Research Article

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Theoretical Models and Specific Communication Situations in Projects

Abstract: In recent years, numerous proposals have been made with the aim of establishing a systematic hierarchy of relationships for languages for special purposes (LSP), and different approaches have been classified in terms of vertical and horizontal models. Recently, however LSP research has moved more and more towards Applied Linguistics and a segregation has emerged between studies focusing on systematic topics and those based on concrete case studies. While studies in applied LSP research have increased, work on systematic approaches has been neglected. The present study follows a different approach, in that instead of segregating the analysis of concrete case studies from the work on systematic approaches, examples from case studies will be used for testing and revising systematic approaches. In this paper we shall first address the question based on these examples of which long established classifications need to be revised, and consider further whether revising and applying classifications is the way to go in LSP research or whether there is a need for a new typology. In the present paper we shall thus be building on and developing the work on structuring LSP in (Roelcke 2014) and on project-specific terminology (Pelikan & Roelcke 2015).

Keywords: Project communication, horizontal structuring, vertical structuring, expert-laymen communication, typology

1 Structuring LSP – the basics

Languages for specific purposes can be defined as certain concepts of linguistics variants specific to a professional setting – terms could be labels for these concepts. The setting does not have to be based on an academic discipline, the present paper focuses on academic disciplines although this data comes from the communication of a research project.

Questions related to establishing structures of languages for specific purposes and types of technical texts have been raised for over 50 years in the German research tradition, as in the work of Hoffmann (1985), Steger (1988), Kalverkämper (1988), Roelcke (2014) for horizontal structuring, and Ischreyt (1965), Hoffmann (1985), and Roelcke (2014) for vertical structuring. Also worth mentioning are for instance Göpferich for an overview on different text types (Göpferich 1998) and studies on comprehensibility of professional communication (Göpferich 2006) as well as Baumann on the levels of expertise (Baumann 1994). The present chapter will give a brief overview of different approaches to defining structures in LSP, i.e. establishing the different relationships between and within the different LSPs. Following the approach of Saussurean linguistics with "distinguishing *langue* and *parole*" (Thomas 2004:150), *langue* is considered to be "a system of signs, the common property of a particular speech community" (ibid.) while "*parole*

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is actual produced speech, subject to individual idiosyncrasy and will" (ibid.). The different settings of professional communication (such as for instance research projects) can also be considered as social groups (Roelcke 2017) functioning as temporary speech communities. Referring to Saussure, they have each their own *languages* interacting with the *parole* for making communication work.

The structures of professional communication are presented here by establishing, identifying and defining structures between and within the languages used. This procedure is rather different from classification or typology and the present paper will explain these different concepts.

Criteria which have been proposed in previous research on LSP for identifying structures include for example, the different disciplines and areas of study (Roelcke [3]2010:29). What may be termed the 'horizontal structuring' of languages for specific purposes is based on academic disciplines and areas of study themselves. In addition, a distinction may be made between different levels of abstraction within communication in a specific LSP. These different levels can be identified in terms a 'vertical structuring'. In German LSP research since the 1980s the distinction between different text types is commonly made on the basis on how communication is structured within them. These different text types and their structures help to classify LSPs and take into account a number of requirements for professional communication.
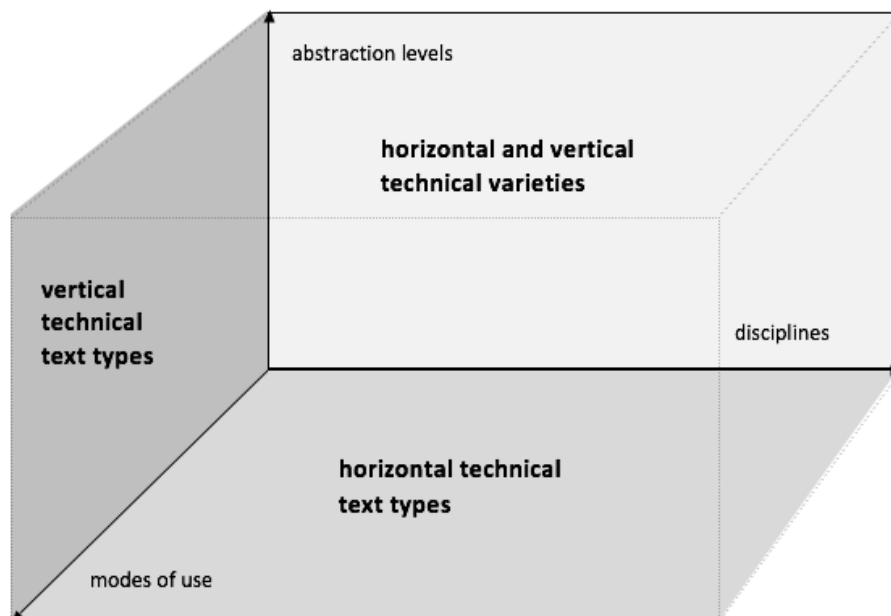

Fig. 1: Structures of LSP (translated from Roelcke [3]2010:30)

Figure 1 above shows different criteria for structuring languages for specific purposes (disciplines, levels of abstraction, modes of use), with due consideration being given to different priorities for description, i.e. the levels of abstraction within the disciplines using approaches provided by variationist linguistics (light grey background), the modes of use within different disciplines (grey background) and different levels of abstraction as provided by approaches within textual linguistics (dark grey background). In this way we can identify two different approaches for structuring, i.e. 'horizontal' and 'vertical'. The best-known accounts in these terms are those of Steger Hoffmann (1984), (Steger 1988), and Kalverkämper (Kalverkämper 1988) for horizontal structuring and Ischreyt (Ischreyt 1965), Beneš (Beneš 1969), von Hahn (von Hahn 1980), and Hoffmann (Hoffmann 1984) for vertical structuring. Roelcke (Roelcke [3]2010:31 ff.) explains horizontal and vertical structuring as follows:

1.1 Horizontal structuring

Horizontal structuring is based on structures of disciplines and specialist areas, as evolved independently from intralinguistic idiosyncrasies. One of the best-known proposals for horizontal structuring is the differentiation into three sections by Steger [Steger 1988]. He differentiates science, engineering and institutions, and this may be complemented by two further divisions, business and consumption, as proposed by Kalverkämper (Kalverkämper 1988). The language of consumption can also be seen as a discrete area of communication within the other disciplines, and this would point to a vertical structuring rather than to a horizontal one. As previous models for horizontal structuring of LSP have been recognised as not sufficient, Roelcke (Roelcke 2014:158) suggests basing them on economic sectors:

Economic sectors	primary sector (extraction of raw materials)	secondary sector (processing of raw materials)	tertiary sector (professional services rendered to humans)	quaternary sector (processing of information)
LSP	(engineering) craft	applied science engineering	theoretical science institutions (new media)	applied science engineering institutions new media

Fig. 2: LSP horizontal structuring (translated from Roelcke 2014:159)

Structuring LSP based on economic sectors was already proposed by Möhn and Pelka (Möhn & Pelka 1984:35), albeit with only three sectors, i.e. primary production, manufacturing and service. Roelcke differentiates between four sectors, the first: extraction of raw materials, the second, the processing of raw materials, the third: professional services rendered to humans, and the fourth: the processing of information, and assumes that all areas of human activity can be described with this model (Roelcke 2014:158f.). Applied sciences, institutions, engineering and new media are assigned to more than one sector – this serves as an illustration of this structuring. Roelcke further suggests this model be the basis for a horizontal typology of German LSP and adds that his typology does not give any information about the features specific to each LSP itself (ibid.).

1.2 Vertical structuring

While the horizontal classification focuses on distinguishing between disciplines and specialist areas, the vertical structuring concentrates on levels of abstraction within a single discipline. Beginning with Ischreyt (Ischreyt 1965) the vertical structuring was also based on three sections, i.e. scientific language, specialist colloquial language and technical language (Roelcke [3]2010:38 f.), and it is presumed that there are different

levels of abstraction within all the disciplines in these sections.If the emphasis is placed on specialist communication, the level of specialist and linguistic abstraction is high, whereas it can be described as low if the focus is on the particular. Obviously, the approach of Ischreyt (1965) is then insufficient, since on the one hand, the humanities are not included, but on the other it is not detailed enough. All the different levels and the areas of all disciplines with their various component divisions cannot be described adequately in terms of these three sections. Roelcke suggests a typology based on the dichotomy between expert and laymen and thus does not differentiate between the various areas and disciplines. He identifies the specific type of communication within a discipline or beyond its boundaries (Roelcke 2014:164) in general. Further developing this approach, he further suggests a vertical structuring based on five different types as shown in figure 3 below:
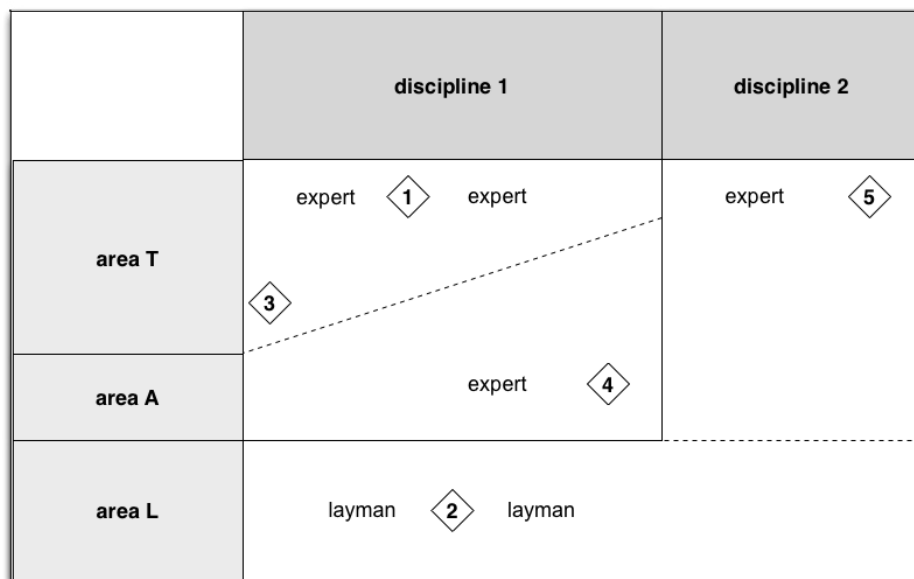

Fig.3: Vertical structuring (translated from Roelcke 2014:164).

This model presents two different disciplines which could be disciplines of the same sector (e.g. economic) or two different sectors. Furthermore, Roelcke distinguishes between three different areas of activity and related communication: T as the more theoretical and abstract specialised area, as opposed to A, which is the applied and concrete specialised area. L is the objective area without a clear reference to any specific discipline. The criterion distinguishing the areas T and A on the one hand and the area L on the other is the existence of some kind of specialisation, while the level of specialisation is the criterion for differentiating between the areas T and A. Roelcke's model includes two different types of person, experts and laymen, which occur in five different types of communication. Type 1 is a communication between two experts on the same professional level in a single discipline, while type 2 involves communication between two laymen in the relevant subject area, i.e. a communication without any specialisation limited to the area L. Type 3 denotes communication between two experts in a single discipline, but with each possessing different levels of expertise (or possibly within other disciplines). Type 4 would then relate to communication between an expert of a specific discipline and a layman within this subject area, going beyond the boundaries of specialist area A and the objective area of interest of layman L. Type 5 would then relate to a situation where two experts from different disciplines are communicating with each other on the same professional level. Roelcke suggests comparing type 4 and type 5, since an expert in one discipline could be considered as a layman in another (Roelcke 2014:165). Everybody can on at least one subject be denoted as expert – here has to be

differentiated between extreme and relative experts. Roelcke does not go into detail here, but focuses on monolingual communication – therefore, there is no need for clarifying the difficult differentiation between experts and laymen in international and intercultural settings as it is the case in the present paper. In everyday communication, the differentiation between experts and laymen needs to be discussed again, while in the professional context it is suggested to implement a model differentiating between extreme and low experts/laymen.

In conclusion, it must be admitted that these models are rather imprecise, as both models have been developed from studies which are controversial. For instance, horizontal structuring can never be complete and include all disciplines, whereas vertical structuring would benefit from measuring the degree of knowledge of the relevant discipline or subject – a non-realistic approach. So a degree of imprecision has to be accepted when applying these concepts. Of course, it is possible that they will become more concrete and in this way more reliable applicable as they are developed further? The dichotomy between experts and laymen is a frequently discussed topic and referring to research as a global enterprise where scientists have been working together in inter- and transdisciplinary projects for a long time, it needs to be revised. These people cannot be considered laymen commonly. Taking the emic and etic approach (Pike 1982) into account, it depends on the contemporary position if someone can be considered to be an expert or not. We shall go on to discuss these issues further in the present paper.

2 Typology or classification ?

The present paper shows different approaches for identifying structures within LSP. Specifying vertical and horizontal structures help to understand the different relationships within and between the different LSPs. But the concept in which these two approaches are included still needs to be defined – the distinction between the concepts typology and classification needs to be made. In his recent paper on identifying structures of LSP, Roelcke (Roelcke 2014) focuses on developing a typology instead of classifying. In general, defining a typology and classification specific to linguistics has been neglected, although it has been addressed in a number of publications (see Roelcke 1997, or for an overview Croft 2003 and Plank 2007). First, typology needs to be defined in order to distinguish it from classification.

"Since the establishment of a classification requires previously available concepts (which may be refined in the course of working out a classification), is it correct to regard classification as a procedure of concept formation", Mario Bunge asks (Bunge 1998:89). IN agreement with Bunge, classification will be seen here as the "occasion for the introduction and elucidation (refinement) of concepts" (Bunge 1998:89). In this way, established concepts are selected and applied to a defined data set. A classification can be the basis for a typology, located on a higher level. Every typology is "the result of a grouping process" (Kluge 2000) whereas the groups themselves are defined as types (Kelle & Kluge 2010:85). As it is an description serving to organise and group the topic to be analysed, it can also be defined as "selection of a certain number of combinations of groups of varieties" (Capecchi 1968:09), characterised by defined dimensions (Capecchi 1968:10). A type can be defined as a combination of specific attributes (Kuckartz 2005:97) and described on the basis of the constellation of the attributes. It is not the extension of the type descriptions which matter, since a type can be known in detail without knowing all tokens of this type (Wiegand 2003:199). Referring to Felber & Schaeder, a typology has to fulfil a number of intended purposes. It has to be exhaustive and intended to be of universal application, and it should be based on classification criteria (attributes), which are essential, reasoned and manageable intersubjectively for the object to which it is being applied (Felber & Schaeder 1998:1728). But as opposed to a classification, these criteria are meant to be universally applicable and the application must be based on already existing hypotheses.

If we return to Roelcke (Roelcke 2014) and attempt to apply this to LSP, it is not the different areas of a discipline themselves which should be seen as the basis for structuring (this would be classifying). The different forms of communication relating to these areas are considered as the basis here - within them or even beyond their boundaries. Based on this, the difference between typology and classification can be radically simplified and summarised as follows:

- Typology
  For a typology, the criteria and characteristic features have been developed in advance to be applied to various aspects of the subject area (Roelcke [3]2010:29). This means that criteria and characteristic features are developed without referring to actual LSP data while the model is being developed.
- Classification
  A classification starts out from a subject area and tries to structure the defined subject area based on characteristic features and criteria. Following this approach, data from a case study would be the basis for research on LSP.

The present paper aims to develop a typology rather than a classification, focusing on the approach of a relative typology. Relative typology enables us to characterise a topic on the basis of different levels of types, which means a graduation of attributes. According to Kluge (Kluge 1999:26 f.), the attributes of one type should be as similar as possible (inner homogeneity) while the types should be as contrary as possible (external heterogeneity).

By classifying the types in different categories, only real types are taken into account, not ideal types which do not exist in reality (Weber 1922:191). With this we proceed to a further step in typologisation, i.e. metatypologisation (Tietz 1960:26), which involves rather more than differentiating between real and ideal types.. In addition to the differentiation between classification and typology, as well as the one between real and ideal types, we need to go one step further and ask what the identified types look like in detail. The types could be typologised based on different attributes, for example, for describing idiolects (explained in detail in Pelikan & Roelcke in prep.) or types for describing communication situations as described in the present paper. Furthermore, specific types can be differentiated in identifying types specific to each phase of a project. Although not all types will be included in every phase, there are different attributes depending on the specific phase of the project. Other types are linked to the scientific focus of the project, so that, for example, types related to transdisciplinary research will not be included in an interdisciplinary research project. In summary, several attributes may define a type, focusing on the communication situation. After the type is defined, the metatypologisation begins with defining each type in more detail (see Pelikan & Roelcke in prep.). In the present paper, we have presented a typology which has been developed and illustrated in terms of different attributes, as applicable to different communication situations in research projects.

3 Structuring LSP – revising the models

Research has become international and many research projects are carried out not only by researchers from different nationalities but also from different disciplines. More and more research questions cannot be answered by researchers from a single discipline and collaborative research has become common (Pennington 2008). In the following section the models outlined above will be applied to concrete communication situations found in research projects. A project is "a temporary endeavour undertaken to create a unique product, service or result" (PMI). Project teams often consist of collaborators who do not usually work together (PMI), but who have together to work in one project. The present paper focuses on the communication of international research projects, using English as lingua franca (ELF) for daily collaboration. Although using ELF for communicating with project partners and stakeholders, in some cases multilingualism is used (Pelikan 2017, Pelikan et al. in prep.). The project members switch to their mother tongue (dialect etc.) within their local teams automatically, as soon as there is no one attending who does not speak the language used. For gathering data during the field research, the local language was consciously used as interaction in local language leads to more meaningful data. Within the examples of research projects considered for the present paper, the project members mainly did not speak the language of the country they worked temporally with high proficiency: English was considered to be the working language. As the project members work in different countries, the project communication often is carried out web-based with only a few face to face meetings (if at all). This

results in mainly written communication supplemented by phone calls and videoconferences. As the project members therewith miss the chance for exchanging by use of mimic or other forms of non-verbal communication quite often, this relevant part is neglected in the present paper. These research projects can be intradisciplinary, or with members from different disciplines. Several terms are used to refer to collaborations between different disciplines – Stock and Burton use "integrated research" as a collective noun for all different forms of research integrating multiple disciplines (Stock & Burton 2011:1091). The present paper will focus on intradisciplinary, interdisciplinary, multidisciplinary and transdisciplinary research projects and we shall not use other terms, such as 'supradisciplinary' (Stock & Burton 2011:1091), 'polydisciplinary' (Shalinsky 1989) or 'oligodisciplinary' (Abram & Haddox 2000:05), the definition of which is not entirely clear-cut, or the term 'hyperinterdisciplinary', introduced by Christie and Maton (Christie & Maton 2011:92).

Based on communication situations in international research projects, the approaches mentioned above for structuring LSP will be evaluated and revised as necessary. All data referring to an interdisciplinary research project come from the AMASA project, an EU FP7 project with project members from different disciplines in Great Britain, Belgium, Switzerland, Uganda, South Africa and India. There communication of this research project was mainly web-based and influenced by several languages for specific purposes (for a detailed description, please refer to Pelikan & Roelcke 2015).

As mentioned above, some approaches to structuring LSP rely on the assumption that there is a dichotomy between experts and laymen. Kalverkämper (Kalverkämper 1990:112), for example, suggests that there is no communication which is non-specialised, since all communication is specialised, and the crucial distinction lies in the degree of specialisation (Kalverkämper 1990:112), even though this may imply that there are no laymen. Following, all utterances (not only) within project communication are specialised. They include the lowest level of specialisation (the level, which might be called 'the laymen of professional communication'), at least, and increase the level of specification depending on the communication setting (involved persons, topic etc.). Measuring and then denoting the different levels of specification is very difficult as there is a fluent passage between them and there is no clearly defined scale for differentiating between them. This interaction of the different specification levels occurs in internal and also in external communication. The present paper focuses on project internal communication, adding external communication only in a very few instances for explanatory purposes.

3.1 Defining experts and the interplay of knowledge and language in research projects

As seen in figure 3 above, vertical structuring deals with different types or different kinds of experts. So before structuring project internal communication horizontally and vertically, the question has to be answered what is an expert and what is expert knowledge in the internal communication of research projects. Bromme defines experts as persons with sufficiently long education and socially codified specialised knowledge (Bromme 1998:50), whereas laymen are persons who can only draw on everyday knowledge (Bromme 1998:50). The level of expert relates to a distinct level of explicit knowledge – in-depth knowledge in the required field. However, the factors by which this kind of knowledge can be measured are unclear. Years of experience, the status of education, the number of quality publications in the relevant field are among the factors which have to be taken into account. A distinction between the different forms of knowledge (Abel 2015:150) has to be made, although they overlap one another (Abel 2012a:08). Here, especially the basic (tacit) knowledge and procedural knowledge (Abel 2012b:245 ff.) are essential in considering the development of all project members in the course of a project. For example, a project member – a postdoc – might have lower basic knowledge in a discipline than the PI[1] of the project, as defined in terms of years of experience, publications, the number of projects etc. But there are new research instruments and the postdoc may have more experience in using them in the field than the PI. In

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1 PI: Principal Investigator

this case the postdoc would have more procedural tacit knowledge than the PI and could possess a higher level of expertise on this specific topic. There could also be new research findings which the postdoc has made and which the PI does not know about yet. But findings need to be located in the discourse of the discipline, and here the more experienced PI clearly has more expert knowledge than the postdoc. So the postdoc has some knowledge (for instance new results directly from the laboratory) which the PI does not have, but it does not give him a higher level of expertise than the PI since he cannot integrate these. If we are dealing with inter- or even transdisciplinary research projects, we have to look beyond discipline boundaries. First, all researchers work on becoming experts in their field – this gives them in-depth knowledge in their disciplines but it does not make them experts in inter- or transdisciplinary research. Transdisciplinary research requires not only being an expert in the own field but also "mutual understanding between multiple epistemologies" (Zinsstag 2015), "a high level of self-reflexivity to allow for a dialogue between different hermeneutic frameworks" (ibid.) is mandatory. Science becomes a part of societal processes, as scientists enter "into dialogue and mutual learning with societal stakeholders" (Hirsch Hadorn et al. 2008:25). This implicates "contributing explicit and negotiable values and norms in society and science, and attributing meaning to knowledge for societal problem-solving (ibid.). Therewith, being an expert means also being able to learn with different stakeholders and to have a high level of self-reflexivity. "Transdisciplinarity is no longer an aim, vision or dream, but a reality (Tanner 2016). Therefore, in-depth knowledge in collaborating with other disciplines and the skills for establishing transdisciplinary processes are mandatory. But not only has the knowledge to be acquired for collaboration on the specific project, there is also the creation and acquisition of knowledge through collaboration. Through collaboration, different kinds of knowledge are acquired: linguistic knowledge, specialised knowledge, technical knowledge – as taught in subject teaching (Kovacs 2016:228), but here, they are acquired by situative participation (Lave & Wenger 1991). These different forms of knowledge are acquired through collaboration within the project team. Following the Fleckian approach of a thought collective, knowledge can only be created through interaction, dynamically by confrontation with something new or unexpected (Rheinberger 2005:28). But the question then arises of how individual and collective knowledge is linked to language?

The relationship between knowledge and language in each of us is beyond doubt, if some details of this relationship are still unclear. Aristoteles considered that linguistic utterances symbolise thoughts, which means that knowledge is primarily reflected in language (Weber 2004:33). Language transfers the information emanating from personal knowledge. We have to differentiate between broad knowledge from everyday activities and professional knowledge. The more specialised the knowledge, the more specialised the information transferred through communication. The different forms of knowledge mentioned above consist of individual and technical skills (Erden et al. 2008:06) and are linked to a particular LSP. The idiolect, the speech habits of each single person, includes specific LSP based on the discipline of education and knowledge acquired unconsciously while working in such a complex environment. So the level of tacit knowledge from a specific discipline could, for instance, be linked to the LSP of this discipline – increasing in-depth knowledge implicates increasing LSP. From this point of view, it can be assumed that professional knowledge (whether acquired consciously or not) acts as the basis for the LSP. The following sections will try to structure LSP, keeping the interplay of knowledge and language in mind.

3.2 Horizontal structuring

The model for horizontal structuring as presented in figure 2 has to be adapted in order to apply it to a research project:

Economic sectors	primary sector	secondary sector	tertiary sector	quaternary sector
LSP on project / meta level			Theoretical Science Institutions (New Media)	Applied Science Institutions Engineering New Media
LSP on object level	Craft Engineering	Applied Science Engineering	Theoretical Science Institutions (New Media)	Applied Sciences Institutions Engineering New Media

Fig.4: horizontal structuring based on economic sectors as applied to communication within a research project

As figure 4 above shows, in order to apply this model we need to differentiate between LSP on a project or meta level and on the object level. The project or meta level includes the internal project communication itself – it is limited to the third and fourth sectors only. No extraction (first sector) or processing of raw materials (second sector) is included in the internal project communication. The object level includes all four sectors as it refers to the object of the carried out research, and thus this level varies according to the scope of the research. Thus, if the project's focus is on craft or engineering, the first sector is involved, if it is only about applied science and engineering only the second sector is involved. In this way, the model can be applied to research projects with different scopes. But the two empty boxes are conspicuous and raise the question, if this model is accurate enough for applying it to various research projects. Focusing on research projects instead of economic settings, the following model is based on academic sectors:

academic sectors	primary: academia	secondary: public authorities	tertiary: populace	quaternary: private
LSP on project / meta level	Theoretical Sciences Applied Sciences Institutions	Applied Sciences Institutions (New Media)	Applied Sciences Institutions (New Media)	Applied Science Institutions **Engineering** New Media
LSP on object level	Institutions Craft Engineering New Media	**Applied Science** Institutions Craft Engineering New Media	Institutions Craft Engineering New Media	Institutions Craft Engineering New Media

Fig.5: horizontal structuring based on academic sectors as applied to communication within a research project

Referring to the typology in figure 4 above, figure 5 should be seen as a specification of the four columns on the right. Understanding academia as one sector, the typology of figure 5 goes deeper into this single sector - like using a magnifier. This typology could be used for any kind of research collaboration, also for inter- or transdisciplinary research projects. Keeping the differentiation between meta and object level, the model presented by figure 5 includes four different academic levels. This model refers to the stakeholders, involved in the projects to be analysed. Referring to Habicht et al., research projects rely on different decision makers (Habicht et al. 1999), depending on focus and setting of the research project. The present model groups them into the four different sectors. Following the aim of developing a model to be applied to all different communication settings in research projects, these four sections are necessary, as – compared to the model in figure 4 above – they allow a more precise analysis of communication situations in complex research projects. As for instance Roth et al. describe, the relevance of involving different authorities is significant (Roth et al.2003) – this takes effect not only for projects in the area of public health, where interacting with all necessary sectors leads to benefits for the populace (ibid.). All these sectors require the "awareness of the researchers of the approach in the given knowledge system" (Ali & Zinsstag 2015) – every sector is an own thought collective (Fleck 1999) also displayed in the referring LSP. The first section includes academe in research projects – independent of the involved disciplines. This includes the development of research methods as well as the concrete data collection. As the first sector is for academe only, the other three sectors are for non-academic audiences. Similar to the second factor of the model based on economic sectors, the second sector here also includes the processing of raw materials. Public authorities are the second section – relevant for processing material into practice, respectively planning of further dissemination steps. The populace in the third sector implicates the professional services rendered to humans. Research outcomes are used to solve concrete issues burdening the populace. Also here, it needs to be differentiated between the communication on the project/meta level – internal project communication in transdisciplinary research projects, where the non-academic audiences are part of the project and communicate with the academics about the collaborative research. Additionally, in the object level, they communicate about the objects the research is dealing with. The quaternary sector presents single private persons or households – they might be direct project partners or they are involved in the data collection at least. As we will see in the chapter on vertical structuring below, these sections need to be considered for developing a typology for the analysis of the communication in research projects.
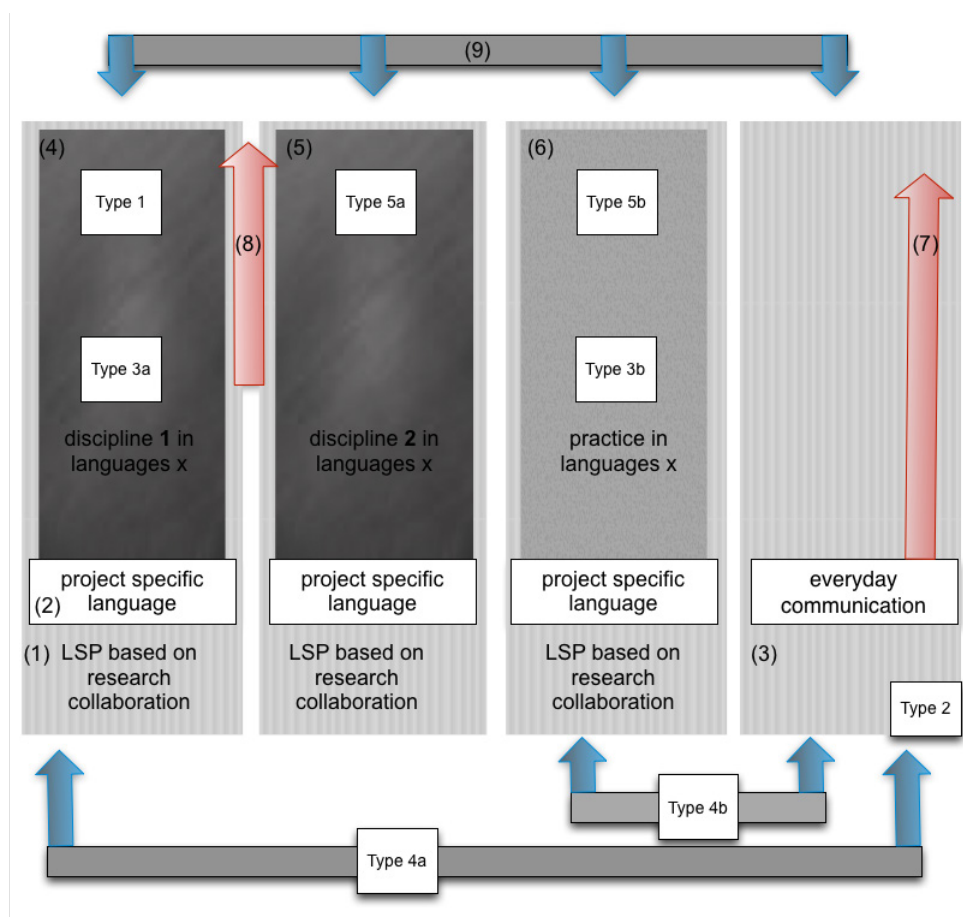
3.3 Vertical structuring

In order to be applicable to the communication of interdisciplinary or even transdisciplinary research projects, the model for vertical classification from Roelcke (Roelcke 2014, see figure 3 above) needs a major revision. Roelcke's model does not allow a detailed analysis of these complex communication situations. In order to revise the model, the different project phases have to be considered and the model has to be adapted accordingly. If we are to aim at developing a typology applicable to different research projects, the following model has to include intradisciplinary, interdisciplinary, multidisciplinary and transdisciplinary examples. By way of illustration, Roelcke's initial model (Roelcke 2014) refers to communication situations between two individuals.

Figure 6 presents the full model for the vertical structuring with the focus on communication situations including a gradual upgrading of the levels of expertise, (i.e. the higher/lower the triangle the higher/lower the level of expertise).

If we start from the assumption of a collective tacit knowledge, as outlined above, every person has some tacit knowledge. The tacit knowledge of the project members needs to include some tacit knowledge about research collaboration in an international and intercultural project (see (1) in fig.6 above). This knowledge is essential for collaborating in such projects and the relevant terminology can be considered as mandatory. Right from the beginning of a research project, all project members do not only use the LSP of their professional background, they also acquire a preliminary understanding of the concepts of other disciplines. While collaborating, the project members exchange terms between each other and

therefore they also exchange the concepts of their LSP(s) in those different disciplines. These terms could either have been coined newly within the LSP of their own discipline, or they could have been borrowed from other individual languages (as for instance Latin or Greek) or LSP(s). Through the borrowing, terms are implemented for objects, which could not be denoted in the referring communication setting. These objects could be appearing due to general research development or societal changes, but they could also be project-specific. Projects develop their own project specific language (2), and this becomes visible as the terminology functions in the same way as a corporate wording, even if the terminology has not been implemented consciously (analysed in detail in Pelikan & Roelcke 2015). These two terminologies for specific purposes can be seen as the basis for internal project collaboration and thus as essential for all project members. Only the members of the project are familiar with these terminologies, and external persons (not members of the referred research project) are not (3). Many research projects consist of project members from different disciplines ((4) and (5)), who use the LSP of their discipline in different languages. Transdisciplinary projects also include project members from other (e.g. commercial) fields rather than academe (6), and they may be from different nationalities and speak different languages.

Fig. 6: vertical structuring of project communication focusing on the communication situations

Taking the model from Roelcke (see figure 3 above) as starting point, there are different types referring to the different communication situations. In this case, type 1 refers to a communication situation among persons with high levels of expertise in one discipline and a specific level of expertise in terms of interdisciplinary knowledge, and this is reflected through the LSP on the idiolect. For instance, two experts in medicine – one from India speaking Marathi as their first language and a Lusoga speaker from Uganda. They communicate using English as a lingua franca. Type 2 refers to a communication situation between people persons

without an academic background – possibly peoplepersons involved in data collection without being part of the project itself. These persons could have some knowledge and the relevant LSP which the project members do not have, for instance in terms of the local situation where they live or about illnesses they might suffer from. This procedural knowledge (7) also reflects on the LSP and hence is included in the idiolect. Type 3a relates to a communication situation between two experts from the same discipline in the same environment but with different levels of expertise, possibly with different first languages. These two experts could be both from sociology – for instance, a PhD student from the UK talking to a professor in sociology from South Africa. In this case the professor might be seen as the person with the higher level of expertise in this communication situation, but the PhD student could have some procedural knowledge linked to the LSP which the professor does not have (8). Type 4 represents the interaction between project members from academe (type 4a) or from a practical field (type 4b) interacting with persons outside the project. Type 5a would then relate to a communication situation between an expert from a second discipline in the same interdisciplinary environment and an expert of the first discipline on the same level. For instance, an expert in medicine from India and an expert in anthropology from Belgium. Following the approach of transdisciplinary research, type 5b would stand for the interaction between two non-academics on the same level of expertise, while type 3b would relate to the interaction between a project member from one academic discipline and another with a practical background. Following Roelcke's description of dialogistic communication situations (Roelcke 2014, Roelcke 2016), all different communication situations should be taken into account, irrespective of the number of participants (9). Skype meetings with more than ten project members from different disciplines and mother tongues, for instance, would also be included as part of the internal project communication. This means that different levels of expertise and different LSPs are embedded in the project specific environment in an academic setting.

Roelcke (Roelcke 2014, Roelcke 2016) only analyses samples of the project process. He does not include a diachronic approach by analysing all different phases of the project, and this will constitute part of the present paper. (Roelcke 2014, Roelcke 2016) does not deal with the influence of the current location while communicating, and this will not be considered here either. Some data have shown that a project member from the USA may write different emails when working in India (speaking Marathi all day) to those written when working in Switzerland (speaking English all day). These influences, as well as some other psychological or sociological influences (outlined in the pragmalinguistic context model in Roelcke [3]2010) cannot be taken into account here due to considerations of space.

In the following, the model presented in figure 5 will be applied to different phases of research projects as outlined above.

3.4 The vertical structures in interdisciplinary research projects

Interdisciplinary research projects entail collaboration of researchers from different disciplines interacting with each other (Bammer 2013:08). They exchange their knowledge and work together closely in order to reach aims which are defined collaboratively. The model for vertical structuring from Roelcke (see figure 3 above) can be applied in this case, beginning with the project planning, which is the first phase of an interdisciplinary research project:

Figure 7 shows the internal project communication of an interdisciplinary research project with two different disciplines. At the very beginning of a research project, the initial idea is discussed among members of the lead institution. This might involve only two disciplines – researchers coming from different educational and linguistic backgrounds. First, type 1 and 5 discussions take place, and later the staff will be informed (type 3). At this very early stage of the project, no project-specific terminology has developed and no knowledge or a related LSP has been shared between the different disciplines. No laymen are involved in the first discussions.
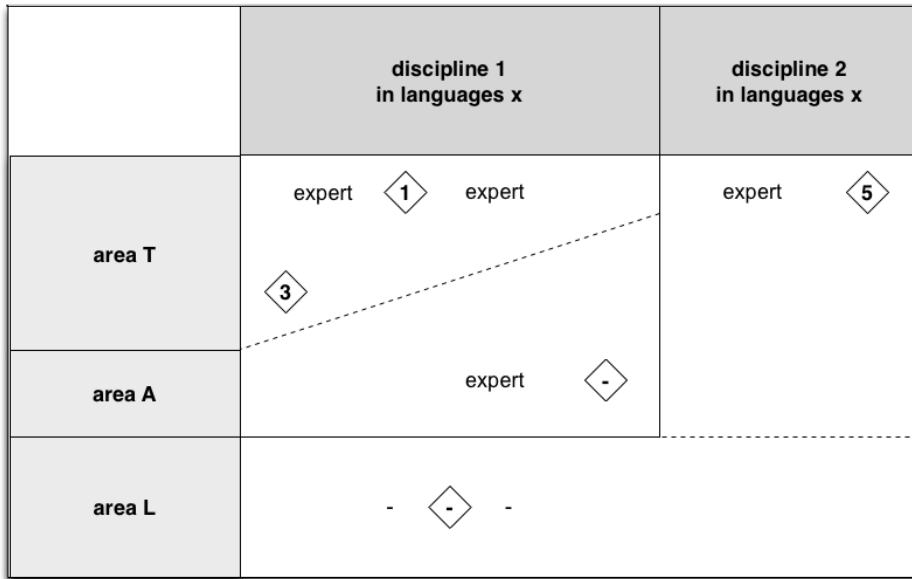
Fig. 7: interdisciplinary research project in the planning phase

Later, in the phase of data collection, it is necessary to apply the revised model (see figure 8 below):
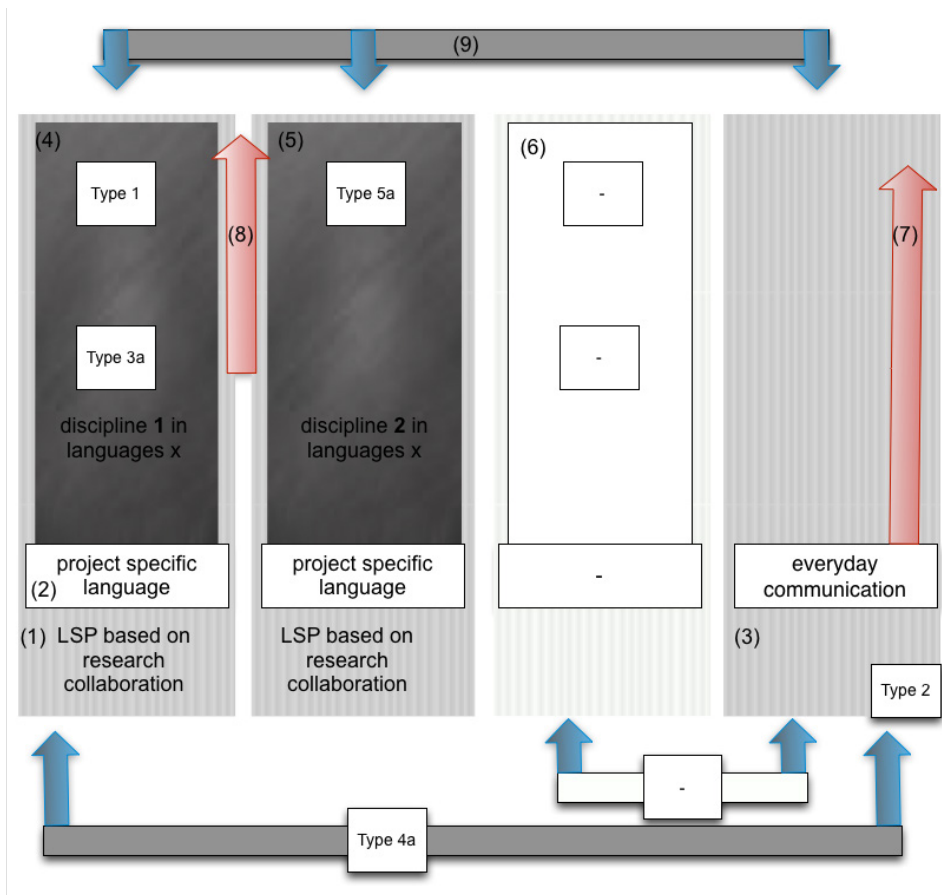

Fig. 8: interdisciplinary research project in the data collection phase

At least two different disciplines are involved in an interdisciplinary research project, but no project members from outside academe. As opposed to the scheme given in figure 7, communication situations represented by type 5 are part of the project here. Group meetings include participants from more than one discipline (10). And the external person might refer to some of their interdisciplinary terminology by communicating in communication situation type 4a.

This model for interdisciplinary research projects (presented in a simplified version by figure 7 and 8) has been applied to the communication of the already mentioned AMASA project. As basis for a study on communication optimisation of the internal project communication, the communication setting needed to be described in detail. This model served as helpful tool for describing all complex communication settings of the AMASA project.

3.5 The verticalstructures in intradisciplinary research projects

The members of intradisciplinary research projects all come from the same discipline, although they might have different nationalities and work in different countries. Looking at the same project phase, the data collection, the model has to be limited to:
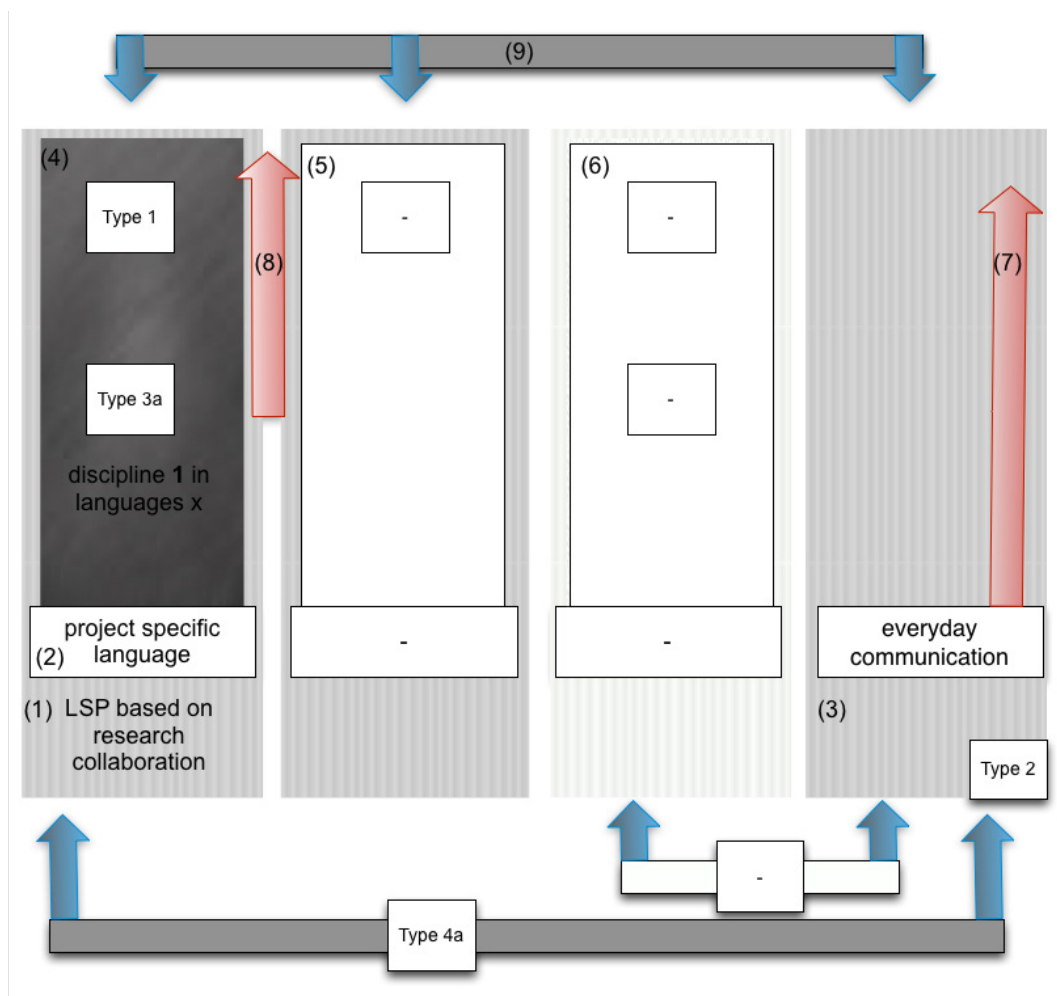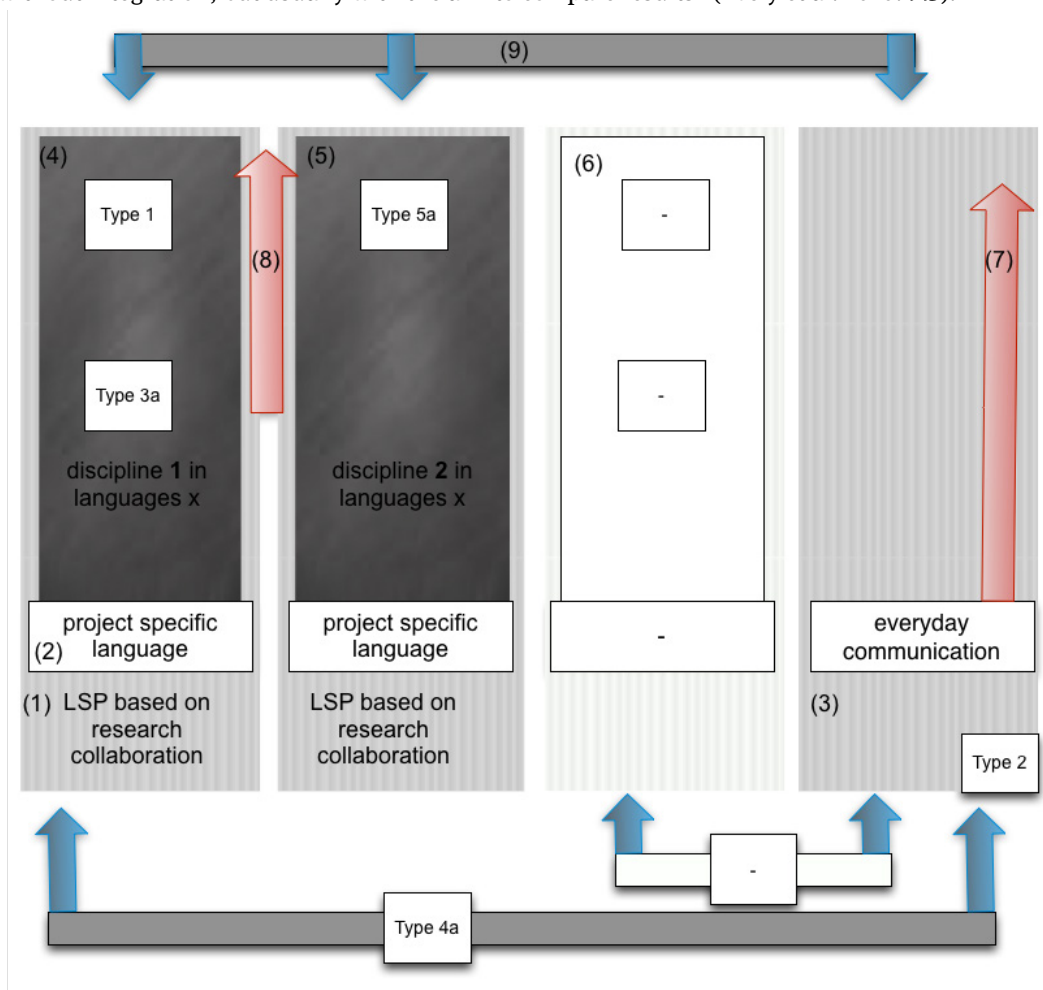

Fig 9: intradisciplinary research project in the data collection phase

In an intradisciplinary research project, no other academic disciplines or project members from outside academe are involved. As figure 9 shows, two project members from one discipline with different levels of expertise (type 1 and type 3) communicate with each other. A project specific language (2) could be developed in such a setting as well, embedded in LSP based on research collaboration (1). In the phase of data collection presented here, the project members are in contact with persons outside the project (3). This involves communication between these persons (type 2) as well as communication between these external persons and project members (type 4a), for instance while conducting interviews.

3.6 The vertical structures in multidisciplinary research projects

Multidisciplinary projects involve project members from different disciplines, i.e. the setting is the same as in interdisciplinary research projects. But here they do not work on reaching collaboratively defined aims but on reaching multiple disciplinary aims. "The research process progresses as parallel disciplinary efforts without integration, but usually with the aim to compare results" (Evely et al. 2010:443).
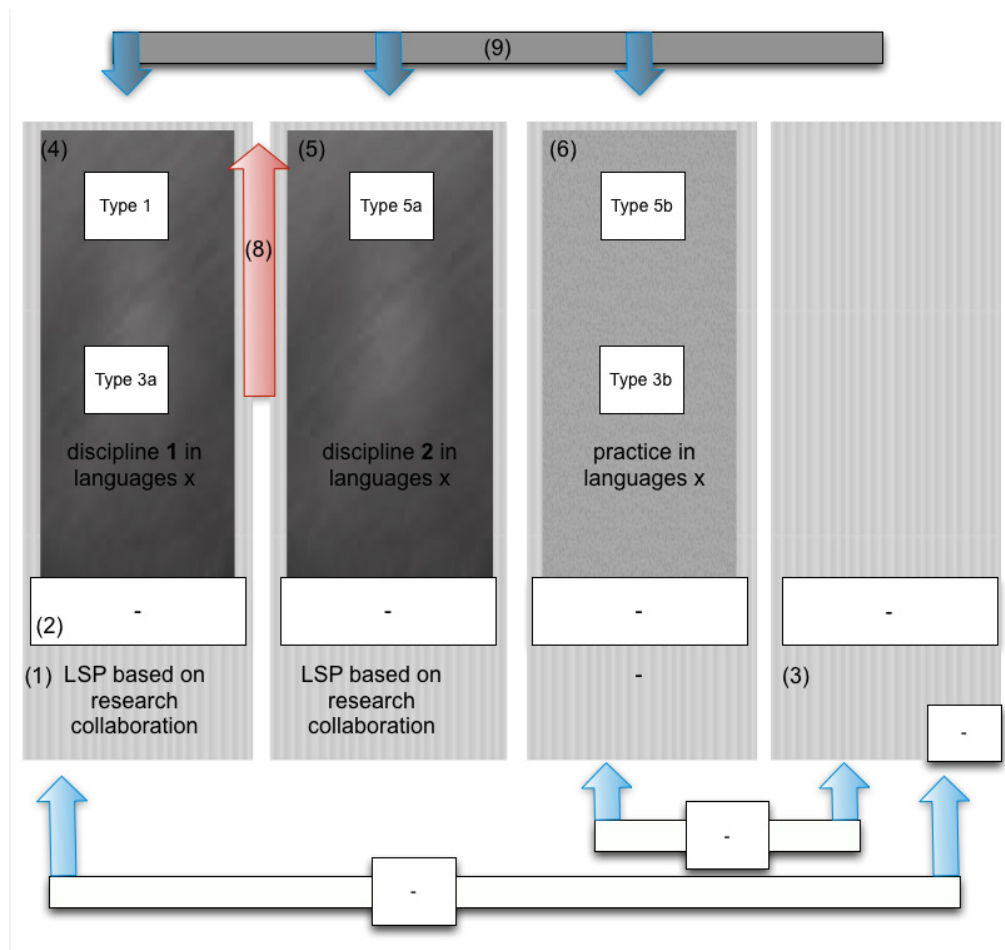

Fig. 10: multidisciplinary research project in the data collection phase

As figure 10 shows, there are no type 5 communication situations in these contexts. The different disciplines work on their own and not collaboratively with each other. This also influences the project-specific terminology and the LSP based on the research collaboration. There could still be a project-specific terminology unconsciously developed, but including for instance terms based on administrative topics and not on topics related to research (as described in Pelikan & Roelcke 2015).

3.7 The vertical structures in transdisciplinary research projects

There are different definitions for transdisciplinarity or transdisciplinary projects. While it may also be defined as integrating the "natural, social and health sciences in a humanities context" and transcending their boundaries (Choi & Pak 2006:351), we here take transdisciplinary[2] collaboration to be collaboration between academic and non-academic groups (Klein 2013) working together as project members of a research project. In this way, transdisciplinary research projects are defined as those involving persons from outside academe as internal project members.
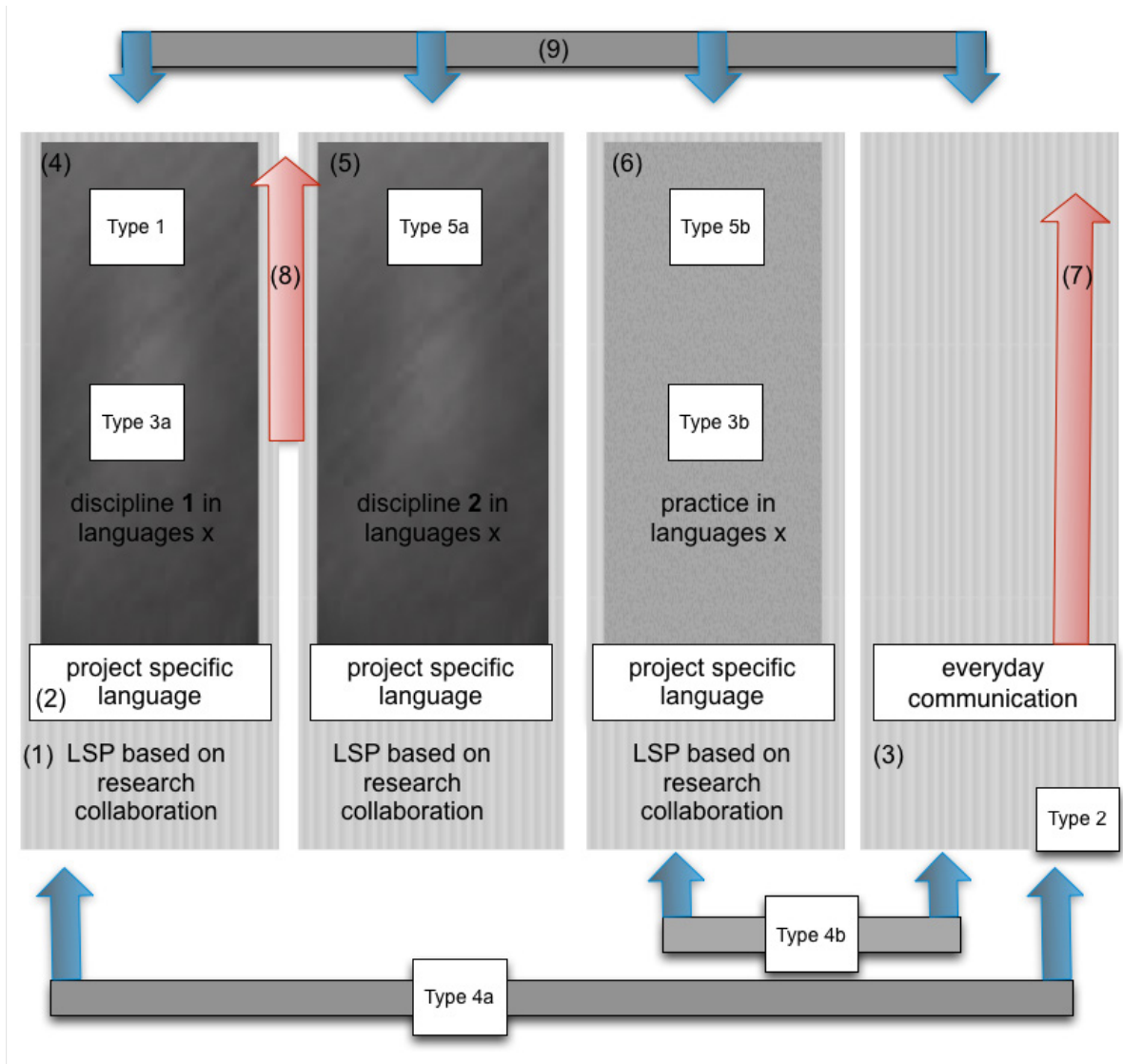

Fig. 11: transdisciplinary research project in the inception phase

The inception phase is the one where project collaboration is beginning. There is already interaction between the project members as they work together to establish the research planning. The academic project members ((4) and (5)) might have some LSP based on research collaborations from previous projects, but the non-academic project members (6) probably do not have this. At this early stage, no project-specific terminology has yet developed.

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2 A transdisciplinary research project does not have to include an interdisciplinary research setting. Due to space limitations, we do not show this here in detail, though.

Fig. 12: transdisciplinary research project in the data collection phase

Looking at the same research project at the data collection phase, the communication situations are different and for describing them, the full model as presented in figure 12 (and in figure 8) would be necessary. The project consists of members from different academic disciplines, as well as from outside academe. They communicate in heterogeneous groups (10) and in different dialogues (types 1, 3a, 5a, 5b and 3b). For data collection they also interact with individuals outside the project and from outside academia (type 4a and 4b) – as well as interacting with themselves (type 2).

An international research project might consist of only a few different communication situations, which but they show that this model could be used for describing all the different communication situations occurring in complex research projects – intradisciplinary, interdisciplinary, multidisciplinary, and transdisciplinary, and it can be easily adapted to different communication situations. The question then arises, though, of whether it fulfils the criteria of a typology.

4 Summary

Coming from the field of applied linguistics, working with case studies in LSP research is essential for analysing and solving everyday problems. But before trying to solve problems of different communication situations, the case study itself has to be described and structured carefully. For doing this, all communication situations of the project have to be described – including the idiosyncrasies of the communicating personscommunication persons. As the communication settings might change depending on the project phases, including the diachronic view on the project is essential (Pelikan forthcoming. At the AMSA project, the communication situations have been described, first by using the known models outlined in the first chapter of the present paper. As our analysis has shown, conventional models used to describe the structure of structuring professional communication are stretched to their limits when applied to the communication of complex research projects. And AMASA was not a very complex research project, compared to transdisciplinary research projects (for instance Zinsstag 2015). So the analysis of a case study lead here to the development of new models and helped to revise existing models. The results of the new model served as appropriate basis for a study on communication optimisation at the AMASA project (Pelikan 2015b, Pelikan 2016, Pelikan forthcoming).

The new model which we have developed and described in the present paper may also serve to establish the structure of a variety of possible communication situations occurring in other research projects, and this typology could be adapted to the different phases of projects and different linguistic settings such as are given by by different LSP or the various languages used. For intra-, multi- and transdisciplinary projects, it has not been applied in practice so far, only theoretically in mind based on some information from transdisciplinary research projects (Berger-Gonzalez et al. 2016). Project specific communication is gaining relevance, for all kind of science communication – also for web-based communication, communication on online platforms etc. This makes it relevant for different research areas, such as also digital humanities.

Applying the model to further research projects, mainly with transdisciplinary settings, will be one of the next steps.

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