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Do we speak the same language?: Terminology strategies for (software) engineering environments based on the elcat model - innovative terminology e-learning for the automotive industry

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Abstract. This paper addresses the need for correct and consistent use of concepts and terms in engineering environments. It provides guidance on how to formulate a corporate terminology policy as a pre-requisite for managing corporate language, designing and implementing a terminology process, and eventually writing definitions and creating new terms. The strategy presented in this paper follows the elcat model, an innovative e-learning initiative that focusses on content development of terminology management modules for the automotive industries. The authors suggest that the role of terminology management is to bring some order to support consistent and more precise language adoption for a period of time. Effective medium to long term terminology management is thereafter enabled through the introduction of a terminology change management procedure.

Keywords: Communication strategies, terminology policy, terminology processes, terminology management

1 Terminology in engineering environments

Engineering constantly faces very complex processes as the industry is continually developing new products, whose terminology has to be adapted to very different target groups. These products have to be marketed on various global markets under fierce competitive pressure.

Therefore it is necessary that the decision-makers in the company attach due importance to it. This is important because sufficient resources, i.e. technical equipment and workforce, are required for a systematic planning and effective development of terminology processes.

In engineering environments terminology already exists and needs to be collected, documented, standardized or made accessible in a structured way. This is often the case in large international companies, especially in the wake of mergers, acquisition of other companies, or the development of new products. Other contexts may require the coining of new terms, writing definitions and translation of terms from one language into another is necessary. [1]

Terminology is embedded in one way or the other in company's specialised language, i.e. in creating and using technical or special terms and expressions. Therefore terminology needs to be developed, or existing terminology needs to be used:

- tailored according to your individual requirements
- in an efficient way
- taking the specific target groups into account.[2]

1.1 What exactly does terminology mean?

According to ISO 1087-1 [3], terminology is the specialised vocabulary of a subject field, i.e. a set of terms representing the system of concepts of a particular subject field. The work concerned with the systematic capture, description, processing and presentation of concepts and their designations in terminological databases or terminological dictionaries is called terminology work.

Terminology management involves:

- creating new terms
- collecting and documenting existing terms
- formulating definitions for new concepts
- compiling a database for terminology that includes relevant information about grammar, context, usage, style, etc., and administrative information, such as alteration date, etc.

It is important to ensure that target groups both within and outside the company have access to this carefully prepared terminology. To achieve this aim, primary importance is on:

- providing specific target groups with access to relevant terminology
- training all those involved according to their specific needs.

This first topic will be discussed in the next chapter of this paper based on the findings and guidelines elaborated in the elcat project, innovative terminology e-learning

for the automotive industry [4]. Following this framework and in the chapter 3, the vast array of dynamic processes, behind these central tasks will be studied in connection with the large number of people with very different skills and interests that are involved.

2 Formulating a company policy for the corporate language and communication

A company's terminology policy must be supported by all parties right from the very beginning. It is extremely important to identify all persons that must be involved in the implementation of a terminology policy or strategy. [5]

Include all parties in the process from the very start. Create an internal and external network. People will have different interests in or attitudes towards this project. Therefore they should be addressed and involved in different ways. In this way, opinions can be changed in a positive way, or they stay the same. Nevertheless, all opinions are important in order to develop a terminology policy that can be supported by everybody. It is important to discuss expected difficulties, resistance and negative attitudes and conceive strategies to deal with them specifically.

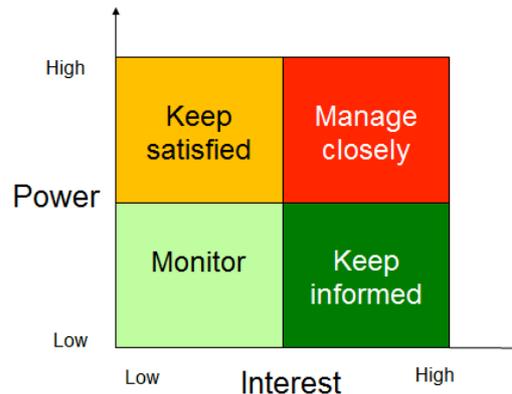


Fig. 1. ISO 29383:2010 Annex A - Tools for stakeholder analysis

This template can be used as a tool for the stakeholder analysis: All persons identified should be assigned to one group, according to their influence and interest in this chart for which different strategies are applied. The group membership is not static and may be constantly changing.

- **Keep Satisfied:** Some effort is required to satisfy this group - but not too much to avoid them feeling bored or annoyed.

- **Manage closely:** These people must be the ones involved the most in the process. They need maximum support and integration in the development process.
- **Monitor:** Observe these people's attitude. Offer information and advice but be careful not to overwhelm them.
- **Inform:** These people should be informed regularly and sufficiently. To avoid dissatisfaction, they should be given the chance to influence key factors.

2.1 Developing and Implementing a Terminology Policy

This section concentrates on the process from the preparation to the implementation of a terminology policy and shall help to anticipate problems, respond proactively and to proceed systematically. The process described here corresponds to ISO 29383 "Terminology policies - development and implementation" [6].



Fig. 2. ISO 29383:2010 model for development and implementation of terminology

Preparation

Overview of the current status

When implementing a terminology policy, thorough preparation is the prerequisite for all further steps. Invest time in extensively researching requirements, the purpose and the necessary processes. A terminology policy must perfectly match the conditions if it is to be effectively deployed in the long term.

Possible aspects to take into account are:

- Which languages are spoken?
- Which languages are used in the development department, in marketing, purchase, customer service, etc.?
- Which markets do you serve, where do you export to?
- Are there any guidelines or regulations with regard to terminology, communication, knowledge management or language existing in the company or in individual departments?
- Is it possible or necessary to build on the existing guidelines or regulations or do they have to be integrated into the new strategy?
- Which areas suffer the most serious problems with regard to communication and knowledge management?

- Which people are affected in some way by terminology policy? Do not forget subsidiaries and correspondence with suppliers and contractors!

Comprehensive documentation is useful for collecting information and facts if you are compiling a plan of action, in-house campaigns, press releases and other public announcements. Case studies and concrete figures are helpful for argumentation purposes. Especially, if they come from within the company or industry. Employees from various departments can provide an abundance of material for this purpose.

This first step of preparation is very labour-intensive. But extensive preparation will pay off in subsequent steps. The organisation of a corporate consultation process should be considered when possible, including meetings, questionnaires or interviews with opinion leaders. Involve strategically important employees.

Consulting is carried out to produce a positive attitude and a sense of co-determination and responsibility. It can also serve to animate passive stakeholders to participate.

Formulating and Ratifying Policies

A terminology policy can be documented in various ways, for example in guidelines or strategy documents. The shorter the document, the greater the likelihood that it will be read and used.

However, the basic principles of how to proceed remain the same:

- Compile a corporate terminology policy
- Design a coordination plan with other corporate strategies
- Implementation plan and action plan
- Present strategy
- Decision by executive board

Draft a terminology policy

All necessary preparations have been made during the preparatory phase. Now, the results must be presented in an attractive and appropriate way.

The following points should be observed:

- Specific targets and non-targets
- Extent
- Benefit
- Stakeholders
- Evaluation

When preparing a policy, it is important to remember that those who make the final decision, are not terminology experts, and focus on the concrete benefits for the core business.

Coordination plan

Terminology and terminology management affect all company divisions, from Development, through Finance and the Legal Division, Localisation, Marketing, Corporate Communication, Management, Technical Writing and Purchase [7]. It often happens that these divisions are operating independently of each other. The goal of a

corporate terminology policy is to involve all divisions and business areas. Sometimes, you may even find an existing infrastructure for terminology-related issues.

The terminology policy is intended to harmonise these processes and to support the company's overall performance. This can be achieved, e.g. by applying an integration statement illustrating the relationship of terminology policy with the individual business areas. The coordination plan will also help adapt the strategy accordingly under changing circumstances.

Implementation Plan

Successfully implementing a terminology policy is perhaps the most delicate step and requires careful planning and endurance. A terminology policy will be most successful when it is based on existing infrastructures and involves available networks. If it is necessary to create a new infrastructure, make sure to plan and reserve time and financial resources well.

Necessary infrastructure may include:

- Further education and training of employees
- Allocation of staff, hiring new staff if necessary
- Provision of premises, hardware, software and literature
- Support for cleansing and maintaining databases and systems
- Access to corporate documentation

An action plan with a timeframe schedule is an important aid when implementing a terminology policy. It should include the priorities set. Be modest and set moderate, easily achievable goals. Do not underestimate the psychological effect of fast results. They encourage motivation and endurance and also have a positive impact on evaluation results [8].

Presentation / Template

The arguments and the proposed strategy must attract the attention of decision-makers and arouse their interest by addressing issues that concern them. Remember that, from a controller's perspective, your draft is simply one among many budget items competing with each other for resources.

The presentation should therefore be

- convincing
- clearly written or presented,
- well motivated,
- reinforced by accurate and up-to-date facts and
- be relatively short.

Emphasise in your presentation the strengths and weaknesses of the current situation in the company concerning terminology and explain the consequences of a terminology policy for the overall situation.

Decision

It is important that the terminology policy is not only formally approved, but that it attracts ongoing interest and receives long-term support. Make sure that the topic of terminology remains on the agenda and is remembered through regular communication.

Implementation

Operational planning, organisation and communication is required for implementing a terminology policy. In this step, it is important to win the support and obtain the cooperation of the key stakeholders. Be aware that the terminology policy means change for most employees. Change is often perceived as negative as it creates uncertainty and causes extra work. [9]

Creating Sustainability

The aim of a terminology policy is to integrate automatic terminology work into everyday business work flows.

Automation can be established by:

- Qualification of terminology experts, memberships in industry associations
- Regular further training and education of internal and external staff within all departments and areas
- Ensure that the terminology issue is on the agenda at meetings in all departments, so that terminology policy is addressed regularly
- Informal internal networks (which in many companies is explicitly welcome - the terminologist should be known in and be familiar with all areas)
- Software upgrades and network administration
- Communication within the company and externally
- Regular evaluation by an internal or external department in order to be able to respond quickly to changes
- Create flexible infrastructures that allow continued working even in times of financial cuttings.

3 Designing a terminology process

The way terminology processes are designed depends on many factors. A central question is whether new terms are created in the company (prescriptive terminology work) or if existing terms are primarily documented (descriptive terminology work). An innovative industrial company creates new products which must be designated in one or more languages. Industrial companies place - or at least should place - great emphasis on creating terms and formulating definitions. [10]

Drafting a terminology process is very complex and involves many individual factors that have to be taken into account when planning processes, it would not make sense to design a sample work flow for terminology work in a car company. We'd rather give you inspiration for thought and develop planning aids so that you can design your individual processes efficiently and systematically.

The design of terminology processes depends on the objective factors in the company. Another crucial factor is the importance attached to the various aspects of terminology work. The first priority should be to get an idea of the basic conditions of terminology work and to set priorities.

These important aspects should be clarified in advanced:

- whether terminology work in the company is to be approached monolingually, bilingually or multilingually,
- which tasks are to be fulfilled internally and which are to be outsourced,
- how communication is organised within the company and with external service providers (terminologists, translators, technical writers, etc.),
- which employees / divisions / external service providers should have access to the terminology,
- with which suppliers your company co-operates and how you exchange terminology for the parts supplied by them,
- which existing objectives concerning terminology design need to be fulfilled (corporate language),
- and which sources for terminology are being used.

In addition, it is important to provide employees and, as required, external suppliers, who may use tools for terminology work, computer-assisted translation or machine-assisted editing to ensure consistency in the company's language, with the terminology. [11]

Therefore, the systems that are already or will be in use in the company must be included in process planning, i.e.

- terminology management systems
- databases
- editing tools
- terminology extraction tools
- tools for computer-aided translation
- machine translation systems
- knowledge management systems
- knowledge repositories.

Quality should always be in the foreground. However, it is sometimes inevitable to make compromises here for pragmatic reasons such as very tight deadlines set by the client. In these cases, real-time availability of terminology has priority. With regard to other objectives, harmonising existing terminology may be a priority, for others exchangeability of terminological data may be the most important criterion. [12]

Possible Priorities in Terminology Work could be quality, harmonisation, quick availability and exchangeability of terminological data.

3.1 Standard Processes and Unique Processes

Examples of Standard Processes in Terminology Work

- New terms and designations are created for new developments.
- Definitions are formulated to describe and differentiate new concepts.
- New terms are assigned their equivalents in other languages.
- The terminology for product X will be made available to external translators.

However, precise planning and assignment of responsibilities should also be considered when deploying special, unique processes as they may sometimes be extensive and far-reaching.

Examples of Unique Terminology Processes

- A terminology database is currently being integrated into the company.
- The company acquires a competitor. The brands are to be continued, but eventually a common corporate identity and a consistent corporate language shall be established. The terminology of the two companies must be harmonised.
- The company acquires a competitor. Differences in terminology shall be maintained. Terminology for both companies is collected centrally, documented and communicated accordingly, so that the technical documentation and translation departments are able to use a clear brand- or company-specific terminology.

3.2. Defining and Modelling Process

Defining terminology processes involves specifying **who** does **what** **when**.

It is therefore necessary to define the actual processes, to designate the competent persons, to assign responsibilities to them and to set deadlines for performing these tasks. [13]

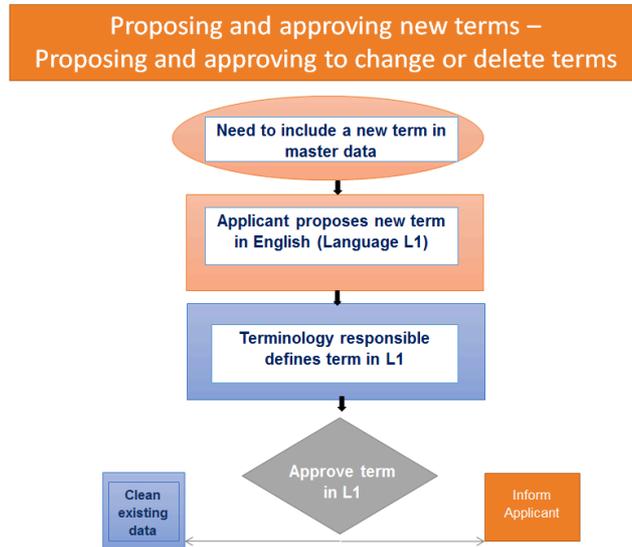


Fig. 3. Example of terminology Process for Approval of terms. [13]

4 Terminology Management – Philosophical and Economic Considerations

The challenge associated with terminology is not static as all organisations are in effect evolving their own use of language as time passes – just as is the case for natural language drift in the wider population. The authors suggest that the role of terminology management is to bring some order to support consistent and more precise language adoption for a period of time. Effective medium to long term terminology management is thereafter enabled through the introduction of a terminology change management procedure.

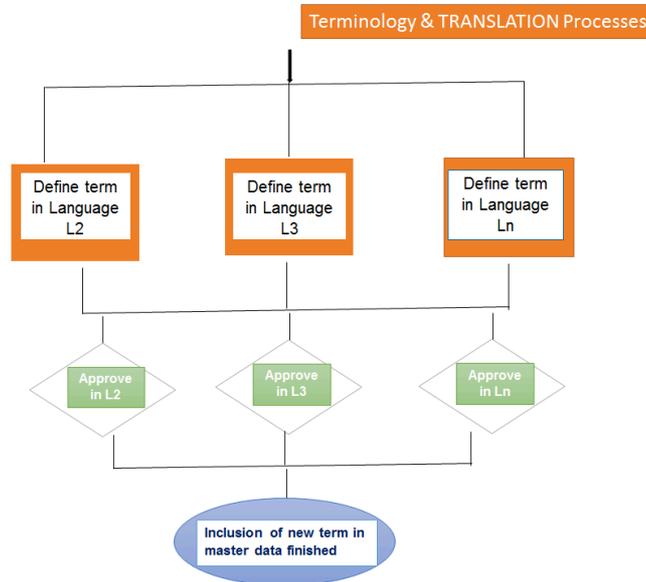


Fig. 4. Example of Terminology and Translation Process. [13]

Terminology management is not a perfect science, rather a starting objective might be economic in nature. There is a point up to which an investment in terminology makes sound economic sense for an organisation and beyond that point, the over-prescription of broader swathes of language and terminology will introduce business inefficiencies.

We suggest that one of the greatest challenges therefore may be the very determination of “how much terminology is enough?” The costs of lack of precision in terminology in any given company or field of endeavour may be a useful indicator to guide a specific response to this question. After all, if a team of medical professionals are undertaking life-threatening surgery, time is not available to clarify specific term meaning and hence a common terminology understanding must pre-exist in the team. Equally, terminological misunderstandings could have very undesirable outcomes for patients undergoing surgical procedures of this nature. We therefore see that terminology influences both efficiency of the job undertaken (how long does it take to complete?) and the quality of the outcomes (how well was the job performed?).

Larger projects involving more people therefore increase the scale of the terminology problem, as does the nature of the work. To put this in some context, if a large team of engineers is involved on a project where poor terminology management is in place, the project will need to cater for two additional risks: (1) that the project may be delayed due to the increased communication required in order to clarify understanding; and (2) the quality of the end product or service may inadvertently be compromised as a result of terminological confusion. The most obvious mitigation strategy for both of these risks is to examine the terminology footprint on the project and determine its areas of weakness, thereafter tightening up on the definition and con-

sistent use of terminology across the project.

The theory we present is reasonably simple and intuitively appealing. However, we must not lose sight of a basic operating constraint: people are involved in the adoption and application of terminology. In the authors' view, the types of concerns introduced by this constraint are varied, some examples of which include:

1) As humans, our use of language for communication involves a constant interpretation and resulting quasi-understanding of what is intended in language.

2) As humans, our capacity to assume to have fully understood some point of language is high (perhaps it needs to be in order to operate) but our actual capacity to genuinely and completely understand all points of language is necessarily incomplete. As evidence of this shortcoming, the number of words and their varied meanings in the established mainstream natural language dictionaries considerably exceeds the memory capacity of any individual person – they are sources of reference and guidance, but not sources that are practically suited for rote learning.

These human limitations give rise to a further issue that arise in terminology debates: communications and terminological shortcomings may be intuitively underappreciated by individuals. We assume an understanding to be correct - our biological mechanisms seem to some extent tuned for this type of behaviour – yet it may only be an approximation to the intended meaning. After all, Georg Hegel is reputed to have observed that *truth is found neither in the thesis nor the antithesis, but in an emergent synthesis which reconciles the two. Truthful* meaning in respect of terms is therefore an emergent synthesis of possible / competing term definitions.

To contextualise this philosophical debate in the context of practical Engineering Terminology, we can extrapolate that certain situations arise, to which we should give careful consideration (refer to Table 1 below)

Table 1. Examples of Terminology Debates.

Potential Situation	Impact & Discussion
Large or complicated projects which seem to require relatively large descriptions may amplify the basic terminology problem.	Where complication exists, increased communication, language and terminology are mechanisms for managing our affairs. However, increased communication, language and terminology serve to increase the potential for mis-understanding. In these cases, more robust and formal terminology management may be desirable.
Engineers and individuals working on complicated projects may have a natural propensity for underappreciating the terminology challenge (in effect, the terminology issue is therefore latent in nature)	A terminology problem necessarily exists – it is a case of how we choose to deal with it. However, if we choose to deal with it purely through informal human communication mechanisms, the issues arising from interpretation and quasi-communication will invariably lead to gaps in understanding which may manifest as undesirable outcomes.
Gaps in terminology usage may	Terminology represents the building blocks for effective

ultimately manifest themselves in poor product quality or service delivery or general project issues.	communication. Terminology is central to work and process management. Where terminology management is sub-standard, we risk introducing product, project and service delivery issues. Consistency and predictability in terms of meeting product and project quality targets is negatively affected.
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Earlier work from the authors has examined the potential for a latent terminology problem to exist in the software engineering field [14]. We found that within software engineering, there is strong evidence to suggest that a terminology problem has arisen, and we have advocated that this problem could be tackled through the use of ontology [15]. We have also seen that this terminology concerns extends to role definition [16]. Indeed and although unintended at the time, some of our earlier work has also demonstrated the complexity that arises in term usage in software engineering, where the very term *success* has been should to be layered in possible interpretation (even though many individuals adopting the term will intuitively assume that they have understood it instantly) [17]. It is perhaps the case the more established engineering fields have a smaller terminology problem than software engineering, but even in these domains the potential for terminology costs and issues to arise remains as where there is a complicated endeavour there is also a need for effective and efficient communication.

5 Conclusions

The purpose of a terminology policy or strategy is to bring "order to chaos" and to a systematic and appropriate use of terminology throughout all company divisions. Company divisions use and are affected by terminology in varying extents and in different ways. In this respect, divisions must apply an individual approach to terminology. Terminology experts often have difficulties to justify their positions and to promote a cooperative environment. One of their key activities involves convincing others. Innovations such as the launch of a terminology database frequently meet with resistance or refusal as many colleagues see it as an added addition to their workload.

A systematic terminology management can only be successfully introduced into the company if employees are convinced that it will make work easier and if all departments are integrated into the corporate strategy from the very beginning. The requirements will be explained in detail in this unit.

Whether terminology management has been successfully introduced in a company is primarily evaluated by controlling and represented in figures. And although the real success can often only be noticed in the long term, early signs of tangible milestones achieved play an important role. The development and implementation of a corporate terminology policy is therefore primarily dependent on the management and communication process. Coherent and convincing arguments are particularly important in this respect.

6 Innovative e-learning

Goal of this project is the development of an e-learning course which offers a user-friendly and sound introduction to basic principles and methods of terminology management. The target group is the automotive industry and includes management, sales and marketing, standardization, product development, technical documentation, terminologists, translators, language service providers and corporate communications. All these areas are important to involve in the terminology project cycle. The challenge is the lacking linguistic or terminological basis of the users who thus have to be introduced to the topic with care. It is the aim to expand the model later to other industries and as an introductory course for students at universities. The course is prepared in cooperation with members from the automotive and IT industry and is offered in German and English.

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elcat is an online training with the most important topics in terminology management. In 2016, cooperation between elcat and the European Certification and Qualification Association (ECQA) was started and the appropriate certificate meeting these needs was created: The ECQA Certified Terminology Manager (CTM) – Automotive. [18]

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