEL and have identified the CONTENT-OBLIGATORY LANGUAGE and the CONTENT-COMPATIBLE LANGUAGE of your course. Students do not yet know these language constructs or were just introduced to them.



The vocabulary and expressiveness of the students will not increase if the students only see the activities done by the teacher. They might be able to execute them themselves, but will have difficulties describing in the foreign language what they are doing.



Therefore: Give a spoken description of the steps you are taking while showing or demonstrating complex abilities — comment your actions. Use the earlier identified content-obligatory and content-compatible language terms when you show their meaning.

LANGUAGE MONITOR

Also known as: Formative Assessment.

You have designed a course with a focus on both content and language, identified the CONTENT-OBLIGATORY LANGUAGE and the CONTENT-COMPATIBLE LANGUAGE and used this for INPUT SELECTION. You have chosen specific learning activities to stimulate METATALK, support language learning with COMMENTED ACTIONS and are aware that you are a LANGUAGE ROLE MODEL. You now want to assess whether your learning activities have had the expected result: an improvement of the students' foreign language skills.



Judging the progress students make with language acquisition is not possible during lecturing, but without judgement you don't know if the students make progress with language acquisition.



Therefore: Implement regular assessments on the language skills of the students to determine whether they grasped the content and whether their language skills have improved, and use these outcomes to intermittently adapt your course.

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