Languages in Education
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Language in Other Subjects

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Language in Other Subjects

Language and other modes of communication are crucial to learning in subjects in schooling other than Language as Subject. There are many implicit expectations of learners in other subjects with respect to their communicative competences and these competences are an integral part of learning. Learners are thus entitled to be taught the required competences and equally, the expectations that they can use such competences put on learners in other subjects are justified if they are to be successful in learning. The language needed is more than the ordinary communicative skills developed in everyday life and academic language has to be taught and learnt deliberately. Other semiotic competences are also required as subjects are taught with the help of for example graphs or statistical tables. Some groups of learners need particular help because they do not have in their environment the support needed to acquire ordinary language competence and even less, academic language of schooling. There are implications for curriculum policy and design and for teaching methods which include cooperation and a holistic view of language learning in schools.

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1. Introduction

It is generally agreed that one specific subject in school is particularly responsible for language education, namely Language as Subject, that is for the development of basic language competences such as listening, reading, interacting, speaking and writing. These competences are acquired by learners within the context of many different complex learning situations, leading to the mastery of communicative skills in connection with a number of different genres and discourse settings. Every learner has the right to be equipped with these fundamental language competences for their future learning, for developing their own identity, for finding their place on the job market, and for participating in society as a social agent and democratic citizen. Language as subject has many more goals to reach and all of these are highly mediated through language, through providing meaningful content, learning activities and opportunities for interaction. The outcome of this should be – in the interest of the learners themselves – certain elements of cultural skills (e.g. spelling correctly or forming understandable sentences), of knowledge, of attitudes and values, of procedural competences in dealing with specific tasks/problems, in dealing with texts and other sources of information and in dealing with people as addressees of appropriate communicative actions.

However, language education does not stop with language as subject. Education in the language(s) of schooling is equally necessary in all other subjects, which are sometimes falsely considered as "non-linguistic" subjects (whereas in fact they are subjects with a "non-language content"). There are many different communication requirements in all other subjects e.g. in biology, in history, in mathematics or in sports. They include :

- reading and understanding expository texts, which are often different in structure depending on the disciplinary context,
- listening to explanations of complex issues by the teacher
- answering questions orally and in a written mode
- presenting results of investigation and study
- participating in topic-oriented discussions.

These new requirements are in close relationship with substantial subject-matter, with tackling and solving tasks of a specific nature involving abstract thinking.

This happens often in an implicit way. It is not obvious to many teachers and students alike, what the specific challenges in language use are, but they are there. Language learning is always part of subject learning, or to put it more radically, subject learning is always language learning at the same time. The learning of subject-specific knowledge as in physics, geography or mathematics cannot happen without linguistic mediation. It is only possible with the help of appropriate skills of language comprehension and use, which have to be acquired or activated simultaneously with subject learning. *Language competence, therefore, is an integral part of subject competence* – it is not an additional external element nor is it a luxury which can be ignored. It has to be explicitly developed alongside subject competence in all subjects, across the curriculum, for the language dimension in these other subject contexts is closely linked to the thinking processes involved. Without adequate language competences a learner can neither properly follow the content that is being taught, nor communicate with others about it. He or she will at best be able to recall and repeat without understanding and will eventually fail in examinations and other evaluations.

School itself is often responsible for this failure because the linguistic and communicative demands implied in subject learning are not made explicit enough to learners. They are part of a hidden agenda, a hidden curriculum. Furthermore, it is often wrongly assumed that the respective competences and skills develop independently, without particular attention being

given to them within the subject classroom, or even without specific (re-)development of what has already been attained in general terms within language as subject.

2. Language and communication in a narrow and a wider sense

Language in other subject contexts is not limited to learning new concepts through a new system of terminology which reflects the knowledge structures of a particular subject. It requires new ways of thinking within the framework of one particular subject or group of subjects (a domain such as natural sciences or social sciences) and their specific approaches to reality and viewing the world. It also requires new ways of communicating, of understanding and producing a variety of text types or genres, of engaging with specialised forms of discourse which follow certain traditions, conventions and expectations. This includes critical reflection about the methods by which new insight is gained and new knowledge is applied, inside and outside school.

The term *text type* relates to the possibilities of classifying texts according to certain general/universal criteria (e.g. narration, description/exposition, argumentation, instruction etc). It is not restricted to written texts, but includes all types of oral and written communication in subject-specific contexts (e.g. a summary of observations or a report on the results of a search on the internet) as well as all types of interactive and reflexive discourse including meta-communication (e.g. contributing to the analysis of a specific issue or questioning a certain assumption/hypothesis).

The term g*enre*, on the other hand, relates to more or less conventionalised forms of presenting meaning shared by a specific community of practitioners, and realised in *forms of discourse* within a specific setting (e.g. scientific articles, research texts, manuals and textbooks, lectures, encyclopedia)

The difference between Language as Subject and Language in Other Subjects is sometimes reduced to a matter of simply learning new words or terminologies in dealing with other subjects and their content. This is too narrow a view. There is indeed the need to establish a shared terminology, yet not in the sense of teaching and learning a multitude of isolated terms (a never-ending exercise in naming and labelling, as is sometimes done in for example chemistry). Instead, the process should be a path to understanding the structures of existing knowledge and thus the semantic relations and meanings underlying it. This places stronger emphasis on the discourse aspects of subject learning, on the forms of speech present in the classroom and not solely on spelling, on accuracy of vocabulary or morpho-syntactic correctness.

In short, what is at stake in subject learning is to adopt the ways of thinking of each new subject, to understand the major issues, the settled and unsettled questions, to comprehend and participate in the ways of discovering, of categorising, of modelling and of reasoning, and to develop efficient communication strategies for oral and written exchanges in a cohesive and coherent manner. All of this could be summarised under the notion of subject-based text or discourse competence

This process can be characterised as one of initiation into the ways of thinking and communicating within a subject, dealing with their specific interests and practices and with their specific approaches towards reality or sections thereof, The teaching of specific subjects may thus involve:

- a tendency within certain curricula not to restrict subject teaching to content or knowledge transmission, but also to focus on the functioning of science and understanding and appreciating its wider sociological and epistemological significance

- objectives relating to understanding the role and impact of scientific knowledge in daily life in society, often connected to education for citizenship (e.g. concerning sustainable development)

- tasks and activities for pupils geared to the application of knowledge and skills in given social situations.

These trends underline the importance of educational goals and values other than the expected cognitive outcomes (e.g. conceptualisations and procedural thinking) such as the development of abilities in the critical assessment and use of the results of scientific investigations.

In short, language in other subjects is linked to the acquisition of knowledge, but also to a critical reflection on the ways knowledge is acquired and the ways in which scientific insights and results are used in social reality.

3. Rights to and requirements of language competences in other subjects

All learners are entitled to reach the goals outlined above and not to fail. This requires efficient forms of teaching the language competences needed for successful learning in subject contexts. The first stage in achieving this is to raise awareness of the issues which often remain implicit, and to ensure that they are made explicit in curricula. This then serves the purpose of establishing transparency and reliability for teachers, learners, parents and others responsible for education.

The acquisition of the necessary competences is an entitlement that schools have to provide if learners are to be successful. At the same time they are also requirements put on learners on the part of the subjects, of the school and of society as a whole. In that sense, curriculum planners act equally on behalf both of society and its expectations and of the individual learners and their right to a comprehensive and quality education and training. Both perspectives complement each other and therefore the formulation of competences or more precisely of levels of competence in terms of standards of achievement to be reached by the learner and to be guaranteed by the school is an expression of rights of learners and of demands made on learners in their own interest. There is no contradiction between these two perspectives, as long as they are made explicit and are linked.

In order to promote transparency with respect to these rights and demands, this Platform is an instrument which serves the following purposes:

- to better install language learning and teaching within each subject

- to co-ordinate language learning within and across subject boundaries and thus to optimise it in the interest of the learner (leading to a whole-school language learning and teaching policy)

- to strengthen the professionalism of all teachers by sensitising them to the needs of linguistic support measures in subject learning

- to diagnose achievements and difficulties in both teaching and learning in subject-based contexts

- to help identify the specific problems and needs of certain groups of learners (vulnerable learners) in dealing with the language(s) of content learning

- to focus on ways of reducing and overcoming these problems, for example by supporting the needs of vulnerable learners for a clear orientation and guidance on the concrete level and by adapting the subject teaching accordingly, so that they can experience quality education

- to evaluate and improve the efficiency of relevant support measures and resources

- to develop more appropriate teaching approaches in those subjects and programmes which use a second or foreign language as a medium of instruction and thus establish a clear link between *Content and Language Integrated Learning* (CLIL) and language learning in subjects using the language of schooling as a medium of instruction.

4. Subject communication and academic language use

Many features of the language of schooling in subject-specific contexts (as much as in language as subject) have been identified and are already known. They have been characterised as classroom-based "academic" language for which *cognitive academic language proficiency* is needed, in contrast to everyday language and the exchange of a more interpersonal nature, where *basic interpersonal communication skills* are sufficient.

The rhetorical structures, grammatical forms, the choice of vocabulary and the overall modes of expression required in the formal contexts of schooling and beyond represent a specific register which can be characterised by the following adjectives: *succinct, precise, complete, explicit, complex, structured, objective, distant, unemotional, unambiguous, situation- and context-reduced.* This is a general type of language which can materialise in many forms, driven by communicative strategies and discourse patterns which influence the concrete choice of linguistic and textual means: words, expressions, collocations, forms of structuring information, of focussing, of implying and establishing communicative effect, based on "full" comprehension and "clear" intention. These forms of discourse which are typically at the heart of school language include among others the following tendencies:

- the language is more specific, it relates to semantic fields and networks of concepts

- it uses a more formal style (e.g. "*reduce*" instead of "*becoming less*") in written texts, though not necessarily in the oral discourse of the teacher,

- it is more abstract in word choice with respect to verbs, adverbs, collocations (e.g. a "curve increases sharply" instead of "goes up quickly"), yet on the other hand it uses many metaphorical expressions

- it uses specific terms for the concepts of the subject (e.g. "precipitation" instead of "rain")

- it is more explicit and detailed, again depending on the form of discourse (e.g. "from January till March the sales figures rise, whereas from April until September they stay even – at a high level")

- it is cohesive in that ideas, sentences and parts thereof are linked (this can be realised by explicit anaphoric devices, by the use of superordinate constructions or simply by repetition of terms)

- it is structured (e.g. concerning the logic of sequencing, of arguing or evidencing) according to the conventions of the text-type or genre

- it is more coherent or goal-oriented in terms of the overall structuring of a discourse or text.

There is however a general problem. It is possible to analyse textbooks and other written materials for the different subjects in different countries and describe the language used in them, but little is known about pedagogical classroom discourse (either expository or interactive in nature), about its different forms applied by subject teachers or their learners, or about how they influence each another in tackling specific tasks and building up subject knowledge. There is a serious gap which will have to be filled with systematic observation and analysis, and for the time being, one can only assume certain types of discourse behaviour. While it is relatively easy to identify activities of written comprehension (reading of textbooks

etc) or oral comprehension (statements by the teacher), identifying those relating to oral production is less straightforward.

The acquisition and use of this type of discourse is however at the basis of all school learning. The relevant competences are linguistically based, but discursive in nature. The discourse is present throughout educational institutions and the competences needed are therefore differentiated, since they depend on the ability to interpret different forms of discourse: the "scientific" language of a subject (in its more accessible form), the types of description, demonstration and argumentation etc. demanded in a subject, the interaction in the classroom (teacher-learner, learner-learner) as well as in the school setting as a whole.

These activities lead to the extension and restructuring of learners' repertoires to include discourse genres which are "academic" in the sense that they presuppose forms of literacy which go beyond the mere capacity of reading and writing. They require forms of "speaking" as one would write (*conceptual literacy*) and thus they require more careful planning, self-monitoring and other forms of user control like internal feedback and self-editing. These are fundamental prerequisites for successful learning in school, for becoming an active and critical member of society and for participating inside and outside of school as a democratic citizen.

On the other hand, not all discourse in the other subjects or in language as subject, is academically oriented or involves cognitive language proficiency. Much of everyday classroom interaction is external to academic language. It is didactic discourse with its specific forms, necessary for managing the transactions of learning and the interactions between teachers and students. This means there are many elements of basic interpersonal communication in language as subject and in other subject classes, together with forms of academic language use, which increase over time. These can be subdivided into *subject-specific language practices*, which are shared by all teachers of a subject (e.g. biology teachers) who form a subject-based discourse community of their own, on the one hand, and *domain-specific language practices* which are shared by a number of different subjects and teachers (e.g. all teachers of the natural sciences).

Separate from both, and outside school, there exists the level of *scientific discourse*, shared by the discourse community of the respective scientists (e.g. biologists or sociologists or literary theorists). This level of specialised communication can hardly be reached in school.

5. The use of other semiotic systems

In addition to verbal language, there are in subject contexts other modes of semiotic communication, sometimes as a major feature. These other semiotic systems of expressing meaning (e.g. graphs, diagrams, statistical tables, sketches or maps) need to be examined, therefore, as to their specific characteristics as well as to their inter-relations and connections with speech. Learners discover that language is not the only meaning-making system, although the dominant one, in our knowledge societies.

These other semiotic means usually do not appear in isolation; they are linked to oral or written verbal explanations and commentaries. The texts or tasks in subject-related contexts therefore require learners to relate one source of information to another. Learners have to deal with mixed modes or multi-modalities. In addition to processing a large number of verbal texts, there are many non-verbal representations of meaning which the learner has to handle appropriately. These are part of scientific discourse, and also of everyday information flow but they are often very dense in their information structure and difficult to decode. There is a need for constant translation from one symbolic system into the other as much as from everyday language into the language of schooling and vice versa.

Therefore, there are extended *plurimodal* competences needed in subject learning and teaching and not just of linguistic ones. This is true, for example, in history (including communication about historical monuments or political cartoons), in the sciences (including the interpretation of graphs, of cross-sectional diagrams or electronic modelling) or in mathematics (with its extreme system of abstract symbols and their dynamic interaction with everyday meanings).

6. Teaching discourse competences and the specific needs of vulnerable groups

Discourse competences in all subjects (including language as subject) as described above do not develop by themselves. They have to be specifically identified, named and focused upon through conscious didactic effort and support measures (in close connection with subject teaching). Learners have to be specifically initiated into academic language use and the new discourse varieties common in subject learning, and they need many opportunities to practice them. For example they need opportunity for all kinds of self-repair, re-writing exercises and plenty of room for planning, monitoring and editing their utterances, especially their written products.

So one of the prerequisites for successful subject learning is the progressively increasing understanding of the subject matter in question by analysing its content, its logical structures and the discursive forms in which it is wrapped. Otherwise learners cannot make use of whatever communication skills they have already developed. Equally important is that the learners understand what they are expected to do with their new knowledge. Step by step, they have to be given a rational explanation of these operational expectations and the communicative acts involved. Once they have developed the basic rhetorical skills and forms of expression for certain genres and discourse functions, they will be able to follow the subject-specific teaching with even more understanding and success. In order to support this learning, the subject teacher has to facilitate the gradual acquisition of appropriate forms of subject-related discourse in connection with specific topics and procedures. It is this kind of security that every learner needs and is entitled to.

The communicative challenges of subject learning are very demanding for many groups of learners. For some learners in present circumstances they are even too demanding. Learners fail because of the insufficiently defined communicative demands in subject learning. Indicators of failure can be described as can possible measures for reducing it or for building up support systems for vulnerable learners so that they better understand what they have to do and learn, what is expected of them and why they need to acquire all this (see the text on *The use of descriptors in learning, teaching and assessment).*

7. Organisational and didactic implications

Learning a new subject is experiencing a new form of discourse, and this means that learners need to build on competences developed to some extent already and continuing to develop in parallel through language as subject. These competences are now extended and restructured for use in more complex cognitive learning contexts, for different scientific goals, for more abstract tasks and academic purposes.

The relationship between discourse competences in language as subject and those in the language of other subjects is one of expanding the message-orientation in learning, of expanding the thematic patterns, but above all of expanding the rhetorical skills and structures needed for relevant, subject-based discourse. On the other hand, language as subject itself progresses and includes forms of content-based communication (e.g. in literary analysis and appreciation) which are equally subject-specific as any topic or issue in other subjects. In that sense, the borders between the communicative outcomes of language as subject and language

in other subjects are somewhat artificial and prove to be only analytically valid, so that, in the perception of the learners, these competences and their entitlement to them are indivisible.

As to the issue of transfer of competences from language as subject to language in other subjects or from one subject-matter to another, there is little known about these processes, how they operate and how they could be strengthened and supported in a systematic way, but language as subject could provide a reliable basis of language competences and other subject areas could contribute their share in the continuation of these processes and outcomes towards language education as a whole[1].

These actual and potential links between language as subject and language in other subjects demonstrate the need for a whole school language teaching and learning policy, which requires collaboration among teachers. There may be a certain division of labour among the school subjects, which would lead to mutual benefit by saving time in establishing the communication base needed for teaching their respective content. Learners would benefit by receiving a comprehensive language education which would empower and sustain them for the rest of their lives.

8. Problems in creating common reference instruments for language(s) in other subjects

In trying to draw up common reference documents for language(s) in other subjects, research on specific operational descriptors, the forms of discourse used in the classroom, the diversity of disciplinary methodologies and epistemologies and different teaching methods and educational cultures, has identified the following issues:

- By definition, the necessary data are scattered across different subject curricula, divided by country, by pupil age, by exam type etc. Therefore, in order to make cross-national exchange and discussion possible, a significant corpus of teaching curricula and examination tasks (e.g. for the end of primary school and obligatory schooling) must be created, describing the conventions and assumptions governing the language specific to each subject and beyond subjects, across the curriculum as a whole. The analysis of this documentation should be backed up by observations of teaching activities and/or interviews carried out for surveys.

- One important hypothesis to be checked in these curricula concerns the question in how far they identify unique subject-specific language requirements needed in particular areas or domains or in how far they define cross-curricular language competences or aspects of both. Whatever the answer, it is necessary to find ways of operationalising them.

- It is also necessary to consider whether and how subject teachers in different countries and settings are prepared for managing their language responsibilities within their subject teaching, through initial training and in-service training. This entails specific needs as well as basic perspectives on planning. Each subject teacher has to become *language-sensitive* in their field of teaching and this includes: understanding what their learners face when they are dealing with the respective subject-matter in school, when they acquire new knowledge, reflect about and incorporate it, when they try to jointly construct meaning with peers and communicate about it. This does not however mean that each subject teacher has also to become a language teacher, but rather that they should be "sensitive" to the many issues involved in integrating content and language learning, even more so when the language of instruction is not the first language or the mother tongue of the learners.

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[1] Another basis for observation and empirical analysis could be the experience of learners enrolled into programmes of Content and Language Integrated Learning and the good practice of teachers of CLIL/EMILE.

As to the relationship between the uses of language in teaching individual subjects and the uses of language across subjects, one can observe a certain interaction. Despite the cross-curricular nature of language in teaching content, its use seems to vary largely according to subject. By way of a first approximation, we could state that

- mathematics seem to be most abstract and have a language (or languages) of their own, but when it comes to verbalising or "translating" the findings or the steps and procedures taken on the way towards these findings, the same discourse patterns hold true as in other subjects
- for the natural sciences and their corresponding school subjects, language serves above all to convey and discuss hypotheses and probabilities, to argue and give explanations, but the *products* of scientific activity come into existence and are largely established beyond their expression in language (experimentation, measurements, observations etc.)
- for the social or human sciences and their corresponding school subjects, language is their very form of existence; history, for example, does not exist as such outside the realms of its expression in language.

In other words, all three areas of knowledge and study are unique to some extent in their uses of language, but they also share common features of communication and, in connection with this, ways of thinking and expressing their thoughts within a commonly defined linguistic/semiotic framework which can be described.

The fact that our reflections on these issues are not yet very advanced nor clear-cut reflects the state of the art: it indicates that the aims and practices of language and communication teaching within subjects, as an integral part of the subject teaching itself, are still relatively unfamiliar to the respective communities and even more so to the wider educational public. Yet these issues are of basic concern for pupils who want to succeed in school and for societies who want to prepare and qualify their young learners for the future

9. Summary

Learners have a complex task in communication: they bring their language, their prior concepts and communicative practices with them into school and into the subject classrooms. The challenge schools and particularly for each subject teacher is to mediate between this everyday language and the patterns of informal interaction on the one hand and the forms and functions of the language of schooling on the other. Teachers have to accept and start with what learners bring into school – what they have to offer as concepts and as communication forms – and then to transform both into more formal, explicit, more precise and pre-scientific ways of thinking and communicating, initiating them into the *subject-based conventions and norms of discourse* needed for the acquisition and use of subject knowledge.

Language as subject can lay the ground for the acquisition of school language from the early years of primary education. In its more advanced stages language as subject also participates and contributes to the development of forms of academic language use similar to that of other subjects, especially with respect to literary analysis, interpretation and appreciation.

The acknowledgement of the important role of language and communication in other subjects poses great challenges for everyone involved in school education and there is a need for a holistic approach to policy for languages of schooling. This involves the teachers of all subjects becoming more language-sensitive and cooperative concerning the management and integration of different communicative layers within their subjects and among them. Curriculum planners too need to develop a more systematic understanding of language/communication across the curriculum and formulate accordingly.

In summary, the main uses of language in other subjects are fourfold: it is needed for "talking a subject", for "learning a subject and interacting", for "talking *about* a subject", and for reflecting on "social uses of a subject". Acquiring language in other subjects involves new and appropriate discourse varieties within each subject, within a domain and across all subjects. Without successfully learning these classroom-based discourse forms learners will be deprived of acquiring adequate subject knowledge, of learning subject-matter interactively, of becoming competent users of subject-specific notions and concepts, of participating in the knowledge society and of experiencing themselves as democratic citizens who critically engage their knowledge in private, professional and social contexts.

In other texts/modules, different approaches and procedures are explained for identifying and describing the necessary discourse competences in connection with subject learning, either within a unique subject or across several subjects. These include:

- History from which procedures might be adapted for other subjects
- Science.

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