

DOI <https://doi.org/10.30525/2592-8813-2024-3-12>

LANGUAGE-SENSITIVE LSP TEACHING: CONCEPTS, MODELS AND PLANNING AIDS

Svitlana Kiyko,

*Doctor of Philology, Professor,
Research Fellow at the Institute for Language and Communication,
Technical University of Berlin (Berlin, Germany)
ORCID ID: 0000-0003-4964-7043
kiykosvit@gmail.com*

Tetiana Rubanets,

*Candidate of Philology, Assistant Professor at the Department of Foreign Languages
for Faculties of Humanities, Faculty for Foreign Languages,
Chernivtsi National University (Chernivtsi, Ukraine)
ORCID ID: 0000-0003-3217-0330
t.rubanets@chnu.edu.ua*

Abstract. The article deals with language-sensitive LSP teaching from the perspective of academic theory and, using insights from research, proposes methods for acquiring subject-specific language skills in German as an introduction to professional language. Language-sensitive subject teaching is a didactic concept of integrated subject and language learning. Subject-specific content, working methods and ways of thinking are introduced to learners through a language-conscious approach, which pays conscious attention to language in order to facilitate subject-specific learning.

The article describes the peculiarities of the German professional language relevant for a better understanding of the professional language, compares the competences for mastering a foreign language and a professional language, presents two approaches to it – affective and defensive, and suggests a methodology for teaching professional knowledge in German.

Key words: languages for specialised purposes, language-sensitive LSP teaching, basis interpersonal communicative skills, cognitive academic language proficiency, scaffolding, grids.

Introduction. Languages for specialised purposes (LSP) began to receive more attention in the 1960s. They were treated as a linguistic variety of the general language. W. Schmidt was one of the first to address the character and social significance of specialised languages and defined them as a «means of optimal communication about a specialised field among experts» (Schmidt, 1969: 17). This definition was significantly expanded almost 15 years later by L. Hoffmann: he defined LSP as «the totality of all linguistic means used in a field of communication that can be limited to a specific subject in order to ensure communication between people working in this field» (Hoffmann 1984: 53). With this definition, the author subordinates LSP as a part of the common language. According to L. Hoffmann, LSP includes not only terms and terminology, but also phonetic and morphological means, lexical elements, syntactic and stylistic constructions. In this context, the author emphasises that a LSP is not homogeneous but has a different language stock within its various text types. At the same time, the monograph on LSP in German by D. Möhn and R. Pelka was published (Möhn, Pelka, 1984). The authors believe that every LSP serves «the recognition and conceptual definition of subject-specific objects as well as the understanding of them» and thus considers «the specific communicative needs of the subject» (Möhn, Pelka, 1984: 26). The authors draw up numerous classifications of LSP at the level of morphology and syntax.

W. von Hahn was the first to break away from the common language and distinguish between purposeful, active behaviour in the subject and various working contexts. According to his definition,

LSP is a «linguistic actions» as well as «linguistic utterances that are constitutively or commutatively connected with such actions» (von Hahn, 1983: 65).

U. Steinmüller is the first to refer to LSP teaching and writes that LSP is characterised by several essential features, namely a specific vocabulary and special norms for the selection, use and frequency of common language and grammatical means (Steinmüller, 1990: 19). It does not exist as an independent manifestation of language, but is actualised in professional texts, which always contain common language elements in addition to the layer. The author argues in favour of conveying the technical content of the respective discipline and doing so in a form that is appropriate to the scientific level of the subject matter. He is thus one of the first to develop the methodology of LSP teaching.

Students with German as a foreign language are expected to understand texts and be able to express themselves correctly when reproducing what they have learnt. However, many teachers experience the difficulties students have with this daily: almost all textbooks and teaching materials are geared towards learners with German as their mother tongue. Comprehension problems are usually explained by the fact that many students with German as a foreign language have difficulties understanding the German language correctly. However, the problem does not only arise in linguistically heterogeneous seminar groups: in practice, it is noticeable that even students who can speak and write German very well often show serious linguistic weaknesses in professional lessons. The reason for this lies in the switch between the two language registers – from everyday language to LSP.

Main part. The purpose of our study is to develop a methodology of a language-sensitive LSP teaching for students from a scientific-theoretical perspective. In contrast to common foreign language teaching, which is intended to enable students to communicate in everyday life and is designed in a dialogue-based, creative-associative and error-tolerant manner, LSP teaching is geared towards tasks and problems that it seeks to solve in a system-compliant manner with reference to a certain methodology inherent to the subject. Language and subject are inextricably linked. Whether the students are listening to the teacher, reading a text or reproducing what they have learnt – the language conveys the subject content. All too often, however, learning fails not so much because of a lack of professional knowledge, but because students do not understand a task in purely terms. Language-sensitive LSP teaching therefore makes deliberate use of language as a medium to remove language barriers.

The aim of the study is to solve a number of problems: 1) to describe the features of the German professional language that are relevant for a better understanding of the professional language; 2) to compare the competences for foreign language and professional language proficiency; 3) to present two approaches to language-sensitive LSP teaching – one offensive and one defensive; 4) to propose the methodology of acquiring subject-specific language skills in German as an introduction to subject-specific language and culture.

The research methodology includes the method of linguistic description to establish multi-level characteristics of professional communication, as well as to analyse professional vocabulary, morphology and syntax in the learning process. To determine the degree of compliance of speech works spontaneously created by students in professional communication with linguistic norms, cultural and speech analysis of natural written speech was used. Consequently, we define a professional linguistic personality as a representative of a certain sociocultural sphere, whose cognitive potential of language is revealed in the created professional discourse and characterised by a certain degree of individuality. This means that professional language personality is formed in an educational system that provides sociocultural and professional relations, access to the outside world and self-awareness of capabilities in a broad social and professional context and can integrate various LSP. Note that in the framework of professional training of a modern specialist of any profile, special attention is paid to professional communicative competence, i.e. to communicative skills in a professional situation. Language-sensitive LSP teaching also consciously and systematically teaches the subject-specific language skills required to understand, reflect on and actively apply the subject matter of a subject.

In language-sensitive LSP teaching, it is not assumed that these language skills will develop on their own. The acquisition of an educational language register through language education in the subjects is essential for the academic success of foreign students and it is the task of teachers to actively counteract educational disadvantage.

Results and their discussion. Language-sensitive LSP teaching is a didactic requirement whose implementation depends on knowledge of the lexicological, morphological and syntactical features of LSP. In terms of morphology, LSP differ from everyday language in a number of key ways, namely through:

- substantivised infinitives: *das Problemlösen, das Beweisen*;
- nouns on *-er*: nomina agentis (*Fahrer, Dreher, Schweißer*), nomina instrumenti (*Zeiger, Zähler, Schwimmer, Rechner*);
- adjectives on *-bar, -los, -reich, -arm, -frei, -fest* etc.: *brennbar, nahtlos, vitaminreich, sauerstoffarm, rostfrei, säurefest*;
- adjectives with prefix *nicht-*: *nichtleitend, nichtrostend*;
- multi-member composites: *Zylinderkopfmutter, Scheibenwaschanlage*;
- compositions with numbers, letters, special characters: *T-Träger, 60-Watt-Lampe, U-Rohr*;
- multi-word complexes: *elektronische Datenverarbeitung, Flachkopfschraube mit Schlitz*;
- formations from and with proper names: *galvanisieren, röntgen, Bunsenbrenner, Ottomotor*;
- discipline-specific abbreviations: *Abb.* – Abbildung, *Abh.* – Abhandlung, *FS* – Festschrift, *GmbH* – Gesellschaft mit beschränkter Haftung etc.

At the level of syntax, the following syntactic structures occur in LSP:

- functional verb structure: *Anwendung finden, in Betrieb nehmen*;
- nominalisation groups: *die Instandsetzung der Maschine, der Über-führungsvorgang*;
- extended noun phrases, clauses instead of subordinate clauses: *nach der theoretischen Vorklärung, beim Abkühlen des Werkstücks*;
- complex attributes instead of attribute sets: *das auf der Achse festsitzende Stirnrad; die grünen, spitzzulaufenden Drähte; der vorfristig beendete Vorgang*;
- impersonal language: *man nimmt dazu; Strahlungen lassen sich schwer nachweisen*;
- ellipses with infinitive: *die Schraube fest anziehen; den Deckel öffnen* etc.

Causal, conditional, final and relative clauses are favoured. The finite verb is usually in the 3rd person singular / plural in the present indicative; passive forms (procedural and conditional passive) and imperatives are often used.

It is precisely in these points that the common language and LSP differ. In practice, teachers note the following problems with the LSP (see Chart 1, according to Leisen 2015: 47):

Chart 1

Problems in LSP teaching

Language Problems in LSP Teaching	Problem category
Learners <ul style="list-style-type: none"> • wrestle with (technical) terms • have a limited vocabulary • mix common and professional language 	Problems related to vocabulary
<ul style="list-style-type: none"> • give one-word answers and avoid complete sentences • speak and write in an unstructured manner • read and speak haltingly, choppily and fall silent • speak and write in the simplest sentence structures • speak and listen in a teacher-centred way 	Problems with verbalisation and communication
<ul style="list-style-type: none"> • massively violate the rules of the German language • do not understand professional texts and forms of presentation (reading) • have difficulties in writing and describing 	Problems related to language, reading and writing skills

The Canadian LSP didactician J. Cummins was the first to distinguish between everyday language and LSP in the classroom (Cummins, 1979: 197–203). Language learning at school starts with everyday language, the so-called *BICS skills* (an acronym for *basic interpersonal communicative skills*). Through language-sensitive LSP teaching, children at school must gradually learn the language of education (*CALP* as *cognitive academic language proficiency*) and later the LSP (s. Chart 2).

Chart 2

BICS and CALP skills

Basic Interpersonal Communicative Skills (BICS)	Cognitive Academic Language Proficiency (CALP skills)
<ul style="list-style-type: none"> • basic communication skills • language skills for everyday interpersonal communication • oral language register 	<ul style="list-style-type: none"> • cognitive school-related language skills • language skills of LSP in the cognitive academic field • written language register

The two language registers are not directly linked. Unlike everyday language, LSP is not acquired automatically, but is learnt through instruction and deepened through practice. Pupils should be able to use the knowledge gained for their further thinking, speaking and acting, e.g. to derive statements and understand them outside of their context. LSP skills are particularly important for success at school.

Furthermore, the question of the right time for LSP teaching plays a decisive role. As a rule, language skills at a good intermediate level are assumed, and most textbooks also start here with their progression, although there are now also attempts to equate the start of LSP teaching with the start of foreign language learning.

Language-sensitive LSP teaching is a didactic concept of integrated subject and language learning. Subject-specific content, working methods and ways of thinking are introduced to learners through a language-conscious approach. In other words, language-sensitive LSP teaching pays conscious attention to language to facilitate subject-related learning. In addition to the term *language-sensitive LSP teaching*, the term *language-aware LSP teaching* is also used slightly differently in the specialist literature. In practice, both approaches aim to make it easier for learners to achieve subject-related learning objectives by providing linguistic support.

U. Steinmüller (Steinmüller 1990: 21–22) makes the following eight components in a proposal for the organisation of language-sensitive LSP lessons: a clear structure of learning material, simple, clear but not imprecise linguistic design, the use of visual aids, pre-relief and structuring of subject texts, ensuring and checking their comprehension, the teaching of working techniques and the creation of a subject reference via suitable teaching material, whereby he ends by explicitly advocating team teaching of German as a Foreign Language and subject teachers.

There are two approaches to language-sensitive LSP teaching: an offensive and a defensive approach. In the offensive approach, the language requirements remain unchanged, but students are supported linguistically. In the defensive approach, the language requirements are raised to a language level that is slightly above that of the students. In each approach, however, many learning situations require special language resources, for example for describing, explaining or justifying.

Language-sensitive LSP teaching relies on techniques that support and help to master communicative situations. For students to gain linguistic confidence, they are offered a framework of aids, so-called scaffolds, see worksheet A without scaffolds and worksheet B with scaffolds in Fig. 1 (according to Leisen 2019: 12):

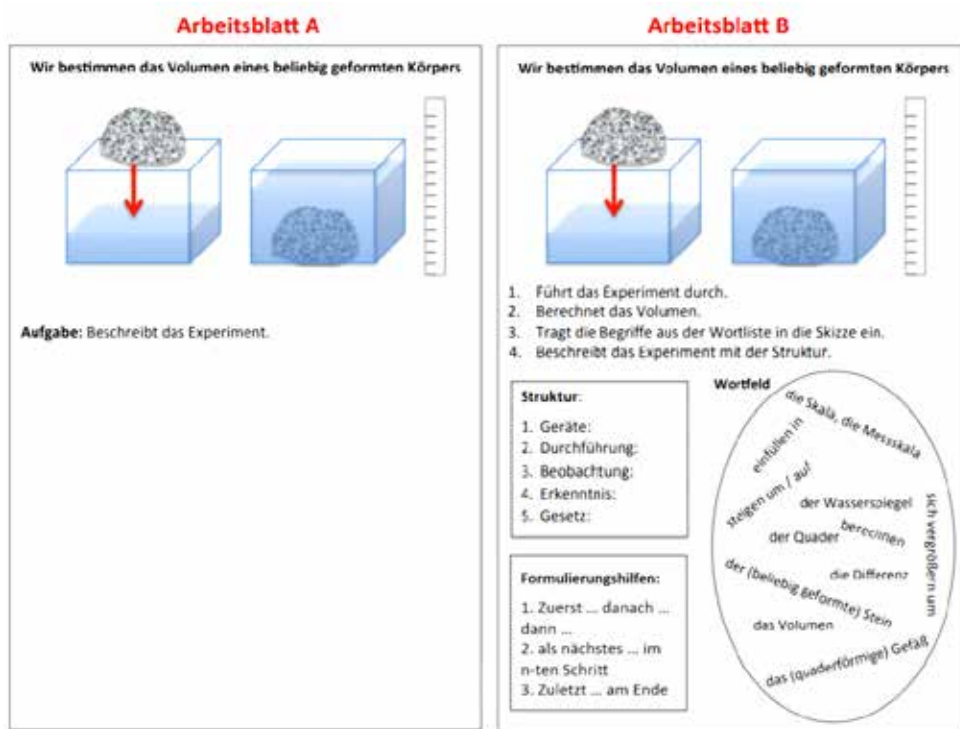


Fig. 1. Worksheets with and without scaffolds

Scaffolding is about providing students with concrete aids so that they can carry out the next higher learning step independently. The following scaffolds, for example, are suitable for language-sensitive LSP teaching:

- word list with important terms,
- graduated learning aids, e.g. speech bubbles with formulation aids,
- word railings in the form of predefined words,
- learning posters to visualise learning content,
- concept networks, clusters or mind maps,
- sample solutions etc., e.g. in maths lessons (see Fig. 2):

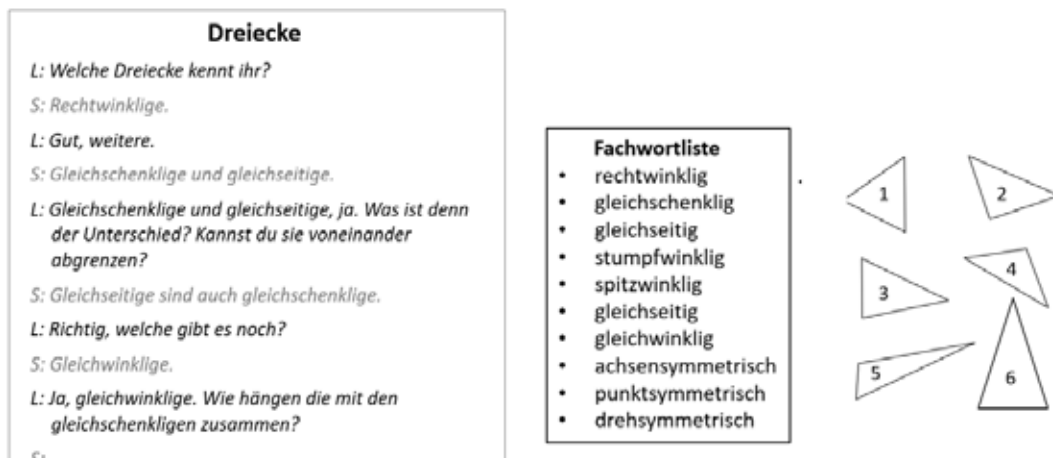


Fig. 2. Sample solutions in maths lessons

Scaffolds are not only suitable for science subjects, but also for humanities subjects, e.g. history, by explaining the topic «The walk to Canossa» (the supplication and penance of the Roman-German King Henry IV from December 1076 to January 1077 to Pope Gregory VII), see Fig. 3 and video at <https://studyflix.de/geschichte/gang-nach-canossa-3730>:

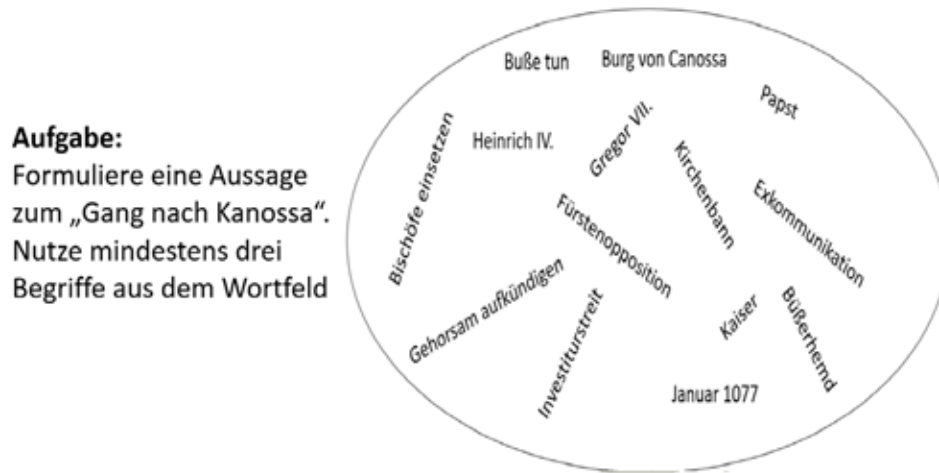


Fig. 3. Scaffolds for a historical material

Graduated learning aids make tasks solvable for students with different levels of LSP skills. They use the learning aids independently and can therefore adapt the level of difficulty of a task to their own performance level. Tiered learning aids are particularly suitable for complex tasks, tasks for reorganising or transferring knowledge and tasks for applying what has been learned. The aids are stimuli that can relate to understanding the task, understanding texts, charts and graphics or to content-related aids for solving tasks. The aids are not presented in one go, but rather guide the students step by step through the process of working on and solving tasks. They should be designed in such a way that they build on each other in terms of content and can be referred to by the students in stages. A step-by-step aid can, for example, comprise five levels. The first level comprises the least amount of help, with each subsequent level providing smaller steps and suggestions that are closer to the solution. The last level of help often corresponds to the model solution developed by the teacher, cf. the task for explaining the processes in the diagram sections (see Fig. 4).

Graduated learning aids are not suitable for developing different solutions to problems are not suitable for developing different solutions to problems, as the aids usually prescribe a specific solution.

Help is often provided in the form of «help cards». The cards can include information (e.g. references to textbooks, teaching materials, explanatory videos, etc., speech bubbles in diagrams, graphics and texts), more detailed explanations of the task (possibly reformulated task), instructions on the solution steps, linguistic aids (vocabulary and/or sentence construction aids). Before the start of the work phase, the teacher should present the graded aids to the students so that they are aware of the areas in which they can make use of help.

Scaffolds support the students' cooperative work. Intensive communication between students gives the teacher more freedom to observe and provide targeted support to individual students. This enables language-sensitive subject teaching. However, only as much help as necessary is offered. As soon as the students can work on tasks independently, the scaffolding is gradually removed again. Working with graded learning aids in individual or partner work is favourable. In principle, however, graded aids can be used in all social and teaching forms.

Aufgabe: Erläutere die Prozesse in den Diagrammabschnitten.

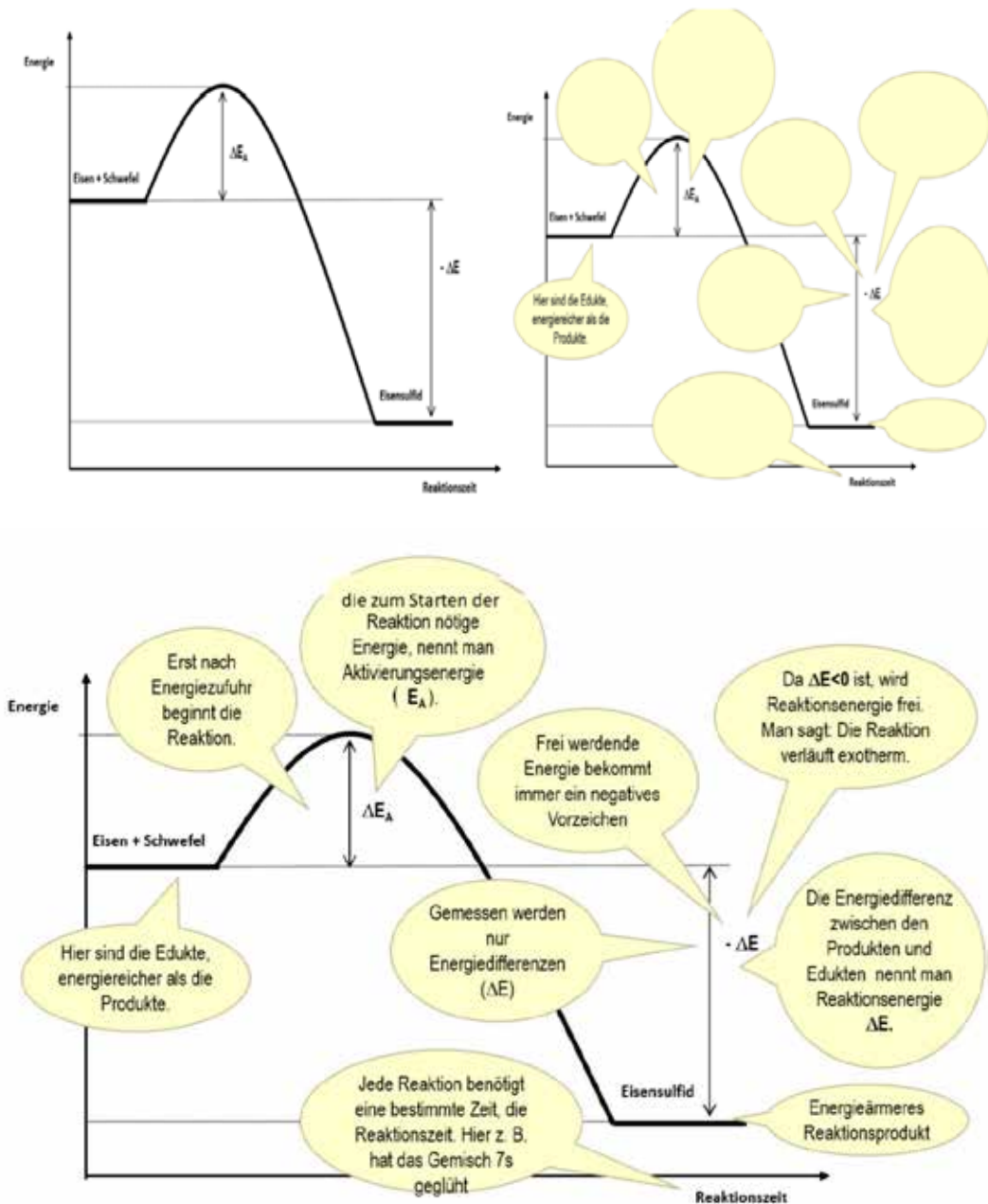


Fig. 4. Graduated learning aids

For everyday planning, sensitive LSP teaching requires a clear and practicable presentation of the planning on approximately one page, a so-called planning grid. The teacher should take language aspects into account as early as the lesson preparation stage. The simplest planning grid is based on the concept for language support in LSP lessons (Tajmel, Hägi-Mead 2017: 75), see Chart 3.

Working with the grid follows a specific procedure. The aim of analysing tasks with the planning grid is to identify and specifically name nouns, verbs, adjectives, prepositions and morphological / syntactical structures (e.g. active-passive, causal sentences, conditional sentences, comparisons) that

Chart 3

Planning Grid

Date:		Class:	
Subject:		Topic of the lesson:	
Competence expectations according to the curriculum:			
	Language actions	Language structures	Vocabulary
			Operators Keywords
General			
Listening			
Speaking			
Reading			
Writing			

are necessary for completing the task. The methodological approach includes an analysis along four key questions:

(1) What is the task?

(2) What activities and linguistic actions should the pupils carry out, e.g. in plenary, in individual work phases, in group work?

(3) What linguistic means and structures are required for this, e.g. to describe chronological processes, conditions, causalities, results?

(4) What vocabulary is required for the subject area?

Another planning grid with modified questions to create looks like this:

– What specialised vocabulary will be used in the lesson? (create a list)

– Which stumbling blocks are included?

– How can these stumbling blocks be pre-relieved?

– Which operators should primarily be practised?

– What material can I use for this? (List with links, worksheets, ...), see Chart 4 (nach <http://www.josefleise.de/download-sprachbildung>)

Chart 4

A completed planning grid

Lesson unit: Addition and subtraction of natural numbers				
Vocabulary used, phrases used	Stumbling blocks		Operators used	Material ideas, links
	Which stumbling blocks are included?	How can they be pre-relieved?		
<i>addieren, dazu nehmen / zählen, zusammenzählen, summieren, vermehren, hinzufügen, plus rechnen, subtrahieren, abziehen, wegnehmen, Unterschied bilden, vermindern, minus rechnen, Differenz bilden, Summand, Summe, Minuend, Subtrahend, Differenz, Klammerregel, Kommutativgesetz (Vertauschungsgesetz), Assoziativgesetz (Verknüpfungsgesetz)</i>	<ul style="list-style-type: none"> • separable verbs (<i>abziehen, wegnehmen, zusammenzählen, hinzufügen</i>) • foreign words, many synonyms 	<ul style="list-style-type: none"> • create a glossary (with plural formation) • vocabulary cloud in the classroom • have specialised vocabulary for the difference circled in blue if necessary • circle technical vocabulary for sum in red if necessary • initially use a small stem of synonyms (e.g. <i>addieren & plus rechnen</i>) 	<i>Berechne, nenne, wende an, addiere, subtrahiere</i>	<p>https://mathewortschatz.schule.at/mathewortschatz.htm Wortschatz Bingo, Domino</p>

If a textbook is to be used in LSP lessons, it would be a good idea for the teacher to examine the text at word, sentence and text level beforehand. The extent of the vocabulary that the students have mastered plays a decisive role in reading comprehension. Criteria for text selection are simplicity, brevity, structure and the clarity of the pictures or graphics. A suitable text:

- is not too extensive,
- uses terms consistently.
- is characterised by a clear structure,
- explains facts using examples,
- does not contain any superfluous information.

If a text seems too difficult, teachers can simplify it by reducing LSP features so that the content is more accessible. However, LSP texts cannot be changed at will. A text should also not be too simple in terms of language development, but should present a calculated challenge.

When preparing LSP texts for teaching, texts should be pre-relieved and structured. It makes sense to provide preliminary and additional information about the text. The text could be opened by asking key questions, underlining or highlighting the key words or main information in the text, writing out key words and labelling their context in the margin of a text. For difficult texts, teachers could create a simpler parallel text, which must, however, contain all the essential content of the main text. Additional graphic representations of the facts are very helpful because of coupling between object, word and image, classification of previously learnt and new terms in graphically designed systems, vocabulary presentation of collective terms and word fields. Activities that accompany and support reading comprehension are divided into three phases:

I. Before reading (activation of prior knowledge)

(1) Activate prior knowledge associatively, e.g. via visual material, associations with individual terms through diagrams, mind-mapping or action-orientated through a preceding experiment.

(2) Pre-explain difficult words (terminology, compound words, foreign words) with word explanations or definitions. Simple self-produced or existing explanatory videos can be used here. These can provide preliminary relief in terms of content and language during preparation at home. They are also a modern tool that corresponds to the media habits of the learners.

II. During reading (reading comprehension, reading strategies)

(1) Cooperative method 'House of Questions' (Brüning, Saum, 2015: 18f), which consists of the following steps:

(a) Individual work: Students are given a text to read. Everyone then writes down at least 3 questions from the ground floor about the text and also writes down the answers.

(b) Group work: Students take it in turns to ask one of the questions. The others must try to answer it correctly. Each student has four speech cards; for each answer, they must place a card in the centre. When they have put down all their cards, they must wait until everyone else has put down their cards. The student asking the question calls out, the others must answer. Questions may not be asked twice.

(c) Individual work: Everyone then writes down at least two questions from the 1st floor on the text and writes down the answers.

(d) Group work: Students take it in turns to ask one of the questions. The others must try to answer them correctly. Each participant has four speech cards; for each answer they must place a card in the centre. Questions may not be asked twice.

(e) Individual work: Everyone then writes down at least one question from the attic about the text and writes down the answers.

(f) Group work: Participants take it in turns to ask one of the questions. The others must try to answer it correctly. Each participant has four speech cards; for each answer they must place a card in the centre. Questions may not be asked twice.

(g) Plenary: The groups now ask their most difficult questions on the 3 levels in plenary.

(2) Support materials such as dictionaries, translation software, etc. Texts should first be broken down into smaller sections of meaning, paraphrased and written down in keywords, e.g. cooperatively in reading tandems or through reciprocal reading, which offers the opportunity to ask fellow students directly if there are difficulties in understanding or to formulate questions about the text yourself.

III. After reading (text reconstruction and text transformation)

(1) Summarise, compare and reflect on what has been read using visualisation techniques.

(2) Summarise what they have read in just one sentence in order to train their eye for the essentials.

(3) Creative forms of text reproduction, for example in a still image or as a role play, productive writing occasions, e.g. rewriting the text from a new perspective, also trains text planning skills,

(4) Use prepared concept cards to help pupils verbalise what they have understood.

(5) Deciphering highly condensed and abstract texts (e.g. through nominal style, passive constructions, complex hypotaxis, long nominal phrases and extensive references). Exercises such as tracing and assigning reference words or simplifying transformations in which sentences are shortened, nominal phrases are converted into subordinate clauses, etc. can provide support here.

Matching exercises are suitable for checking the comprehension of specialised texts when two sets of terms or partial statements are extracted from the text and the learner must link them together. Correct/false exercises and multiple-choice exercises can also be used. In order to understand the specialised texts, central keywords or statements of the text should also be named, an unstructured text should be divided into smaller sections, terms or statements from the text should be entered in drawings, speech bubbles should be filled in, texts should be reproduced in key words orally or in writing, technical contexts, definitions of terms, rules, formulae, abbreviations etc. should be asked for or looked up. At an advanced stage, work assignments could be carried out according to written or oral instructions or work assignments could be formulated for others in writing or orally

These texts are orientated towards the respective subject. The linguistically precise, conceptually written form or non-linear presentation of diagrams makes it more difficult for learners inexperienced in educational language to extract information and must therefore be prepared, supported and practised. The aim is to achieve confidence in using the technical language level, not to simplify it, even if simplification can be an intermediate step.

Conclusions. In conclusion, it can be generalized that the sensitive use of language in subject lessons plays a crucial role in helping students with German as a foreign language to overcome linguistic hurdles, thereby facilitating the achievement of subject-related learning goals. By adapting language use to be more accessible and clear, educators can create an inclusive learning environment that supports the comprehension and engagement of all students, regardless of their proficiency in German. This approach not only aids in understanding the subject matter but also contributes significantly to the students' overall language development. As a result, students increasingly acquire German subject-specific language skills, which enhances their academic performance and confidence in using the language across different contexts. Moreover, this method promotes a more positive attitude towards learning German, encouraging continuous improvement and greater academic success. Through careful consideration of language use, educators can ensure that all students have the opportunity to succeed and thrive in their educational journey.

References:

1. Brüning, L., Saum, T. (2015). Lesekompetenzförderung durch Methoden des Kooperativen Lernens. Strategien zur Schüleraktivierung. 6. Ed. Essen: Verlag Neue Deutsche Schule. 180 S.
2. Cummins, J. (1979). Cognitive/Academic Language Proficiency, Linguistic Interdependence, the Optimum Age Question and Some Other Matters. *Working papers on bilingualism*, 19, S. 197–205.
3. Hoffmann, L. (1984). *Kommunikationsmittel Fachsprache: eine Einführung*. 2., Aufl. Berlin: Akademie-Verlag.

4. Leisen, J. (2019). Das Prinzip der „kalkulierten Herausforderung“: kompetenzorientiert unterrichten. *Schulmagazin*. Nr. 5. S. 10–13.
5. Leisen, J. (2015). Planung von CLIL-Unterricht. *Zeitschrift für Interkulturellen Fremdsprachenunterricht Didaktik und Methodik im Bereich Deutsch als Fremdsprache*. Jg 20, Nr. 2. S. 45–58.
6. Möhn, D., Pelka, R. (1984). *Fachsprachen. Eine Einführung*. Tübingen: Niemeyer (Germanistische Arbeitshefte 30). 171 S.
7. Schmidt, W. (1969). Charakter und gesellschaftliche Bedeutung der Fachsprachen. *Sprachpflege* 18, S. 10–20.
8. Steinmüller, U. (1990). *Deutsch als Fremdsprache: Didaktische Überlegungen zum Fachsprachenunterricht*. In: Zielsprache Deutsch 2.
9. Tajmel, T., Hägi-Mead, S. (2017). Sprachbewusste Unterrichtsplanung. Prinzipien, Methoden und Beispiele für die Umsetzung. *FörMig Material*, 9. Band. Münster & New York: Waxmann, 152 S.
10. Tajmel, T. (2017). *Naturwissenschaftliche Bildung in der Migrationsgesellschaft. Grundzüge einer Reflexiven Physikdidaktik und kritischen Sprachbewusstheit*. Wiesbaden: Springer VS, 264 S.
11. von Hahn, W. (1983). *Fachkommunikation. Entwicklung, Linguistische Konzepte, Betriebliche Beispiele*. Berlin/New York: de Gruyter. 184 S.