Terminologie & Ontologie : Théories et Applications

Verbal and Nonverbal Representation in Terminology

Proceedings of the

TOTh Workshop 2013

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La Représentation Verbale et Non-verbale en Terminologie

Actes de la

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Edited by
Susanne Lervad, Peder Flemestad & Lotte Weilgaard

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Christophe Roche & Rute Costa
www.porphyre.org/toth/

Terminology is as much a science of words as a science of things. A discipline in its own right, it draws on a number of domains of knowledge, from linguistics to theories of knowledge. By linking Terminology and Ontology, the International TOTh Conferences (Terminology & Ontology: Theories and applications) focus on the common ground of these disciplines and on the development of new theoretical and applied perspectives. Initiated in 2007, the conferences have since become an important forum for scholarly meetings and exchange, whether one is a researcher, teacher, trainer, user or industrial partner engaged in the fields of terminology and ontology and, more generally, of language and knowledge. The international character of the TOTh Scientific Committee is an important part of the outreach and dissemination of the work of the TOTh network. The Committee consists of sixty scholars, representing 20 different nationalities. The TOTh Conferences are based on open calls for papers and subsequent selection of articles for publication in the proceedings. The Conferences are two-day events, preceded by a day and a half of training sessions in terminology and ontology. Organized by the University of Savoie at the beginning of June, they open with a key-note lecture and have, since 2011, included a Young Researcher Prize and a *Disputatio* devoted to a foundational text in the domain.

While the TOTh Conferences enable scholars to explore a wide range of disciplines, to analyze findings and to outline new perspectives, the need was felt relatively early for events whose theme would be even more focused. The TOTh Workshops were therefore initiated in 2011 in order to explore specific topics related to the themes of the TOTh Conferences. The Workshops also focus on the common ground of the disciplines of the TOTh network and on the development of new theoretical perspectives. As with the conferences, the workshops have open calls for papers, and subsequent selection of articles for publication in the proceedings. These one-day events are organized and hosted by a scientific partner (university or organization) in accordance with the TOTh Steering Committee and are scheduled mid-term between the TOTh Conferences in June. The inaugural Workshop was held in Portugal in November 2011 and focused on “The Definition in Terminology”, the second took place in Italy in November 2012 on the topic of “Contexts and Notes in Terminology”. The third Workshop, hosted in Denmark in November 2013, was devoted to the study of “Verbal and Nonverbal Representation in Terminology”.

Les Conférences et les Journées d'étude TOTh

Christophe Roche & Rute Costa
www.porphyre.org/toth/

La Terminologie est autant une science des mots qu'une science des choses. Discipline à part entière, elle puise à de nombreux domaines, de la linguistique aux théories de la connaissance. En rapprochant Terminologie et Ontologie, les Conférences internationales TOTh (Terminologie & Ontologie : Théories et applications) mettent l'accent sur les apports mutuels de ces disciplines et sur de nouvelles perspectives de développement tant théoriques que pratiques. Créées en 2007, elles sont devenues depuis un lieu de rencontres et d'échanges privilégié pour tous ceux dont les préoccupations relèvent à la fois de la terminologie et de l'ontologie, et, de façon plus générale, de la langue et de la connaissance, qu'ils soient chercheurs, enseignants, formateurs, utilisateurs ou industriels. La dimension internationale du Comité scientifique participe au rayonnement et à la diffusion des travaux menés à TOTh. Composé d'une soixantaine de membres dont près de 75% de personnalités étrangères, il représente 20 nationalités différentes. Enfin, les Conférences TOTh sont des conférences avec appel à communications, sélection des articles et publication des actes. Les Conférences TOTh sont planifiées sur deux jours et sont précédées d'un jour et demi de formation sur la terminologie et l'ontologie. Organisées par l'Université de Savoie au début du mois de juin, elles s'ouvrent par une Conférence invitée et, depuis 2011, incluent un Prix Jeune chercheur et une Disputatio portant sur l'étude d'un texte fondateur.

Si les Conférences TOTh permettent d'explorer un vaste champ d'études, d'en analyser les résultats et d'esquisser de nouvelles perspectives, le besoin s'est fait sentir relativement tôt d'organiser des événements dont la thématique serait plus ciblée. C'est pourquoi ont été créées en 2011 les Journées d'étude TOTh afin d'approfondir un sujet précis en relation avec les thèmes des Conférences. Les Journées d'étude mettent également l'accent sur les apports mutuels des disciplines du réseau TOTh, ainsi que des nouvelles perspectives de développement théorique. Comme pour les conférences, ces Journées d'étude ont un appel à communications, une sélection des articles et publication des actes. D'une durée d'un jour, elles sont organisées et accueillies par un partenaire (université ou organisation) en accord avec le comité de pilotage de TOTh et sont planifiées à mi-parcours, entre deux éditions successives des Conférences TOTh du mois de juin. Ainsi, la 1ère Journée d'étude s'est déroulée au Portugal en novembre 2011 sur le thème de la « Définition en Terminologie », la 2ème a eu lieu en Italie en novembre 2012 sur le sujet des « Contextes et Notes en Terminologie ». Enfin, le Danemark a accueilli en novembre 2013 la 3ème Journée d'étude qui a porté sur les « Représentations verbales et non-verbales en terminologie ».

Introduction to Verbal and Nonverbal Representation in Terminology

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The TOTh workshop "Verbal and Nonverbal Representation in Terminology" was held on the 8th November 2013 at the Danish National Research Foundation's Centre for Textile Research (CTR), University of Copenhagen. Its focus was on verbal and nonverbal representation in terminology, with a particular focus on the specialist fields of textiles across time periods, cultures and disciplines spanning from the 4th millennium BC to the 3rd millennium AD.

The host institute, CTR, studies terminology in documentary texts and in literature, as well as the delimitation and designation of concepts in a variety of cultures and areas, also drawing on iconographical sources. This research is conducted as part of the TEMA (Textile Economies in the Mediterranean Area) research programme headed by CTR's director, Prof. Marie-Louise Nosch, and based on past CTR studies of textile tools, technology and terminology, in collaboration with an international network of scholars. The terminological research has also shown the importance of the study of logograms as a means of terminological representation,[1] since logograms were part and parcel of ancient writing systems.[2]

Nonverbal representation was integral to and used in various writing systems for the past four thousand years to convey the various aspects of fabric. The representation of a concept by using an illustration is universal, but the effectiveness of these signs is dependent on shared notions. The specialist domain of textiles has been part of humanity for all time, since clothing relates to the body as a second skin. However, in the second half of the 20th century, we no longer spoke only of textiles and instead, over time,

[1] See *e.g.* Lervad (1999); Lervad & Dury (2010); Lervad, Nosch & Dury (2011).

[2] *Cf. i.a.* Olivier & Vandenabeele (1979); Weeden (2011); for the issue of ideograms vs logograms, see Thompson (2012).

this long-established terminology became redirected towards, and dominated by, design. The terminological focus on the textiles and tools of the past five millennia was established as an important field of research,[3] and scholarship on textile terminology continues to grow.[4] However, these projects focus on past languages with long-attested histories, etymologies, and semantic evolution. Nonverbal representation was an integral part of communication in ancient terminology, but the 2013 TOTh Workshop in Copenhagen explored this field further, supplemented by modern means of nonverbal representation, a most pertinent issue, especially since international terminology standards have treated the question for decades, allowing for definitions to be complemented or supplemented by nonverbal clarification.[5] Moreover, reflection on and investigation of the nonverbal is an exiguously small part of terminological scholarship;[6] this is unfortunate, not only because nonverbal terminology is patently part of the modern world and a quasi-independent means of representation, but also because the discipline of terminology itself relies on and uses nonverbal representation in its work,[7] using, for example, diagrams and ontologies.

Further research into this field is therefore a patent desideratum, and the contributions in the present volume constitute work in progress reflecting the current investigation of nonverbal representation over a vast period of time and subject areas. Nonverbal representation in terminology comprises a wide variety of nonverbal means of conveying terminological information: code, formula, icon, pictures, diagrams, videos, sound, and other multimodal means of representation.[8] The contributions propose different perspectives for future research into some of these configurations of nonverbal representation, and their place in terminological research. Two papers focus on the graphical representation of terminological data and its categorization: Bodil Nistrup Madsen stresses the need for a taxonomy for terminological data on the basis of a discussion of definitions and examples from the Data Category Registry of ISO TC 37 (ISOcat) in comparison with the taxonomy developed for the Danish DanTermBank. Christophe Roche demonstrates how nonverbal

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[3] *Cf.* Michel & Nosch (2010), with discussion of diverse linguistic areas, such as various early Indo-European (*e.g.* Mycenaean Greek, Hittite, Indo-Iranian) and Semitic languages (*e.g.* Assyrian and Egyptian).

[4] *E.g.* the 2014 conference 'Textile terminologies 1000 BC to AD 1000, including European, Middle Eastern and Asian languages' in connection with the Euroscience Open Forum in Copenhagen, *cf.* Gaspa, Michel & Nosch (forthcoming).

[5] ISO 704:1987.

[6] Galinski & Picht (1997).

[7] *Cf.* ISO 24156:2014.

[8] *E.g.* ISO 9354:1989.

representations of terms and definitions play an important role in terminology and how technical drawings are, indeed, nonverbal representations of concepts expressed in a figurative and standardized language.

Logograms are the subject of three contributions. Salvatore Gaspa investigates textile designations as attested at different stages of the diachronic development of the cuneiform writing system in the ancient urban society of Mesopotamia from the fourth millennium BC onwards. Marie-Louise Nosch examines the verbal and nonverbal means of expressing textile concepts and the continuity in the logogrammatic rendering of textiles in the three writing systems of the Bronze Age Aegean: Cretan hieroglyphs, Minoan Linear A and Mycenaean Linear B. Miguel Ángel Andrés-Toledo discusses the role of Aramaic in logograms used by the Iranian-speaking scribes of the Sasanian dynasty (3rd -7th centuries A.D.) in south-western Iran, and how the verbal representation of concepts in one language can become nonverbal representations of the same in another. Two further contributions treat verbal aspects of nonverbal information in ancient languages: Peder Flemestad treats a set of terms in the discipline of terminology itself and the roots of these terms in past usage and languages. Maria Papadopoulou investigates textiles as a nonverbal means of communication based on a study of σχῆμα (*schēma*) and its designations, where the ancient Greek concept seems to go beyond the shape of the garment.

Several contributions treat the illustration and visualization of concepts: Juan Antonio Prieto Velasco considers the way concepts can be represented verbally and nonverbally by 'Specialized Knowledge Visualization' (SKV) in the Spanish VariMed project, a term base for medical concepts. Maria Teresa Zanola emphasizes the prominent position of the visual description of concepts in the field of fabric and fashion, and nonverbal aspects in specialized communication between producers, designers and the general public. Dardo de Vecchi sets out new frontiers for pragmatic terminology work, where knowledge and information involve other non-linguistic means of cognitive perception in the specialized communication of experts. Andrée Affeich deals with the differences between technical and scientific discourse and how nonverbal and verbal communication affect the transmission of knowledge in Arabic IT texts. Maria Teresa Gentile examines the formalization of psychoanalysis and reflects on the status of nonverbal representations in relation to Lacanian terminology and translation. Tove Engelhardt Mathiassen and Birka Ringbøl Bitsch introduce the site *textilnet.dk,* a digital dictionary of historical and contemporary terms for textiles and clothing, as well as the manufacturing techniques associated with this domain, where nonverbal representations complement the verbal information contained in the dictionary. Finally, in an epilogue, Susanne

Lervad discusses perspectives in professional nonverbal communication in the field of textiles.

The editors thank the TOTh network for encouragement and scientific stimulus, the Délégation Générale à la Langue Française et aux Langues de France for their help, and the Danish National Research Foundation's Centre for Textile Research for hosting us and for various support and assistance. We are also very grateful to Henrik Holmboe for his support, to Fidelma Ní Ghallchobhair, Aurélie Picton, and Manon Leroy for their help in reviewing the texts, and to Sidsel Frisch for her help with the images. The editors and publisher gratefully acknowledge the permission granted to reproduce the copyright material in this book. Every effort has been made to trace copyright holders and to obtain their permission for the use of copyright material. The publisher apologizes for any errors or omissions and would be grateful if notified of any corrections that should be incorporated.

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Introduction à la représentation verbale et non-verbale en terminologie

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La Journée d'étude TOTh « Représentation verbale et non verbale en terminologie » s'est tenue le 8 novembre 2013 au Danish National Research Foundation's Centre for Textile Research (CTR), à l'Université de Copenhague. Cette Journée d'étude a porté sur la représentation verbale et non verbale en terminologie, en particulier dans les domaines spécialisés des textiles à différentes époques, à travers différentes cultures et disciplines du 4e millénaire avant J.-C. au 3e millénaire après J.-C.

L'institution hôte de cette Journée d'étude, le CTR, étudie la terminologie dans des textes documentaires et dans la littérature, et s'intéresse à la délimitation, la désignation et la dénomination des concepts dans diverses cultures et régions, en s'appuyant aussi sur des ressources iconographiques. Ces recherches sont menées dans le cadre du programme de recherche TEMA (*Textile Economies in the Mediterranean Area*), dirigé par Marie-Louise Nosch, professeur et directrice du CTR. Les recherches du programme TEMA se fondent sur des travaux antérieurs du CTR portant sur les outils, la technologie et la terminologie du textile, menées en coopération avec un réseau international d'universitaires. Ces travaux terminologiques ont également montré l'importance de l'étude des logogrammes comme moyen de représentation terminologique[1], les logogrammes faisant partie intégrante des systèmes d'écriture antiques[2].

La représentation non-verbale est intégrée depuis quatre-mille ans à divers systèmes d'écriture qui l'utilisent pour décrire les différents aspects du tissu. La représentation d'un concept par une illustration est un procédé universel,

[1] Voir *e.g.* Lervad (1999); Lervad & Dury (2010); Lervad, Nosch & Dury (2011).

[2] *Cf. i.a.* Olivier & Vandenabeele (1979); Weeden (2011) ; en ce qui concerne la question d'idéogrammes versus logogrammes, voir Thompson (2012).

mais l'efficacité de ces signes dépend du partage des notions. Le domaine spécialisé des textiles fait partie de toutes les cultures à toutes les périodes historiques, le vêtement jouant pour le corps le rôle de seconde peau. Toutefois, au cours de la deuxième moité du 20e siècle, nous avons cessé de parler de textile uniquement et cette terminologie établie de longue date a été redirigée vers le design, qui en est venu à la dominer. La terminologie des textiles et des outils des cinq derniers millénaires est devenue un domaine de recherche important et reconnu[3], et notre connaissance de la terminologie du textile ne cesse de s'accroître[4]. Toutefois, tous ces projets sont centrés sur des langues anciennes dont l'histoire, l'étymologie et l'évolution sémantique sont attestées de longue date. La représentation non-verbale faisait partie intégrante de la communication dans la terminologie antique, et la Journée d'étude TOTh 2013 a continué d'explorer ce domaine avec l'aide de moyens modernes de représentation non-verbale. Le sujet demeure très pertinent, en particulier si l'on tient compte du fait que les normes terminologiques internationales qui en traitent depuis des décennies complètent ou augmentent les définitions grâce à des explications non-verbales[5]. Pourtant, la réflexion sur la représentation non-verbale et les recherches en la matière ne représentent qu'une toute petite part du domaine de la terminologie[6]. Ceci est malheureux, non seulement parce que la terminologie non-verbale fait de toute évidence partie du monde moderne en tant que moyen quasi-autonome de représentation, mais aussi parce que la discipline de la terminologie elle-même se fonde sur la représentation non-verbale, qu'elle utilise dans ses travaux[7], par exemple sous la forme de diagrammes et d'ontologies.

Des recherches plus approfondies dans ce domaine sont donc souhaitables et les contributions rassemblées dans le présent volume reflètent des travaux en cours qui montrent l'état actuel de l'étude de la représentation non-verbale couvrant une vaste période et une grande variété de sujets. La représentation non verbale en terminologie regroupe différents moyens non-verbaux de transmission de l'information terminologique : codes, formules, icônes, images, diagrammes, vidéos, sons, et autres moyens de représentation multimodaux[8]. Les contributions ouvrent différentes perspectives de

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[3] *Cf.* Michel & Nosch (2010), avec discussion autour de divers domaines linguistiques, notamment diverses langues indo-européennes (*e.g.* grec mycénien, hittite, indo-iranien) et sémitiques (*e.g.* assyrien et égyptien).

[4] *E.g.* la conférence de 2014 'Textile terminologies 1000 BC to AD 1000, including European, Middle Eastern and Asian languages' dans le cadre du Euroscience Open Forum à Copenhague, *cf.* Gaspa, Michel & Nosch (à paraître).

[5] ISO 704:1987.

[6] Galinski & Picht (1997).

[7] *Cf.* ISO 24156:2014.

[8] *E.g.* ISO 9354:1989.

recherche sur certaines de ces configurations non-verbales et sur leur place dans la recherche en terminologie. Deux articles portent sur la représentation graphique de données terminologiques et sur leur catégorisation : Bodil Nistrup Madsen souligne la nécessité d'une taxonomie des données terminologiques en se fondant sur une réflexion au sujet des définitions et des exemples extraits du registre de catégorie de données de la norme ISO TC 37 (ISOcat), comparativement à la taxonomie élaborée pour la banque terminologique danoise DanTermBank. Christophe Roche démontre comment les représentations non-verbales de termes et de définitions jouent un rôle important en terminologie et en quoi les dessins techniques sont en réalité des représentations non verbales de concepts exprimés dans une langue figurative et standardisée.

Les logogrammes font l'objet de trois contributions. Salvatore Gaspa étudie des dénominations textiles attestées à différents stades du développement diachronique du système d'écriture cunéiforme dans la société urbaine ancienne de Mésopotamie à partir du quatrième millénaire avant J.-C. Marie-Louise Nosch examine les moyens verbaux et non-verbaux d'exprimer des concepts dans le domaine du textile et la continuité du rendu logographique des textiles dans les trois systèmes d'écriture égéens à l'âge de Bronze : hiéroglyphes crétois, linéaire A minoen et linéaire B mycénien. Miguel Ángel Andrés-Toledo traite de l'utilisation de l'araméen sous forme de logogrammes par les scribes non-iranophones de la dynastie sassanide (3e-7e siècles avant J.-C.) du sud-ouest de l'Iran et expose comment la représentation verbale des concepts dans une langue peut devenir une représentation non-verbale dans une autre langue. Deux autres contributions portent sur les aspects verbaux de l'information non-verbale en langues anciennes : Peder Flemestad traite un ensemble de termes issus de la discipline de la terminologie elle-même et les racines de ces termes dans l'usage et les langues du passé. Maria Papadopoulou étudie les textiles comme un moyen non-verbal de communication en se fondant sur l'étude deσχῆμα (*schēma*) et de ce qu'il désigne, le concept du grec ancien semblant aller au-delà de la forme même du vêtement.

Plusieurs contributions abordent le thème de l'illustration et de la visualisation des concepts : Juan Antonio Prieto Velasco se penche sur le mode de représentation verbale et non-verbale des concepts par « visualisation des connaissances spécialisées » (*Specialized Knowledge Visualization*, SKV) dans le cadre du projet espagnol VariMed, une base terminologique de concepts médicaux. Maria Teresa Zanola souligne la position saillante de la description visuelle des concepts dans le domaine des tissus et de la mode ainsi que des aspects non verbaux de la communication spécialisée entre les producteurs, les designers et le grand public. Dardo deVecchi dessine de nouvelles frontières aux travaux de terminologie

pragmatique dans lesquels les connaissances et les informations impliquent d'autres moyens non-linguistiques de perception cognitive dans la communication spécialisée entre experts. Andrée Affeich étudie les différences entre le discours technique et scientifique et montre comment la communication verbale et non-verbale affecte la transmission des connaissances dans des textes en langue arabe relevant du domaine des technologies de l'information. Maria Teresa Gentile traite de la formalisation de la psycho-analyse et réfléchit au statut des représentations non-verbales en relation avec la terminologie lacanienne et la traduction. Tove Engelhardt Mathiassen et Birka Ringbøl Bitsch présentent le site *textilnet.dk*, dictionnaire numérique de termes historiques et contemporains dans le domaine des textiles et de l'habillement et relatifs aux techniques de fabrication associées à ce domaine et dans lequel les représentations non-verbales complètent les informations verbales contenues dans le dictionnaire. Enfin, Susanne Lervad signe un épilogue exposant les perspectives en termes de communication non-verbale professionnelle dans le domaine des textiles.

Les rédacteurs remercient le réseau TOTh pour les encouragements et la stimulation scientifique apportés, la Délégation Générale à la Langue Française et aux Langues de France pour son aide, et le CTR pour avoir accueilli la Journée d'étude et fourni son aide et son assistance. Nous remercions aussi Henrik Holmboe pour son soutien, Fidelma Ní Ghallchobhair, Aurélie Picton et Manon Leroy pour leur aide à la révision des textes et Sidsel Frisch pour son aide dans la gestion des images.

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The Use of Linguistic and Non-linguistic Data in a Terminology and Knowledge Bank

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Abstract. This paper will discuss definitions and give examples of linguistic and non-linguistic representation of concepts in a terminology and knowledge bank, and it will be argued that there is a need for a taxonomy of terminological data categories. As a background the DanTermBank project, which is carried out at Copenhagen Business School, will be introduced. In order to illustrate the need for a taxonomy for terminological data, some examples from the Data Category Registry of ISO TC 37 (ISOcat) will be given, and the taxonomy which has been developed for the DanTermBank project will be compared to the structure of ISOcat, the first printed standard comprising data categories for terminology management, ISO 12620:1999, and other standards from ISO TC 37. Finally some examples of linguistic and non-linguistic representations of concepts which we plan to introduce into the DanTermBank will be presented.

1. Introduction

In order to select, organise and present data suitable for different user groups in a national terminology and knowledge bank it is important to describe data categories (metadata) of the future term bank unambiguously and, in order to ensure interoperability with other term banks, one should choose a set of terminological data categories which are compatible with the Data Category Registry (DCR) developed by ISO TC 37 (Terminology and other language and content resources).[1]

When defining a set of metadata categories in a data bank such as the DCR, it is highly useful to base it on some kind of systematisation, *e.g.* a taxonomy, specifying main groups and various levels of subgroups of data categories. Otherwise, one may end up with an incomplete and/or inconsistent set of data categories that is very difficult to use and to extend.[2] ISOcat presents terminological data categories in alphabetic order, which makes it difficult to use. Therefore, the DanTermBank project team decided to propose a taxonomy for terminological data categories, which will help users and designers of term banks to get an overview and to identify individual data categories.[3]

When developing the taxonomy, we encountered some problems in defining certain data categories, *e.g. graphic symbol*. In this connection we considered characteristics such as *non-linguistic*, *nonverbal* and *non-alphabetic*. When looking up *symbol* in ISO 704:2009, we found that the description is unclear, and *symbol* is not defined in ISO 1087-1:2000. In this paper, definitions from ISO 12620:1999, ISOcat, ISO 704:2009, ISO 10241-1:2011, and the DanTermBank taxonomy of terminological data categories will be compared and discussed.

2. Background – the DanTermBank project

2.1 Aim of the DanTermBank project

The aim of the DanTermBank project is to establish the foundations for a national terminology and knowledge bank. In order to clarify and distinguish the meanings of domain-specific concepts, these will be described by means of characteristics and relations to other concepts in terminological ontologies, thus facilitating the development of consistent definitions that further the understanding and the correct use of terms.

However, terminology work that includes the development of terminological ontologies is very labour-intensive and, therefore, the DanTermBank project aims to

[1] The DCR of ISO TC 37 can be accessed at www.isocat.org, and is here referred to as ISOcat.

[2] *Cf.* Madsen & Thomsen (2008).

[3] *Cf.* Madsen *et al*. (2012), (2013).

develop methods and prototypes for automatic extraction of information about concepts, as well as automatic construction and validation of terminological ontologies. The DanTermBank project also aims to develop methods for target group-oriented knowledge dissemination.[4]

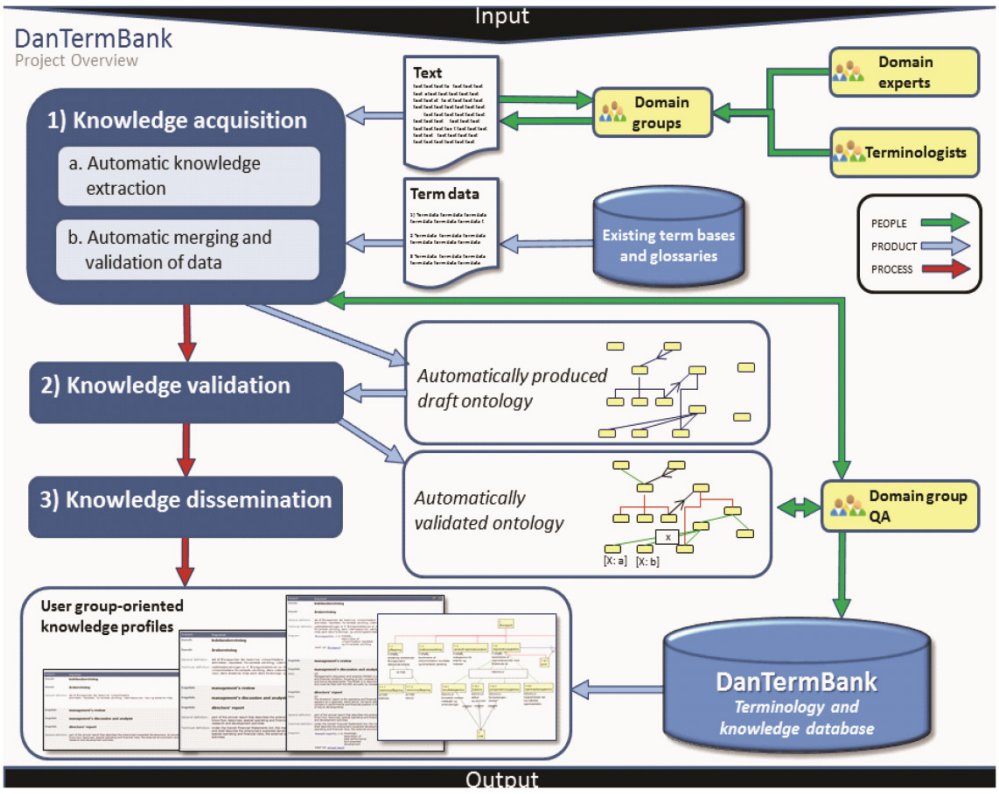


FIG. 1 – *Overview of the DanTermBank project.*

The DanTermBank project team consists of people with backgrounds in computational linguistics, terminology, ontology, language administration and system development.[5]

[4] See Figure 1 and the description at https://sf.cbs.dk/dtb_uk/about_the_project. An example of a terminological ontology is presented in Figure 2, section 2.2.

[5] See https://sf.cbs.dk/dtb_uk/project_participants. The project is funded by the VELUX Foundation, http://veluxfonden.dk/.

2.2 Terminological Ontologies

Figure 2 presents an extract from a terminological ontology of disease prevention from the Danish National Board of Public Health,[6] implemented here in the terminology and knowledge management system i-Term, developed by the DANTERM-centre.[7]

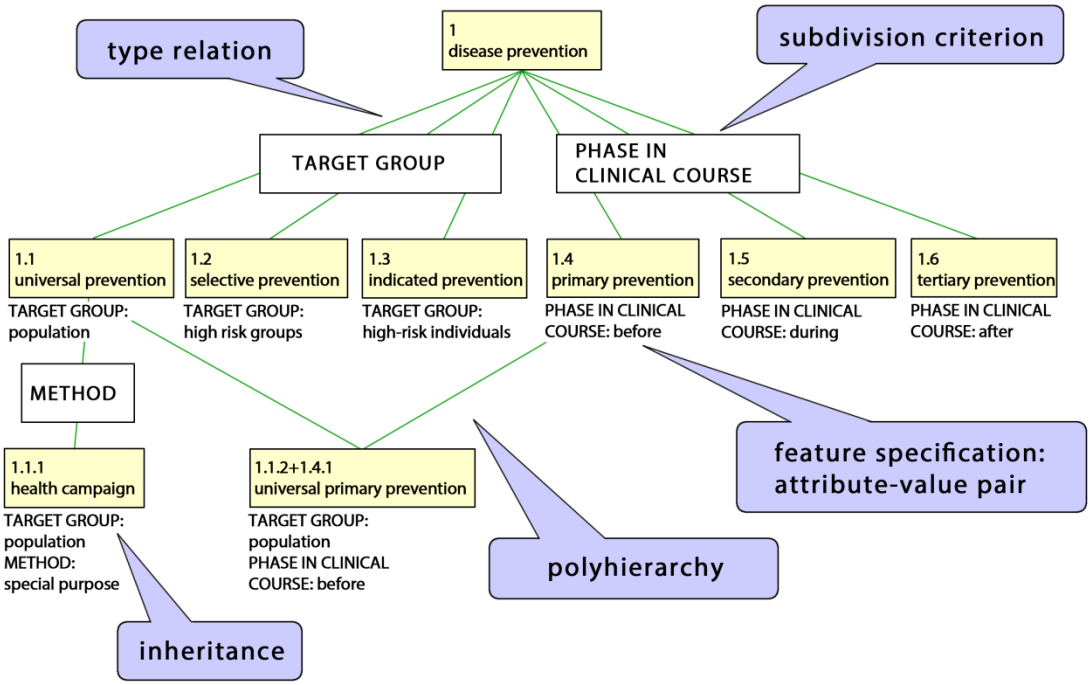


FIG. 2 – *Terminological ontology*.

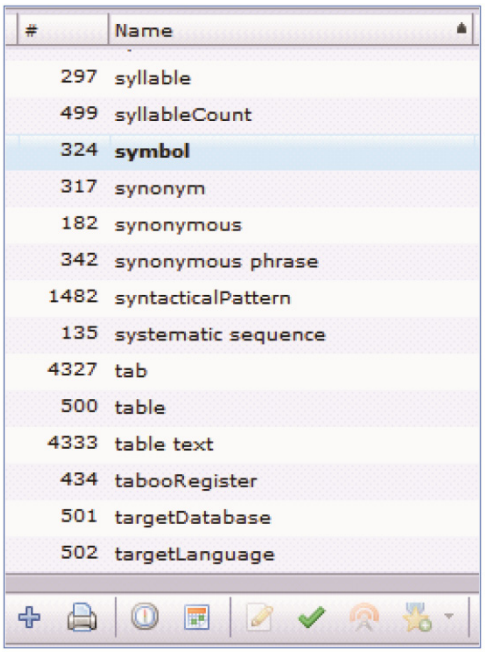
[6] http://begrebsbasen.sst.dk.

[7] www.danterm.dk.

Terminological ontologies comprise formalised descriptions of concepts, i.e. feature specifications in the form of attribute-value pairs, each representing a characteristic of a concept, *e.g.* the feature specification, consisting of the attribute *TARGET GROUP* and the value *high risk groups*. Terminological ontologies are subject to a number of constraints primarily based on inheritance, and the validation of draft ontologies is based on these constraints.[8]

3. Why a taxonomy for terminological data categories?

Figure 3 shows an extract of the alphabetic list of data categories in the Terminology profile of ISOcat, which comprises ca 600 data categories. If a user wishes to identify all data categories related to *e.g. usage*, she will have to go through the whole list and identify relevant categories on the basis of the definitions. If a user wants to introduce a new data category, it may be difficult to check whether it is already in the registry, because ISOcat may have used a different designation for the data category than that of the user. However, in the case of permissible values for data categories, there is some help for the user since the values are listed under the relevant data category.[9]



#	Name
297	syllable
499	syllableCount
324	**symbol**
317	synonym
182	synonymous
342	synonymous phrase
1482	syntacticalPattern
135	systematic sequence
4327	tab
500	table
4333	table text
434	tabooRegister
501	targetDatabase
502	targetLanguage

FIG. 3 – *ISOcat: Extract of alphabetic list of data categories*.

[8] See for example Madsen *et al*. (2004).

[9] *Cf.* the values of the data category *abbreviated form* under the data category *term type* in Figure 4.

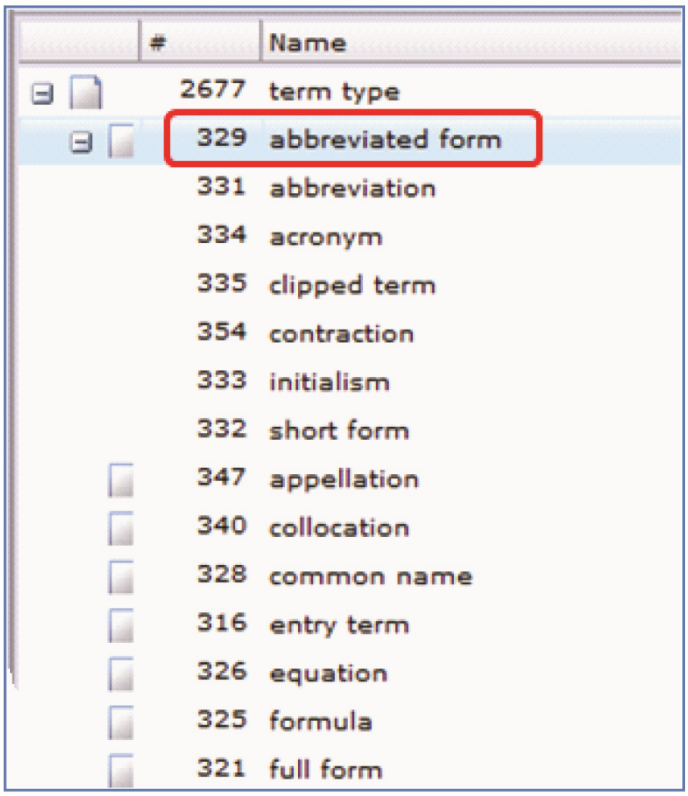


FIG. 4 – *ISOcat: The data category "abbreviated form" with permissible values.*

The experience of the DanTermBank project team was that it is difficult to navigate in the alphabetic list when attempting to identify relevant data categories, that data categories overlap (due to lack of co-ordination) and that maintenance is complicated (due to double entries and inconsistencies). Therefore we found it useful to propose a taxonomy of terminological data categories.[10]

[10] *Cf.* section 5.

4. Terminological data categories in ISO 12620:1999

In ISO 12620:1999, terminological data categories were classified in three main groups and ten subgroups:

Term and term-related data categories
A.1 term
A.2 term-related information
A.3 equivalence
Descriptive data categories:
A.4 subject field
A.5 concept-related description
A.6 concept relation
A.7 conceptual structures
A.8 note
Administrative data categories:
A.9 documentary language
A.10 administrative information

FIG. 5 – *Structure of the data categories in ISO 12620:1999.*

This structure was to some extent based on the structure of data in a terminological entry, and did not reflect a logical ordering of the data categories,[11] but it was much better than no structure.

Position No.	**Data category name**
A.2.1.12	romanized form
A.2.1.13	symbol
A.2.1.14	formula
A.2.1.15	equation
A.2.1.16	logical expression

FIG. 6 – *Some term types in ISO 12620:1999.*

[11] *Cf.* Madsen & Thomsen (2008).

Figure 6 presents an extract of the list of term types in ISO 12620:1999, subgroup *A.2 term-related information*. The classification of the data categories *symbol*, *formula*, *equation* and *logical expression* gives rise to discussion on the definition of *non-linguistic* and *nonverbal*.[12]

In 2003, when it was decided to set up the Data Category Registry (ISOcat) in ISO TC 37, the classification of the categories in main groups and subgroups in ISO 12620:1999 was abandoned.[13]

5. A taxonomy for DanTermBank data categories

Based on the taxonomy for classification of lexical data categories,[14] the DanTermBank project team developed a taxonomy in which the main groups of information types are structured based on linguistic disciplines:

- *graphic information,*
- *grammatical information,*
- *etymological information,*
- *phonetic information,*
- *information on usage,*
- *semantic information*.

In addition, this taxonomy contains the groups: *language*, *administrative information*, *structural information* and *note*.

The upper levels of the DanTermBank taxonomy are presented in Annex 1. In cases where the DanTermBank team has introduced an additional data category it is marked 'DTB'. 'DTB name' means that we have chosen another name for the data category than the name used in ISOcat. The ISOcat name is kept as a synonymous name in the entry for the data category, in order to make it possible for users to get an answer even if they search using this name.

The categorisation of the data categories in the DanTermBank taxonomy makes it easier to find and choose data categories. If, for example, a user wishes to identify possible data categories related to definition of concepts, she may choose the subgroup *semantic information* and navigate down through the subgroup *content specification*:

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[12] See section 6 below.

[13] *Cf.* Wright (2004).

[14] DS 2394-1:1998.

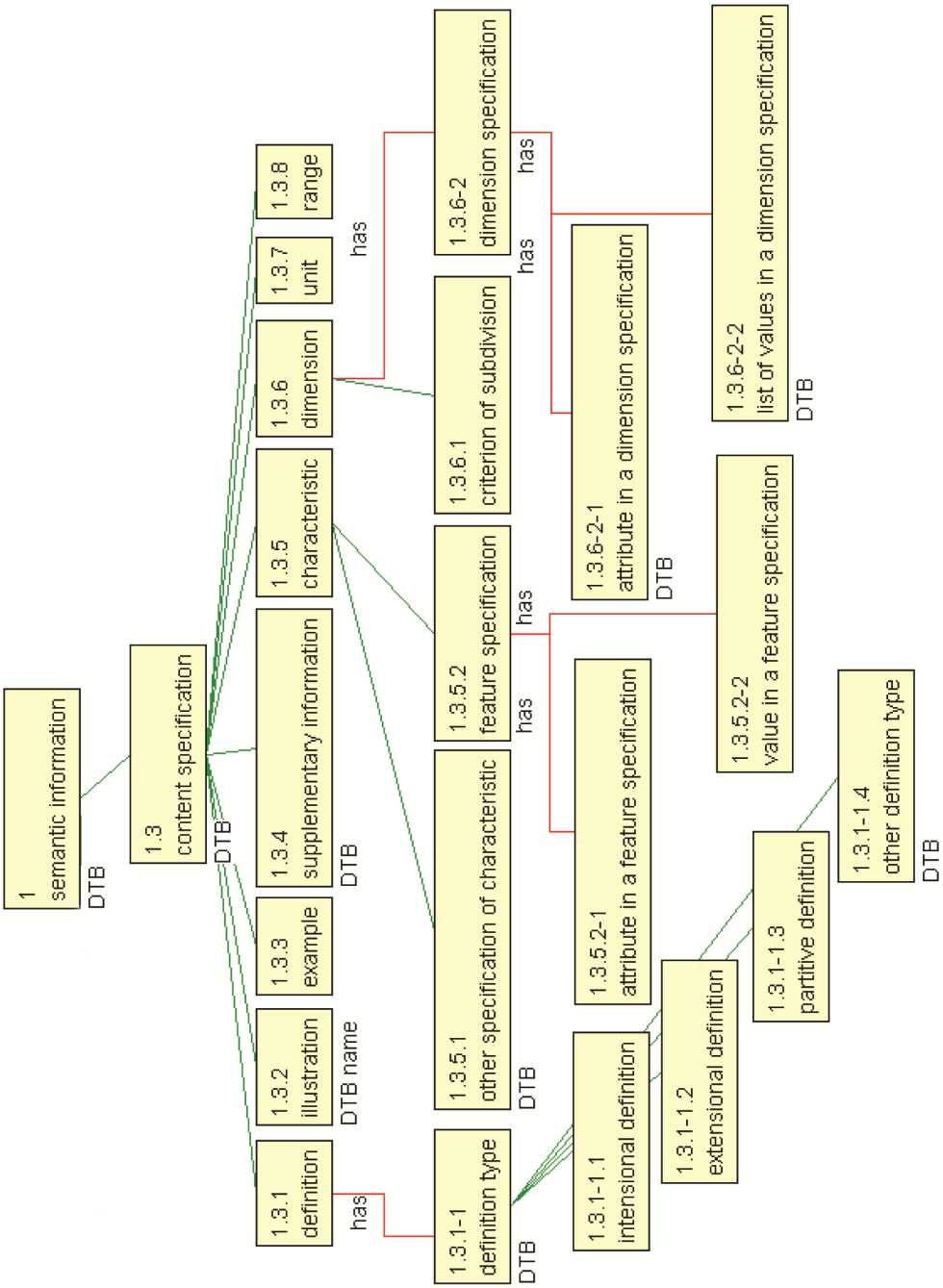

FIG. 7 – *The DanTermBank taxonomy: content specification.*

6. Concept clarification: linguistic versus non-linguistic concept representation

The future Danish terminology and knowledge bank will comprise both linguistic and non-linguistic representation of concepts. When defining some data categories for the term bank, *e.g.* the data category *symbol* in the DanTermBank taxonomy, we felt that there was a need for concept clarification: is *symbol* a linguistic or a non-linguistic designation, and what is the difference between *non-linguistic*, *nonverbal* and *non-alphabetic*?

6.1 Categorisation in standards from ISO TC 37

In ISO 704:2009 the following explanation is given:

"In natural language, *concepts* can be represented by *terms*, *appellations*, *definitions* or other linguistic forms; they may also be represented by symbols; in artificial language, they can be represented by codes or formulae, while in multimedia they can be represented by icons, pictures, diagrams, graphics, sound clips, video or other multimedia representations."[15]

Figure 8 presents an attempt at giving an overview of the categorisation in ISO 704:2009. From the explanation in ISO 704:2009, one may understand that concept representations in *natural language* are linguistic representations, while concept representations in *artificial language* and *multimedia* are non-linguistic representations.

This means that these three groups cannot be distinguished by means of the criterion: *linguistic* or *non-linguistic*. And it is not quite clear how ISO 704:2009 categorises *symbol – linguistic* or *non-linguistic*? Moreover, there is no explanation of what is meant by *other linguistic form*. The concepts behind these categories should probably be modelled in an ontology by introducing subdivision criteria. Perhaps the concepts *linguistic concept representation* and *non-linguistic concept representation* should be introduced, and the group *multimedia* should be removed?

[15] ISO 704:2009, section 5.1, p. 3, emphasis added.

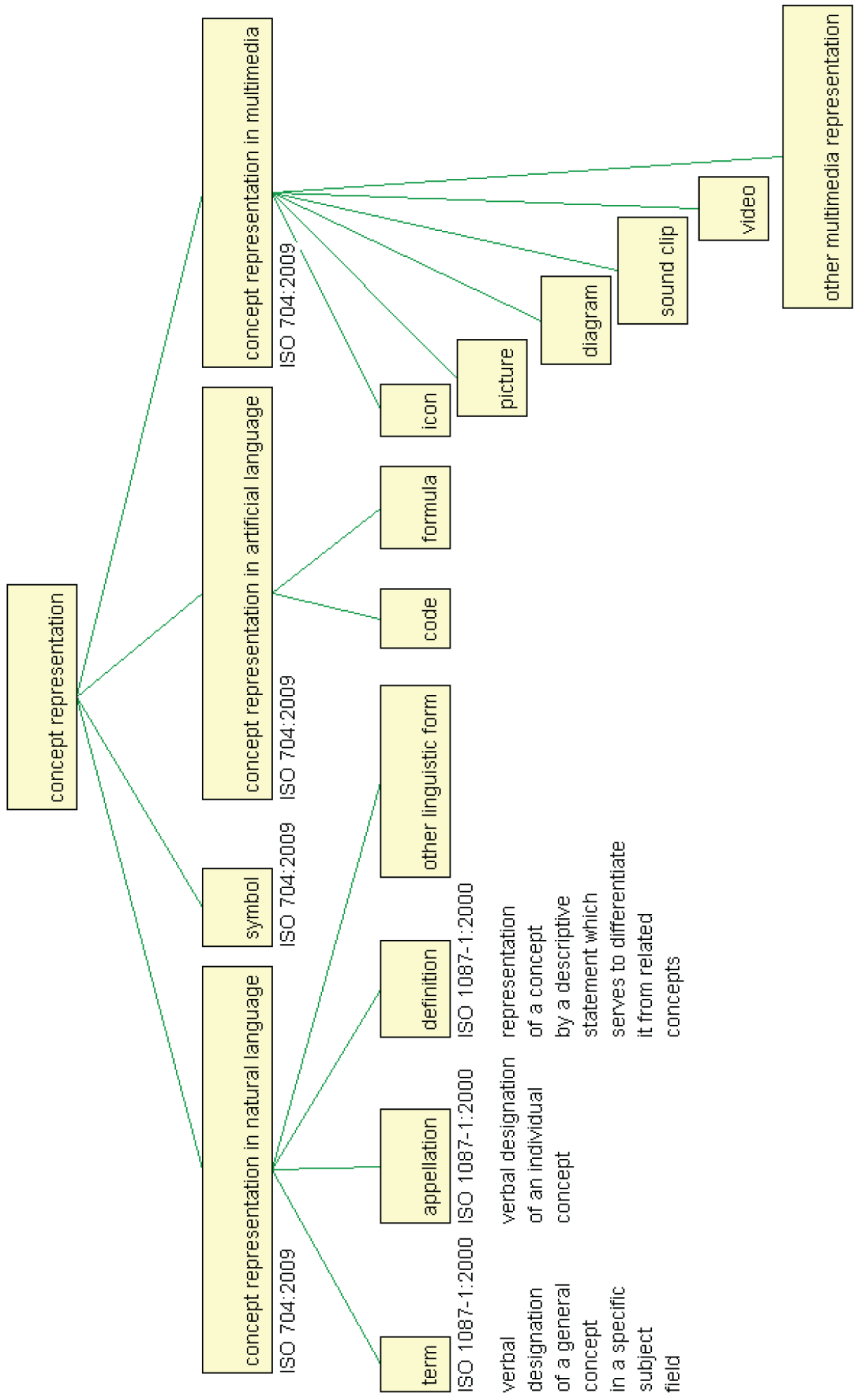

FIG. 8 – *Representation of concepts according to ISO 704:2009.*

In ISO 704:2009 *symbol* is introduced in the following way:

> "A *designation* is a representation of a *concept* by linguistic or non-linguistic means. *Designations* are categorized as:
>
> • *terms* designating *general concepts*;
>
> • *appellations* designating *individual concepts*;
>
> • *symbols* designating both *individual* and *general concepts*.
>
> It should be noted that not all symbols are *designations*."[16]

Section 7.5 further states that:

> "Symbols are an important aid to international communication because their visual representation of *concepts* functions independently of any given language. They can communicate information directly under difficult circumstances (*e.g.* traffic signs, airport signs). Whenever the technology allows for their integration on terminological records, they can be added as synonymous forms for a *term* or *appellation*. Only symbols that represent a *concept* are considered *designations.*
>
> Iconic symbols should bear some visual resemblance to the *concept* they represent."[17]

From this description it may be deduced that symbols are considered *non-linguistic* designations. However, according to ISO 12620:1999 and ISOcat a *symbol* is a *term type* defined as "a designation of a concept by letters, numerals, pictograms or any combination thereof".

ISO 10241-1:2011 distinguishes between *graphical symbol* and *letter symbol*:

- graphical symbol: visually perceptible figure with a particular meaning used to transmit information independently of language

- letter symbol: ***symbol*** (3.4.1.1.3) composed of one or several characters used to perform special communicative functions in a domain expert community

This supports the above view that the categorisation in Figure 8 is too simple. It also means that a symbol may be one or several letters, *e.g.* the Greek letter omega, which is the symbol for ohm. In this case, it may be argued that the letter omega is

[16] ISO 704:2009, section 7.1, p. 34.

[17] ISO 704:2009, section 7.5, p. 41.

not used in its function as a letter in this context, and it is therefore a *non-linguistic* concept representation.

This is confirmed by the following note in ISO 704:2009: "It should be noted that the lexical *designations* of SI units are *appellations* while the non-lexical ones are considered symbols rather than *abbreviations* since they do not vary from language to language, have no plural, and are never written with full stops (periods) except for normal punctuation."[18] This means that, for example, *ohm* is an appellation (name), and Ω is a non-linguistic symbol.

6.2 Categorisation in the DanTermBank taxonomy

In the first version of the DanTermBank taxonomy, we introduced two new categories under *term type*: *non-linguistic form* and *linguistic form*, and we placed *graphic symbol* as a subcategory of *non-linguistic form*. On closer consideration, we decided that *non-linguistic form* and *graphic symbol* are synonyms, which means that there are no subcategories of *non-linguistic form* under term type (see Figure 9).

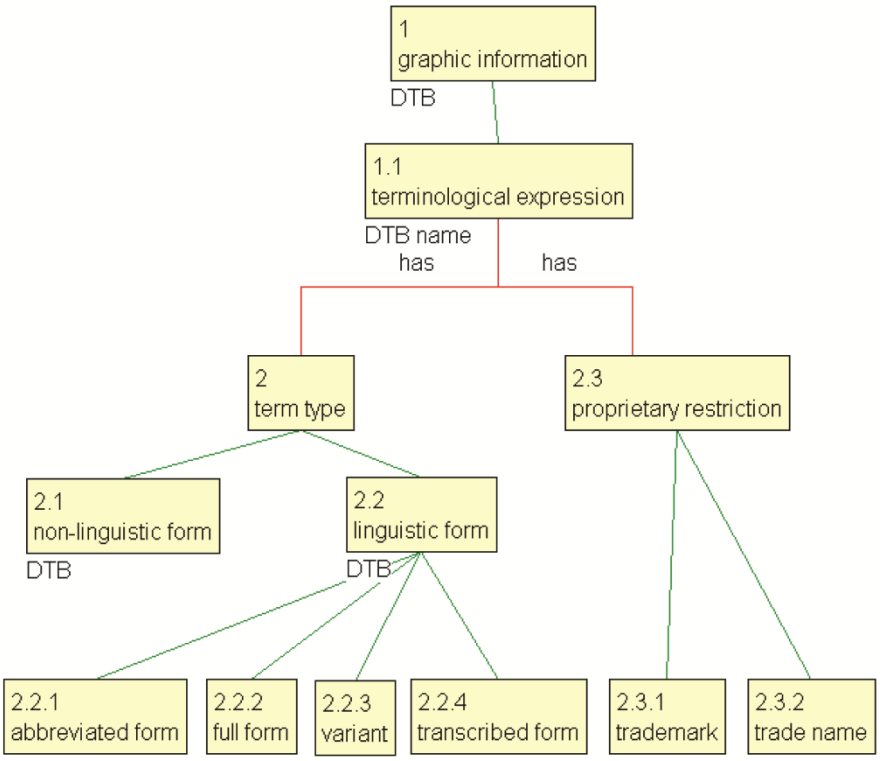

FIG. 9 – *The subgroup "graphic information" in the DanTermBank taxonomy.*

[18] ISO 704:2009, p. 38.

ISO 10241-1:2011 has the following note to *letter symbol*: "Complex letter symbols can include also numerals, mathematical symbols, typographical signs and syntactic signs (*e.g*. punctuation marks, hyphens, parentheses, square brackets and other connectors or delimiters), whose character styles (*i.e*. fonts and bold, italic, bold italic, or other style conventions) are governed by domain-, subject- or language-specific conventions."

In light of the above, we need to discuss the categorisation of *letter symbol* in the DanTermBank taxonomy. The DanTermBank definition of graphic symbol is "term type expressed in non-alphabetic form". This introduces another problem: how to define *non-linguistic*, *nonverbal* and *non-alphabetic*?

The theme of the TOTh Workshop[19] was *Verbal and nonverbal representation in terminology*, and both *symbols* and *illustrations* were mentioned in the introduction with reference to ISO 704:2009 and ISO 10241-1:2011.

6.3 WordNet definitions

Figure 10 presents the concepts *linguistic*, *verbal* and *alphabetic* with definitions which are found in WordNet.[20]

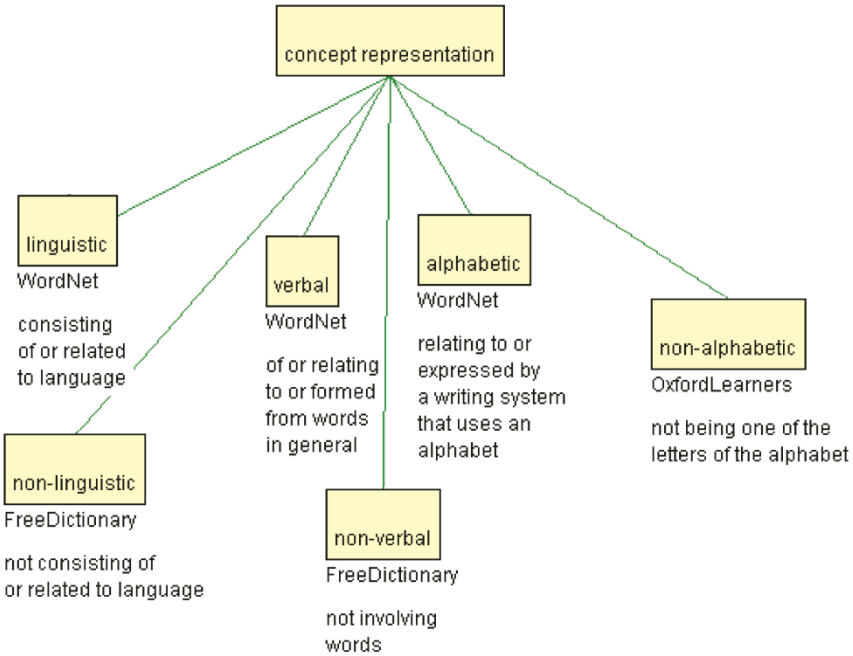

FIG. 10 – *Representation of concepts: non-linguistic, nonverbal and non-alphabetic.*

[19] *Cf*. http://www.porphyre.org/workshop-toth/2013-en.

[20] *Cf*. http://wordnetweb.princeton.edu/perl/webwn.

The antonyms are not found in WordNet but in dictionaries with definitions based on the WordNet definitions.

This also calls for further concept clarification: what are the relations between *non-linguistic concept representation*, *nonverbal concept representation* and *non-alphabetic concept representation*?

7. Linguistic and non-linguistic representations of concepts in the DanTermBank

7.1 Semantic information

Group 1.6, *semantic information*, in the DanTermBank taxonomy comprises three subgroups: *subject classification*, *semantic relation* and *content specification*.[21] All three groups comprise linguistic and non-linguistic data categories.

7.1.1 Content specification

The data categories *equation*, *formula* and *logical expression* were considered *term types* in ISO 12620:1999.[22] ISO 704:2009 states that:

> "Chemical formulae for chemical compounds can be considered symbols or be treated as synonymous forms for a term. Alternatively, formulae may be used as definitions, but not both at the same time."[23]

Figure 7 presented the subgroup *content specification* from the DanTermBank taxonomy. In the DanTermBank taxonomy, the data categories *equation*, *formula* and *logical expression* were not included, but they should be added and probably classified as *content specifying information* in line with *definition* and *illustration*.

The Danish terminology and knowledge bank will also include linguistic data categories related to terminological ontologies, which are not normally found in term banks, i.e. *feature specifications* and *dimension specifications*. An example of a feature specification is *PURPOSE: wastewater treatment* in Figure 11 below. An example of a dimension specification of the concept *wastewater treatment plant* is: [*METHOD: physical* | *biological* | *chemical*]. This is not shown in Figure 11.

[21] See Annexe 1.

[22] See Figure 6.

[23] ISO 704:2009, p. 42.

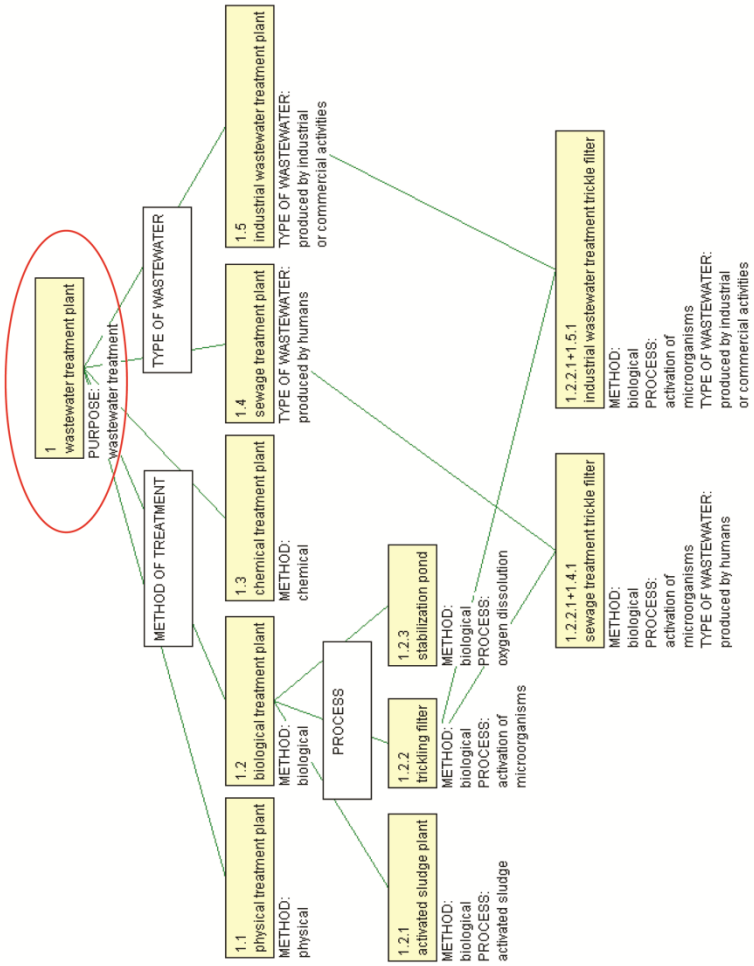

FIG. 11 – *Terminological ontology for wastewater treatment plants*

7.1.2 Semantic relation

Figure 12 shows part of the group *semantic relation* in the DanTermBank taxonomy. In concept systems concepts are related by various types of *concept relations*, and a concept has a *specific position* in a *concept system*. The *concept system* may be considered as super-ordinate to *terminological ontology*. A terminological ontology is an enhanced concept system, where characteristics of concepts are included as formal attribute-value pairs, and formal rules related to the inheritance of characteristics enable validation of the concept system.

Concept position is a kind of non-linguistic information which represents the concept in the concept system. Examples of concept positions are found in Figure 11. For example, the concept *wastewater treatment plant* has position 1 in the concept system.

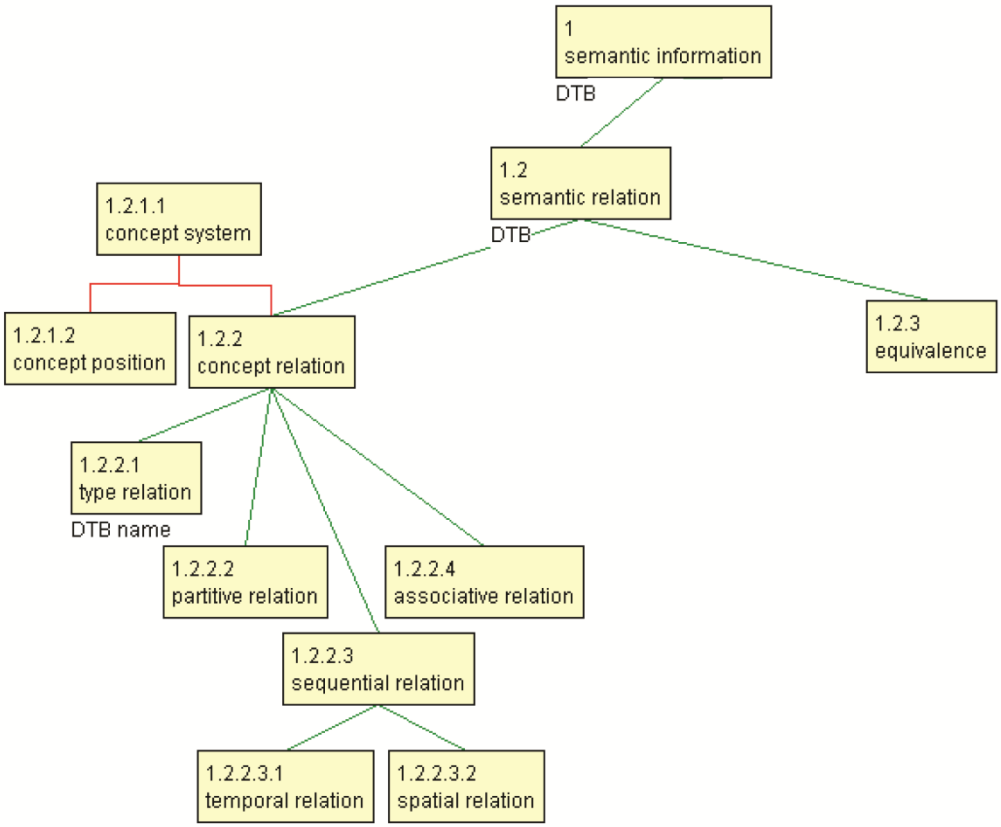

FIG. 12 – *The DanTermBank taxonomy: semantic relation.*

7.1.3 Examples of semantic information in the DanTermBank

Figure 13 presents an entry as it may look in the DanTermBank, comprising information from all three groups *subject classification*, *concept relation* and *content specification* of the DanTermBank taxonomy: *concept positions* and *illustrations* are non-linguistic representations of concepts, while *definitions* are linguistic representations of concepts.

As mentioned in section 2.1 above, the DanTermBank project aims to facilitate automatic knowledge extraction and automatic construction of terminological ontologies. In the project, we have developed prototypes and we have experimented with automatic creation of ontologies including both terms and illustrations. A terminological ontology may finally look like the example in Figure 14, comprising both linguistic and non-linguistic representations of concepts.

FIG. 13 – *Entry with linguistic and non-linguistic representations of a concept.*

8. Conclusions

When defining a set of metadata categories, it is highly useful to base it on some kind of systematisation, *e.g.* a taxonomy. The lack of systematisation in ISOcat is probably the reason why some data categories overlap: some of them have been suggested and introduced twice in ISOcat with different names, while others have different definitions but identical names.

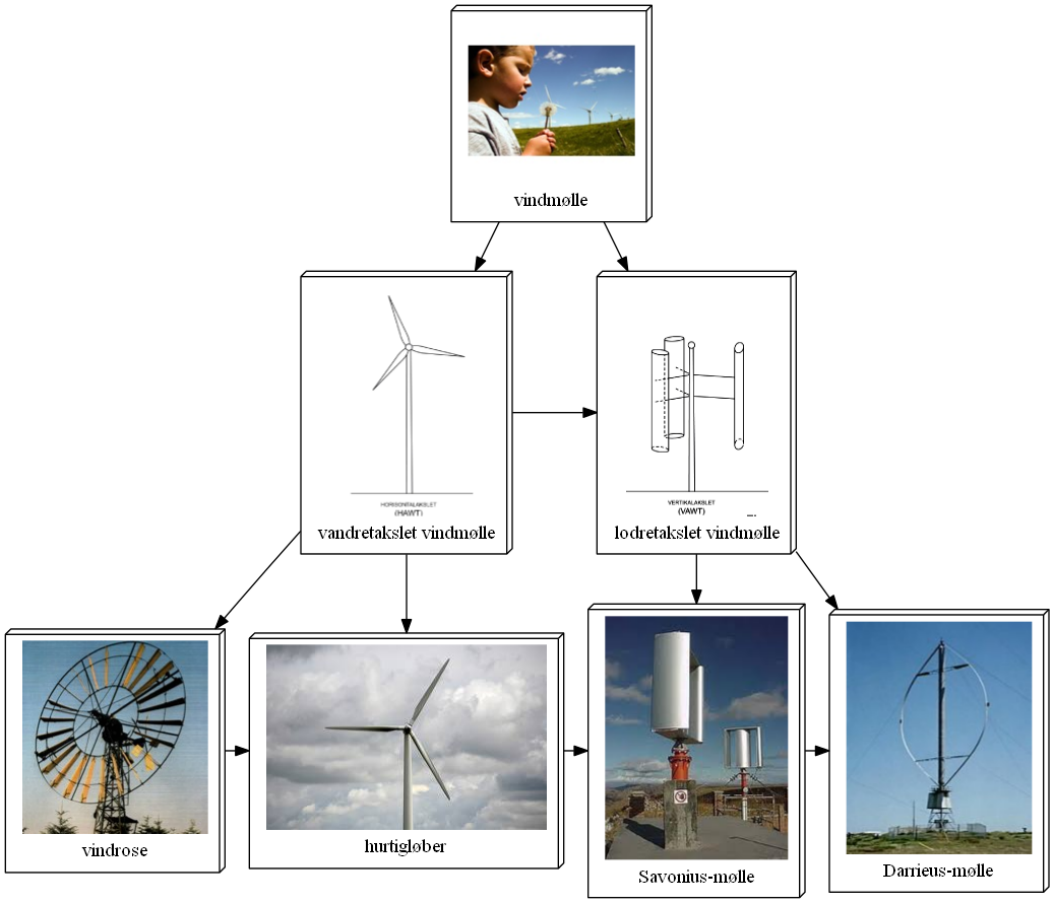

FIG. 14 – *Ontology with both linguistic and non-linguistic representations of concepts.*

It may be concluded, therefore, that there is a need for a taxonomy of terminological data categories which will ensure completeness, consistency, extensibility and user-friendliness of ISOcat. It must be acknowledged that creating a taxonomy for terminological data categories is a time-consuming process. However, the

DanTermBank taxonomy provides a solid foundation for the DanTermBank project, and it may be useful for other termbase projects. It is also the hope of the project team that it will facilitate further development of ISOcat.

It may also be concluded that there is a need for concept clarification and harmonisation in the ISO TC 37 standards ISO 704:2009 and ISO 10241-1:2011, describing the various types of representation of concepts. This concept clarification, which should be based on a terminological ontology, may also lay a better foundation for the decisions that still remain in the description of some data categories in the DanTermBank taxonomy.

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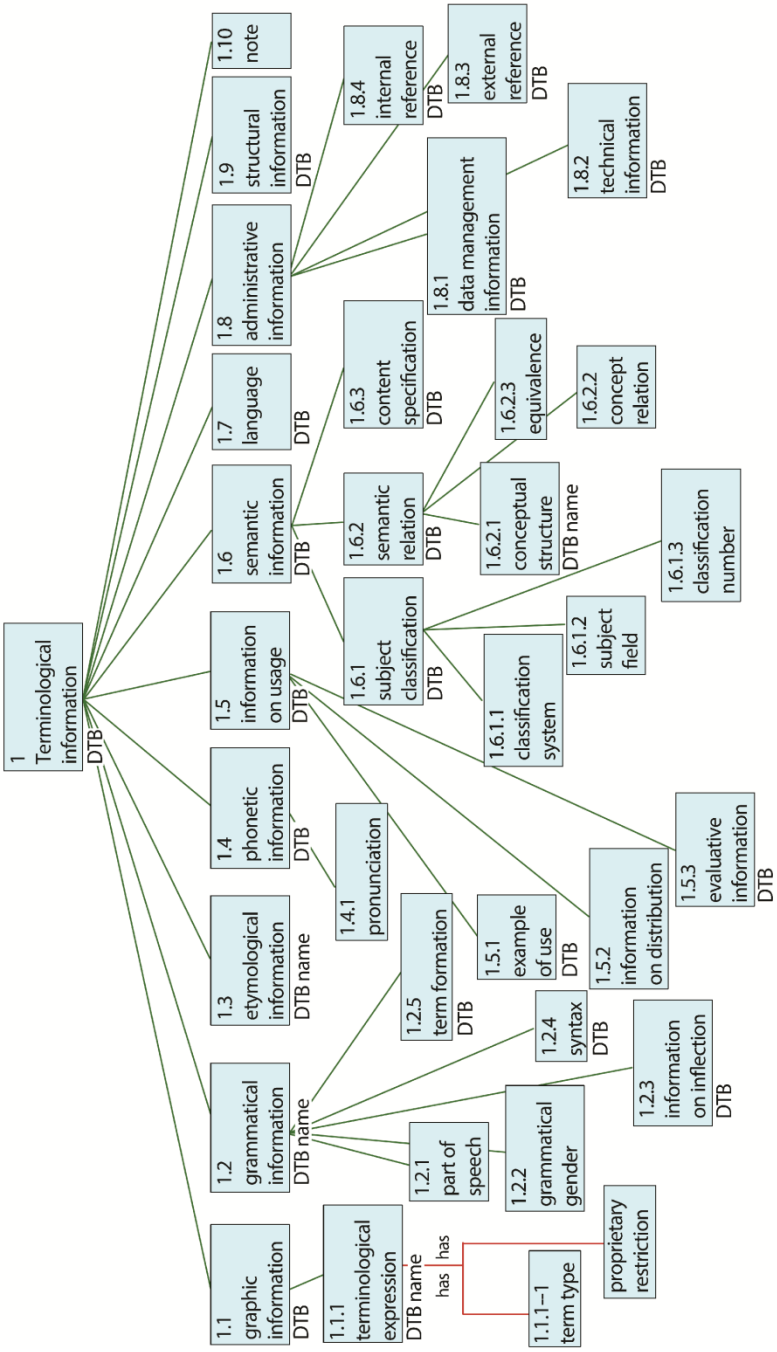
Résumé

Dans cette contribution, nous traiterons des définitions et nous donnerons des exemples de représentation linguistique et non-linguistique de concepts dans une banque de terminologie et de connaissance. Nous exposerons aussi pourquoi une taxonomie des catégories de données terminologiques est nécessaire. Pour illustrer notre propos, nous présenterons le projet DanTermBank, qui est actuellement en cours à Copenhagen Business School (CBS). Afin de montrer la nécessité d'une taxonomie de données terminologiques, quelques exemples du Data Category Registry de l'ISO TC 37 (ISOcat) seront exposés, et la taxonomie développée pour le projet DanTermBank sera comparée à la structure de l'ISOcat, à la première norme publiée comprenant des catégories de données pour la gestion terminologique, ISO 12620: 1999, ainsi qu'à d'autres normes de l'ISO TC 37. Enfin, quelques exemples de représentations linguistiques et non-linguistiques de concepts que nous prévoyons d'introduire dans DanTermBank seront présentés.

Annex: Upper levels of the DanTermBank taxonomy



Représentations formelles en terminologie

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« *Il est bien difficile de montrer le sens des mots et leurs imperfections, quand on a rien d'autres que les mots pour le faire* »
Essai sur l'entendement humain, chap. 6, §19
J. Locke

Résumé. Les représentations non-verbales, que ce soit des termes ou de leur définition, jouent un rôle important en terminologie. Comment ne pas citer l'exemple du dictionnaire multilingue de la machine outil de E. Wüster, fondateur de la terminologie moderne, où les connaissances du domaine sont représentées sous la forme de dessins techniques exprimés dans un langage figuratif et normalisé. Parmi les représentations non-verbales, les représentations formelles tiennent aujourd'hui une place prépondérante, en particulier avec l'apport des ontologies issues de l'ingénierie des connaissances. Ce tournant ontologique impacte la terminologie dans ses fondements et ses principes. Il amène à distinguer les définitions formelles des concepts, spécifications logiques et objectives, des définitions en langue naturelle. Il permet de normaliser ce qui peut l'être, à savoir les connaissances du domaine, et de préserver ce qui doit l'être, à savoir la diversité langagière. La langue, même scientifique et technique, ne se laisse pas normaliser.

1. Représentations non-verbales du concept

Les représentations non-verbales, que ce soit des termes ou de leur définition, jouent un rôle important en terminologie. Ainsi, la norme ISO 704 rappelle que les symboles « *constituent une aide importante pour les communications internationales, car la représentation visuelle des concepts au moyen de symboles est comprise dans toutes les situations, peu importe la langue* », la représentation non-verbale étant définie par la norme ISO 10241-1 comme une « *représentation d'un concept par d'autres moyens qu'un énoncé descriptif, tout en révélant les caractères de ce concept* ».

Cela n'est pas nouveau. Il suffit de voir la place qu'occupent les figures, schémas et formules dans les dictionnaires techniques. L'*Encyclopédie*, Dictionnaire raisonné des sciences, des arts et des métiers, nous le rappelle dans son discours préliminaire : « *De-là naît le besoin de Figures. On pourroit démontrer par mille exemples, qu'un Dictionnaire pur & simple de définitions, quelque bien qu'il soit fait, ne peut se passer de figures, sans tomber dans des descriptions obscures ou vagues ; combien donc à plus forte raison ce secours ne nous étoit-il pas nécessaire ? Un coup d'œil sur l'objet ou sur sa représentation en dit plus qu'une page de discours* ». Et comment ne pas citer l'exemple du dictionnaire multilingue de la machine outil de E. Wüster[1] où le dessin technique, exprimé dans un langage figuratif et normalisé, constitue une représentation non-verbale du concept reléguant les définitions en langue naturelle[2] au rang d'explications linguistiques (figure 1).

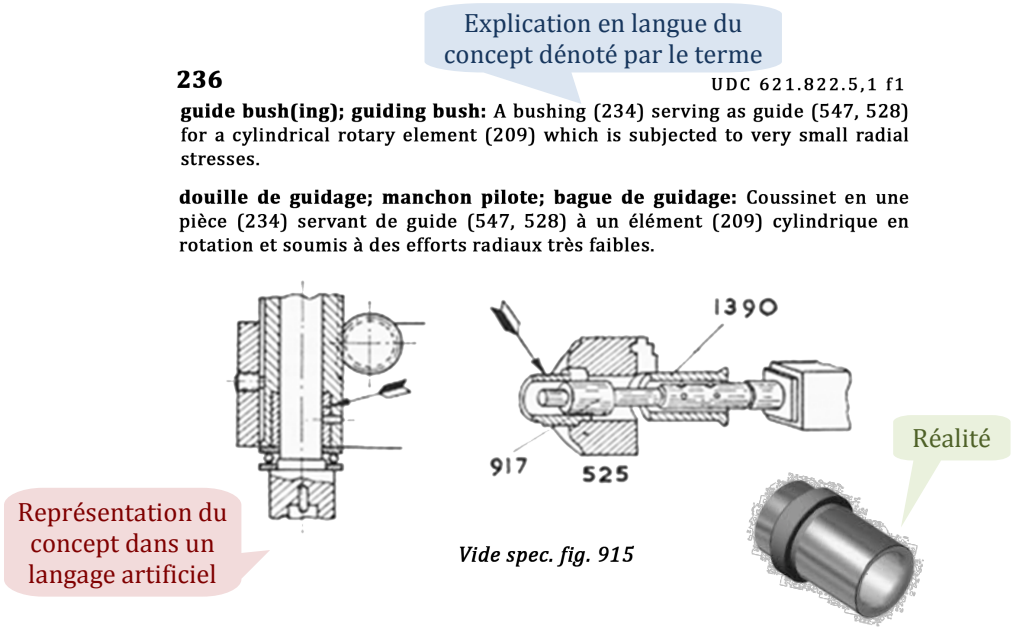

FIG. 1 : *Le dictionnaire multilingue de la machine outil de E. Wüster*.

Cela amène naturellement à distinguer la définition du concept de la définition du terme permettant ainsi la prise en compte d'informations connotatives trop souvent « oubliées » par la terminologie. Renouant avec les définitions de nom, de mot et de chose (Port Royal), la notion d'*onterme*, en associant terme et concept au sein d'une

[1] Considéré comme un des pères fondateurs de la terminologie dite « classique », Wüster (1968).

[2] On distinguera langue et langage. La première se référant à la langue naturelle et le second à un système artificiel de signes.

même entité, permet de concilier les dimensions linguistique et conceptuelle de la terminologie (figure 2).

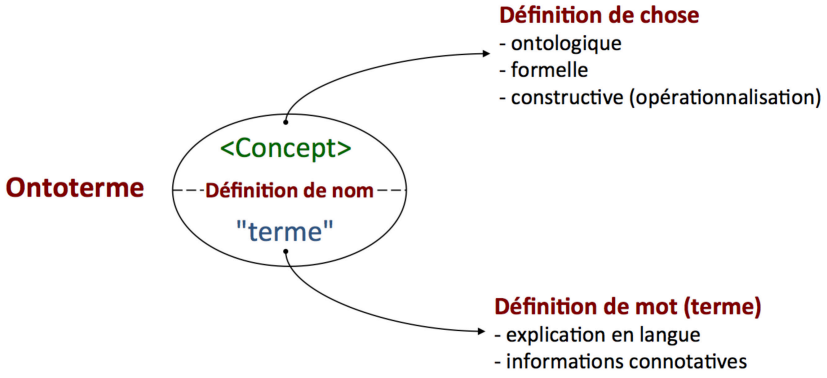

FIG. 2 : *L'ontoterme : définitions de nom, de mot (terme) et de chose (concept).*

Le terme est un signe, non pas au sens de F. de Saussure, mais au sens de G. d'Ockham où « *on entend par signe tout ce qui étant appréhendé fait connaître quelque chose d'autre*[3] ». Ainsi, le concept, connaissance extralinguistique, n'est pas confondu avec le signifié de la linguistique ; tout comme le terme qui est un mot, certes pas n'importe lequel, n'est pas confondu avec le nom du concept puisqu'ils relèvent de systèmes sémiotiques différents.

La définition du terme est généralement en terminologie une définition de chose. Exprimée à l'aide de mots donnant eux-mêmes lieu à interprétation[4], elle reste un discours sur le concept qui demeure inatteignable. Qu'on la considère comme une explication en langue de la chose désignée ou comme une description des usages du terme en discours, elle n'est pas à être obligatoirement normalisée.

A contrario, la définition du concept est une spécification formelle et constructive (au sens où elle donne lieu à la création d'une entité soumise à calculs). Normalisée, la représentation construite est assimilée au concept lui-même[5].

Le concept[6], par nature extralinguistique, requiert pour sa définition un langage spécifique dédié à l'expression des connaissances du domaine[7]. Un langage de

[3] Ockham (1993).

[4] « Cependant ces définitions, pour les choses naturelles et matérielles, ne peuvent guérir ce mal [idoles de la place publique], puisque les définitions elles-mêmes sont composées de mots et que les mots engendrent les mots » Bacon, *Novum Organum.*

[5] En intelligence artificielle, il suffit d'être représenté (au sens informatique) pour « exister », à rapprocher de la citation de Quine : « être, c'est être la valeur d'une variable liée ».

[6] La norme ISO 1087-1 définit le concept comme une « unité de connaissance créée par une combinaison unique de caractères ». Plus globalement, le concept peut-être défini comme une

définition de concept, s'il permet de s'extraire des ambiguïtés inhérentes à la langue naturelle[8], doit répondre à plusieurs critères. Il devra en particulier :

- supporter les principes épistémologiques sur lesquels reposent la conceptualisation[9] du domaine ;
- donner lieu à une représentation du concept et du système notionnel qui corresponde à l'idée que nous nous en faisons ;

et dans la mesure du possible :

- permettre l'écriture de définitions consistantes et objectives ;
- aboutir à une représentation du concept qui soit manipulable, par exemple à travers des modèles informatiques, condition nécessaire à toute opérationnalisation de la terminologie (à des fins de traitement de l'information par exemple).

2. Représentations formelles

Les langages formels, langages artificiels dont la syntaxe et la sémantique sont clairement spécifiées, permettent de répondre à tels critères. Ce ne sont pas uniquement des systèmes de symboles arbitraires dont les seuls arrangements régis par des règles en définissent le sens. Ils se veulent *idéographiques*[10] dans la mesure où ils visent à exprimer directement, sans passer par l'intermédiaire de mots, les

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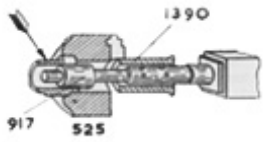
connaissance portant sur une pluralité de choses répondant à une même loi, que cette loi porte sur la nature des choses, leur structure ou leur état.

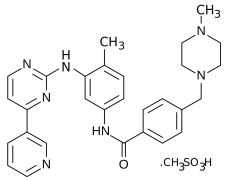
[7] Il ne faut pas confondre les discours sur la connaissance avec la connaissance elle-même. Ainsi, il n'y a pas de concepts dans un texte, mais uniquement des usages linguistiques se référant aux connaissances du domaine. La langue naturelle joue le rôle d'une métalangue par rapport au langage objet utilisé pour exprimer les connaissances.

[8] C'est « un moyen d'expression qui permette à la fois de prévenir les erreurs d'interprétation et d'empêcher les fautes de raisonnement. Les unes et les autres ont leur cause dans l'imperfection du langage », Frege (1971).

[9] Il n'y a pas de terminologie sans une théorie du concept.

[10] Ces langages s'*écrivent* avant d'être parlés : le symbole (mot écrit) n'est pas le signe d'un son (mot parlé), mais celui d'une chose, d'une idée. De même, si on ne peut pas ne pas « dire » une formule, par exemple l'expression mathématique 'f(x)' peut se lire « f de x » - quel sens cela-a-t-il d'un point de vue linguistique ? – certaines représentations ne peuvent être que commentées, expliquées, glosées, en aucun cas « lues ». C'est par exemple le cas des schémas techniques et des formules topologiques en chimie :





idées qu'ils combinent en une algèbre[11] fondée sur la raison. Ces langages sont le support de catégories de pensée sur lesquelles repose la conceptualisation du domaine.

Dans de tels systèmes, les définitions sont objectives au sens où leur interprétation est régie par la théorie indépendamment de toute interprétation individuelle : elles ne portent que sur les objets et leurs propriétés au regard d'une théorie et d'une communauté données. Elles sont consistantes pour les langages relevant de la logique au sens où elles constituent un système non contradictoire. Enfin, elles sont constructives dans la mesure où elles aboutissent à des représentations qui sont manipulables, en particulier pour les langages compréhensibles par un ordinateur[12].

Ainsi, dans le domaine des turbines hydrauliques (figure 3), le concept de <Roue Francis> s'exprimera en logique du 1er ordre par un prédicat de même nom défini comme la conjonction des prédicats [13] RoueHydraulique (x), SansAugets(x), SansPales(x) et AvecAubes(x) :

$$\text{RoueFrancis}(x) := \text{RoueHydraulique}(x) \wedge \text{SansAugets}(x) \wedge \text{SansPales}(x) \wedge \text{AvecAubes}(x)$$

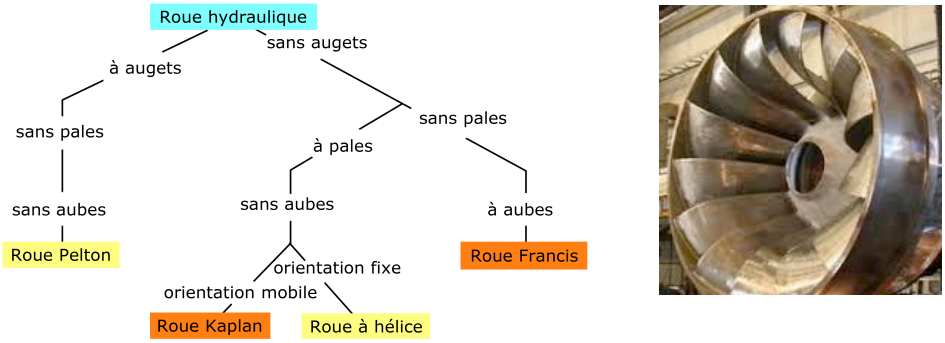


FIG. 3 : *Extrait de l'ontologie des roues hydrauliques définie à l'aide de l'environnement OCW (Ontology Craft Workbench) de l'Université de Savoie.*

[11] Ici considéré comme un ensemble d'éléments (idées et ses constituants) muni d'opérations internes (le résultat est un élément de l'ensemble). Par exemple, la définition d'un concept comme étant une combinaison unique de caractéristiques.

[12] Tout cela a un prix. Le champ du connaissable est limité par le pouvoir d'analyse et d'expression du langage formel : « 5.6 Les frontières de mon langage sont les frontières de mon monde » Wittgenstein (1922).

[13] En fait, la modélisation logique de la définition aristotélicienne en genre prochain et différence spécifique sur laquelle repose l'ontologie de la figure 3 requiert une logique différente, d'un ordre supérieur ou modale (quantification ou rigidité des prédicats correspondants aux différences).

Les langages formels ne sont cependant pas tous équivalents[14]. Ils n'offrent ni les mêmes fonctionnalités, ni les mêmes garanties. Le pouvoir d'expression dont dépend directement la conceptualisation, la capacité à entraîner le consensus, la vérification de propriétés telles que la cohérence, la possibilité de construire des représentations manipulables, sont parmi les plus importantes. Nous nous intéresserons ici à trois familles de langages de représentation visant des objectifs différents mais non incompatibles. Ils se différencient par les principes épistémologiques qu'ils véhiculent, c'est-à-dire leur définition du concept, par leur écriture, c'est-à-dire le système de signes qu'ils mobilisent, et les propriétés, en particulier logiques, qu'ils garantissent.

2.1 Représentations graphiques

Les notations graphiques, telles que les proposent par exemple les normes ISO[15] en terminologie, sont un moyen simple et visuel de représentation du système notionnel, facilement appropriable par tous, qu'ils soient experts, terminologues ou simples utilisateurs. Le système notionnel est visualisé sous la forme d'un réseau de concepts dont les liens représentent les relations entre concepts, qu'elles soient génériques, partitives ou associatives (figures 4 et 5).

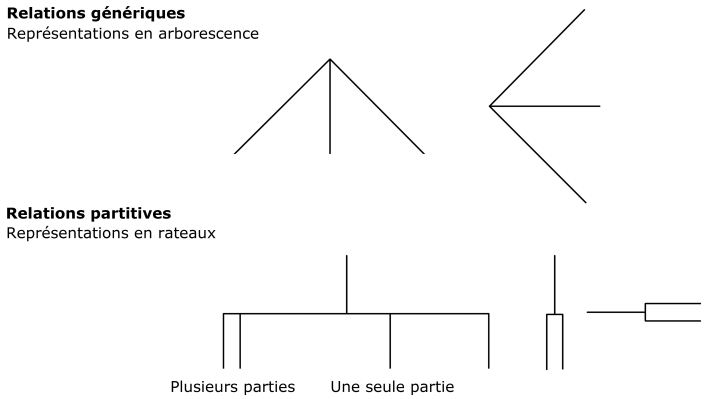


FIG. 4 : *Notation graphique des relations génériques et partitives [ISO 1987-1].*

[14] L'hypothèse de Sapir-Whorf sur le rôle de la langue dans le « découpage » de la réalité s'applique également aux langages artificiels, Sapir (1968).

[15] [ISO 1087-1] Travaux terminologiques - Vocabulaire, [ISO 704] Travail terminologique - Principes et méthodes.

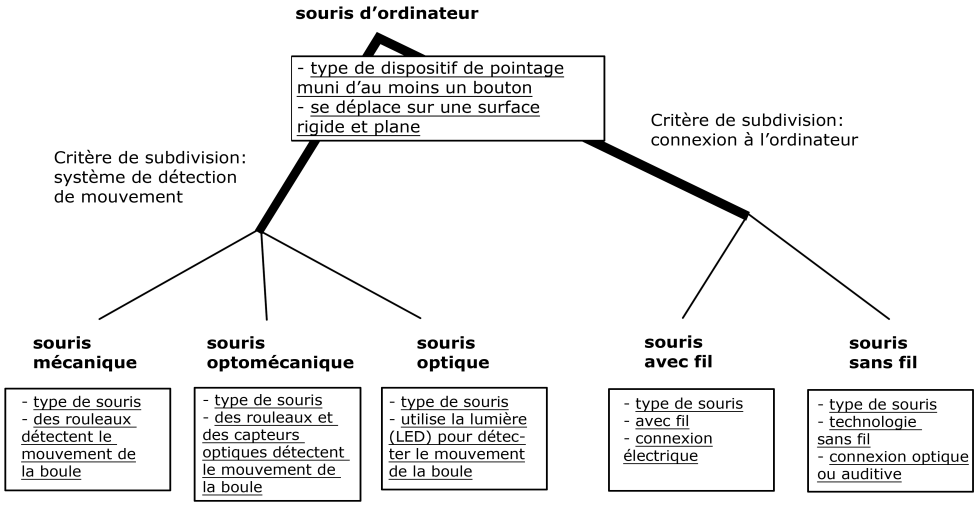


FIG. 5 : *Exemple de réseau conceptuel [ISO 704]*.

Les systèmes de notation graphique diffèrent selon les paradigmes retenus pour la conceptualisation et leur représentation visuelle ; ainsi la norme [ISO 24156][16] basée sur l'utilisation de UML[17] permet d'afficher le critère de subdivision d'un concept (figure 6).

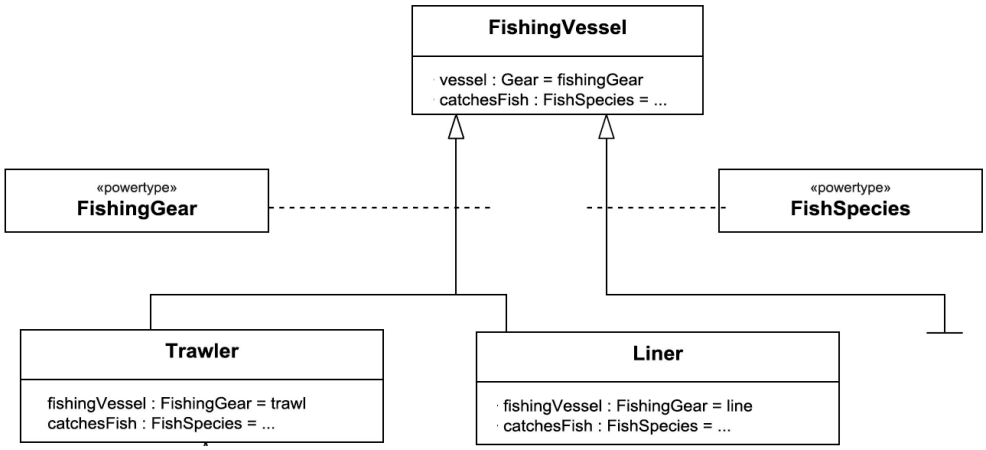


FIG. 6 : *Modélisation d'un système notionnel en UML [ISO 24156]*.

[16] [ISO 24156] Graphic notations for concept modelling in terminology work — Part 1: Guidelines for using UML notation in terminology work.

[17] UML (Unified Modelling Language) est un langage de modélisation graphique utilisé pour la spécification et la conception de logiciels.

Les représentations graphiques mettent principalement l'accent sur la visualisation du système conceptuel qui joue un rôle particulièrement important lors de sa construction mais aussi pour son appropriation. Ils ne visent pas nécessairement la formalisation[18] – on parle alors de langages semi-formels – ni la construction d'un modèle computationnel. Pour cela, il faut se tourner vers les langages logiques ou ceux issus de l'intelligence artificielle.

2.2 Langages de l'intelligence artificielle

Les langages de représentation issus de l'intelligence artificielle[19] permettent de construire un modèle computationnel du système conceptuel. En ce sens, les définitions sont dites « constructives » dans la mesure où elles produisent des entités manipulables par un ordinateur : objets, concepts et relations. Plus formels que dans le cas des représentations uniquement graphiques, ces systèmes permettent non seulement de vérifier certaines propriétés logiques mais aussi de raisonner sur ces entités : héritage de propriétés, construction de taxonomies, classification d'instances (objets), etc.

Le concept, plus souvent dénommé *classe*, est défini par un ensemble d'attributs décrivant[20] la structure commune aux objets d'une même classe. Ces objets diffèrent entre eux par les valeurs attachées à leurs attributs[21] correspondant à autant d'états possibles. Ainsi, la *capacité d'agitation*, la *viscosité maximale*, la *puissance du moteur absorbée*, les *plages de vitesse*, sont autant de caractéristiques décrivant un agitateur mécanique (figure 7) et dont les valeurs différencient les agitateurs entre eux.

Comme précédemment, les classes se structurent en un système hiérarchique par factorisation d'attributs (relation « est-un ») auquel s'ajoutent des relations de composition entre un tout et ses parties (relation partitive[22]) et des relations associatives (figure 7).

[18] Certains environnements incluent un minimum de formalisation comme la définition des signatures des relations, c'est-à-dire de leurs domaine et co-domaine qui spécifient le type des éléments mis en relation.

[19] Ces langages ont une longue histoire, des premières réalisations informatiques de la notion de schéma dans les années 70 jusqu'aux langages actuels du web sémantique.

[20] Qui décrivent plus qu'ils ne définissent.

[21] On parlera d'attributs valués.

[22] La relation partitive n'est pas une relation hiérarchique au sens où il n'y a pas subordination de la partie au tout comme il y a subordination de l'espèce au genre.

{{ Agitateur_helice_mecanique
is-a: Agitateur
has-part : (Moteur Arbre)
capacite_agitation: value
viscosite_maximale: value
… }}

FIG. 7 : *Définition*[23] *de la classe <Agitateur_a_helice_mecanique>*[24].

Cette approche basée sur la description d'une structure commune aux objets de la classe ne permet pas de regrouper des objets vérifiant une même propriété (valeur d'un attribut, relation mise en jeu, etc.) indépendamment de leur structure, par exemple, l'ensemble des agitateurs, quel que soit leur « type », dont la capacité d'agitation est supérieure à une valeur donnée.

2.3 Logique

La logique tient une place particulière en modélisation des connaissances. Une syntaxe et une sémantique claires et précises garantissent l'objectivité et la cohérence des définitions. Son formalisme universellement reconnu assure le partage des connaissances. Mais c'est surtout la définition du concept qui fait de la logique un langage incontournable : le concept, fonction à valeur prédicative[25], est une formule bien formée de la logique ouvrant ainsi la porte à une infinité de combinaisons. La définition de concepts par union et/ou conjonction de concepts existants conduit à une organisation sous la forme d'un treillis[26] dont la *KR Ontologie* de Sowa est un exemple (figure 8). Une forme, entité indépendante et abstraite, sera décrite par le prédicat unaire Form défini comme la conjonction des prédicats unaires Independent et Abstract : Form (x) := Independent (x) ∧ Abstract (x).

[23] En suivant une syntaxe proche du langage SRL (Schema Representation Language).

[24] Sur la base de la description d'agitateurs de la marque IKA.

[25] « Nous avons appelé de telles fonctions [dont la valeur est toujours une valeur de vérité] quand elles ont un seul argument concepts », Frege (1971).

[26] Un treillis est un ensemble muni d'une relation d'ordre partielle (inclusion) où tout couple de concepts possède une borne supérieure (disjonction) et une borne inférieure (conjonction).

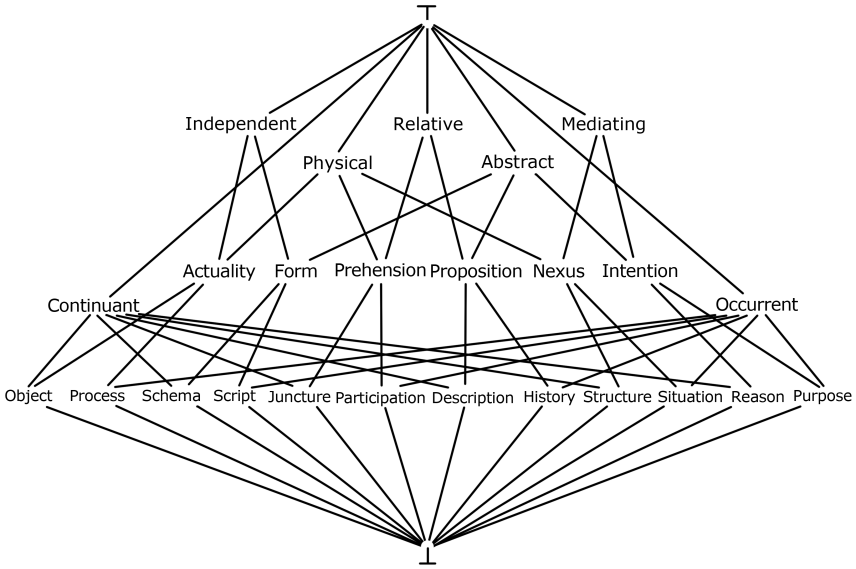


FIG. 8 : *La KR Ontologie de Sowa [Sowa (2000)].*

2.4 Choix du langage

Le choix du langage pour l'expression des connaissances du domaine est important dans la mesure où il conditionne notre vision du monde et sa représentation. Tous les langages formels ne sont pas équivalents. Il est donc important d'en connaître les principales limites et en particulier les catégories de pensée sur lesquelles ils reposent.

Ainsi, si les formalismes issus de l'intelligence artificielle, en regroupant les objets de description similaire[27], ont l'avantage d'être relativement naturels, il n'en demeure pas moins que l'essentialité des choses ne se laisse pas ainsi saisir[28]. Un concept est plus qu'une factorisation d'attributs valués. En effet, qu'est-ce qui fait que des attributs « tiennent » ensemble, forment un « tout » porteur de sens pour les experts du domaine[29] ?

[27] Tels qu'on les perçoit plus qu'on ne les pense : « *esse est percipi* » (« être, c'est être perçu »), Berkeley.

[28] « être mortel » n'est pas une qualité contingente, soumise « au plus et au moins », elle est essentielle à la définition de l'Homme – une caractéristique est *essentielle* si, retirée de la chose, la chose n'est plus ce qu'elle *est*.

[29] Le « nom » du concept (son identifiant) est un moyen pour exprimer le caractère essentiel de la chose, par exemple *mécanique* dans <Agitateur mécanique>. Il ne viendrait à l'idée d'aucun expert de « numéroter » les concepts sous prétexte qu'il a à faire à un système formel.

En restant sur ce dernier point, la logique n'est pas mieux armée pour traduire la nature essentielle des choses. La logique du 1er ordre, en mobilisant le seul paradigme de prédicat, ramènera sur le même plan, sans pouvoir les distinguer, le concept (Homme(x) par exemple), le caractère essentiel (Raisonnable (x)) et le caractère contingent (Malade (x))[30].

La conceptualisation d'un domaine se construit au regard de catégories de pensée (langue de l'intellection) indépendamment du langage d'expression qui sera *in fine* utilisé. Ces catégories permettent d'appréhender et de « mettre en ordre » la réalité selon des principes épistémologiques portant sur la description des choses, la définition des concepts et de leurs relations.

Il reste à préciser que si l'utilisation d'un même langage formel, dont la syntaxe et la sémantique sont clairement spécifiées, nous assure une certaine objectivité et cohérence des définitions, elle ne nous garantit pas pour autant un consensus sur les connaissances exprimées. Celui-ci dépend directement des principes épistémologiques qui auront été mobilisés lors de la conceptualisation.

3. Conclusion

Les représentations formelles du concept en terminologie constituent, avec l'introduction des ontologies au sens de l'ingénierie des connaissances (spécifications formelles d'une conceptualisation dans un langage compréhensible par un ordinateur), une des voies les plus prometteuses pour la terminologie et son opérationnalisation dans le cadre d'applications de traitement de l'information (aide à la traduction, gestion des connaissances, moteur de recherche sémantique et multilingue, etc.).

En explicitant le système conceptuel, le tournant ontologique impacte fortement la terminologie dans ses principes et ses méthodes. Elle distingue la définition du concept, spécification formelle et constructive, de la définition du terme considérée comme une explication en langue. Elle permet de normaliser ce qui peut l'être, à savoir les connaissances du domaine, et préserver ce qui doit l'être, à savoir la diversité langagière[31].

[30] Si l'introduction d'une « rigidité » de prédicat permet d'exprimer l'essentialité d'une caractéristique, elle n'introduit pas un nouveau paradigme qui traduirait cette notion. Elle s'exprime par une formule, vraie dans tous les mondes possibles, construite sur la base du seul prédicat.

[31] La contrainte de bi-univocité n'existe qu'au niveau du système formel, entre le nom du concept et sa définition, et non pas entre le terme et le concept. Réseau de concepts et réseau de termes ne se superposent pas, il ne faut pas confondre les discours sur la connaissance avec la connaissance elle-même.

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Abstract

Nonverbal representations of terms and their definition play an important role in terminology. Wüster's machine tool dictionary is a good example. The technical drawing is a nonverbal representation of a concept expressed in a figurative and standardized language. The definitions written in natural language then appear as linguistic explanations. Among the different kinds of nonverbal representations of concepts, formal representations hold a central place in terminology. If such representations, like ontology coming from knowledge engineering, allow operationalization of terminology for IT applications, they also impact the terminology work both in its principles and methods. Thus, definitions written in natural language, considered as linguistic explanations, are distinguished from definitions written in a formal language, considered as logical and objective specifications, thereby preserving linguistic diversity. Language, even specialized, does not let itself become standardized.

Depicting Specialized Concepts: Strategies for the Visualization of Terminological Knowledge

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Abstract. The representation and description of pertinent concepts have often been a major concern for terminologists. In Terminology, images have become just one semiotic mode for concept representation, which is the main goal of Specialized Knowledge Visualization (SKV), for concepts can both be represented verbally by terms and depicted by non-linguistic signs. SKV accounts for the embodied nature of specialized concepts and the multimodal representation of knowledge in terminological databases. In this article, we describe the SKV approach and present a principled selection of images for their inclusion in VariMed, based on the cognitive patterns which underlie knowledge processing: semantic relations and image-schemas.

1. Introduction

The selection of appropriate terms, and the representation and description of pertinent concepts have often been a major concern for terminologists, who manipulate information in order to construct meaning in terminological databases. According to most cognitive approaches to Terminology,[1] images are just one, albeit relevant, semiotic mode for concept representation, thus encouraging the transfer of knowledge between LSP users. This is the main goal of Specialized Knowledge Visualization (SKV), a terminological approach to the graphic representation of concepts in term bases, since both descriptive and prescriptive theories argue that concepts can be represented verbally by terms and depicted by non-linguistic signs, since "pictorial representations can completely assume the function of both terms and definitions".[2]

[1] Kress (2009), Faber (2012), Prieto Velasco & Tercedor Sánchez (2014).

[2] Galinski & Picht (1997) 55.

SKV[3] accounts for the nature of specialized concepts and the multimodal representation of knowledge in terminological databases. One issue, however, remains unclear: what are the criteria for the selection of images to depict specialized concepts?

According to SKV, term bases should look for the convergence of the conceptual, visual and linguistic information contained in specialized texts. After having successfully applied our approach to EcoLexicon and VariMed, two research projects on environmental and medical terminology, in this article we describe the SKV approach and present a principled selection of images for their inclusion in term bases on the basis of the cognitive patterns which underlie knowledge processing: semantic relations and image-schemas.

Section 2 offers some background information about the theoretical framework of our research, based on the Frame-based Terminology theory and the Specialized Knowledge Visualization approach. In Section 3 we present the VariMed project, in which we are building a terminological database containing terms and variants designating diseases, signs and symptoms. Section 4 explains the foundations of an experiment about the representativeness of medical images. Section 5 envisages some prospective research within VariMed. Finally in Section 6, we provide some concluding remarks.

2. Theoretical framework

Since the 90s, terminological theories have evolved from a predominantly linguistic position towards a social, communicative point of view. These days, moreover, Terminology has borrowed some of the main premises of cognitive theories of learning and knowledge acquisition: embodiment and situatedness. Our theoretical framework is also rooted in cognition, since we conceive concepts as mental construals whose meanings arise from our everyday interaction with the surrounding environment. It is our experience which conditions, if not determines, what we know about the outside world and how we perceive it.

2.1 Background

ISO 10241-1: 2011 and ISO 24156-1: 2014 describe the different types of definitional data categories which could be used in term bases to define concepts and represent them in terminographical resources through intensional definitions, definitional contexts and ostensive definitions.[4]

[3] Prieto Velasco (2008), (2013); Prieto Velasco & López Rodríguez (2009); Prieto Velasco & Faber (2012).

[4] *Cf.* ISO 12620:2009.

Since the beginning of our research, both in VariMed and in previous projects, we were aware that terminological databases should seek to integrate different data categories, that is, rather than simply including terms, definitions, contexts, etc., terminologists need to look for the convergence of non-linguistic modes and assess their representational value from a semiotic and semantic point of view.

2.2 Frame-based Terminology

One of the most recent cognitive-oriented approaches to Terminology is Frame-based Terminology (FbT). This theory has been described by Faber and her colleagues from the LexiCon research group, based in the University of Granada, in a number of projects on environmental and medical terminology. FbT was first described from a lexical-semantic perspective, although it has evolved to become one of the leading cognitive accounts of specialized knowledge. FbT aims at describing specialized language in a relational database through a series of microtheories: semantic, syntactic and pragmatic.[5]

On the one hand, the semantic microtheory tries to explain the internal representations of concepts in the form of definitions, which can help build a hierarchical structure of the generic-specific relations IS_A/TYPE_OF and HAS_PARTS/PART_OF. On the other hand, it describes the external representation of concepts by focusing on the relations between them (objects, processes and attributes). The syntactic microtheory, in turn, contributes to a better interpretation of multiword terminological units through the identification of recurrent structural patterns. Finally, situatedness plays an important role in the pragmatic microtheory, since the embodied nature of the concepts they designate points to larger situational, linguistic, and cultural contexts. This is why recontextualization is necessary to make both internal and external representations more meaningful.

2.3 Specialized Knowledge Visualization

As we have just explained, not only does Frame-based Terminology describe the internal representations of concepts (hierarchical definitions built upon generic-specific relations), but also their external representations (linguistic and non-linguistic designations such as terms, appellations, symbols, contexts and images). Pragmatically, such external representations arise from our situated, embodied conceptualization of the real world. This enables knowledge acquisition, both specialized and general knowledge. Hence, our knowledge about health, disease and pain, for example, comes from our contextualized experience, which makes medical concepts and the designations we use to name them more meaningful.

[5] Faber (2013).

According to ISO 10241-1: 2011, images are *deverbalized terms*, and then they are "representations of a concept by means other than a descriptive statement, while revealing characteristics of this concept".[6] In fact, images define concepts through nonverbal representations in the form of demonstrative or ostensive definitions, complementary to intensional definitions and defining contexts.

One of VariMed's primary objectives is to find a consistent criterion to integrate graphic representations into a medical terminology database in order to facilitate medical knowledge acquisition and transfer among potential users, doctors and patients alike. In order to achieve coherence within a single term entry of the database, images need to be consistent with the conceptual information provided in definitions and lexicalized in the use of terms in context.

The role of images in scientific and technical texts has been dealt with in previous studies,[7] thanks to which we could specify the relationship between the level of specialization of texts and certain features of images like iconicity and abstraction. These are key notions in the analysis of the communicative efficacy of images, from a pragmatic point of view.

Nevertheless, given that iconicity and abstraction features are to a great extent concept-dependent, it becomes necessary to investigate medical image representativeness on the basis of how we understand reality. Then, Prieto Velasco & Tercedor Sánchez argue that *image schemas* help interpret an image's semantic content, or even decipher the meaning of concepts which may appear obscure for non-experts.[8] Image schemas can also be used to enhance coherence between images, definitions and contexts.

In spite of the opposing views of those who argue that images are no longer mere complements to linguistic definitions,[9] and those who hold that nonverbal representations should not replace concept definitions,[10] what remains clear is that the selection and description of images in terminological databases must not be random, since they are useful in certain domains like Medicine, where denominative variation is mainstream, in order to distinguish between different terms for a single concept.[11]

The study of images as graphic representations in terminological databases is known as Specialized Knowledge Visualization (SKV). It is based on the semiotic principle that terms, images and symbols are representations of the same concept

[6] ISO 10241-1:2011, 3.

[7] Prieto Velasco & Faber (2012); Prieto Velasco & López Rodríguez (2009); Prieto Velasco (2008).

[8] Prieto Velasco & Tercedor Sánchez (2014).

[9] Galinski & Picht (1997) 55.

[10] ISO 10241-1:2011, 27.

[11] Tercedor Sánchez (2011).

using linguistic and/or non-linguistic codes, which come from a shared situated conceptualization we use to communicate experiences.

Consequently, to fully integrate definitions and images and achieve internal coherence, we should encourage intersemiotic translation between different representations. This is why we need to describe images included in VariMed. To this end, each term entry specifies some of the main features of images (specialization, iconicity and representativeness) with a view to more pertinent information retrieval by users with heterogeneous profiles, different prior medical knowledge, communicative needs and information expectations.

3. The VariMed project

The objectives of VariMed are the following: (i) to create a corpus of medical texts in English and Spanish multimodal communication contexts; (ii) to register and classify terminological variants in English and Spanish and study their semantic and pragmatic features from the perspective of situated cognition; (iii) to carry out a series of experimental studies that will provide insights into the phenomenon of variation in relation to the cognitive processes of lexical production and comprehension; (iv) to generate a multifunctional and reusable lexical resource in the field of health care, with image support for linguistic research, translation, and technical writing for knowledge dissemination.

Denominative variation is a key element in medical communication, both at the intralinguistic level (heartburn-*gastroesophageal reflux*) and at the interlinguistic level (chicken pox-*varicella*). A close study of the phenomenon reveals cultural and cognitive patterns typical of various groups of speakers in a given language community. Variation can result from usage-based (idiolectal, sociolectal, chronolectal, ethnolectal, dialectal variants) and user-based differences (mainly based on register: field, tenor and mode) between terms.

VariMed differs from existing databases of medical terminology in that it is primarily aimed at researchers and non-experts who need to know how diseases, signs and symptoms are named in accordance with certain communicative and situational factors, namely: the usage context of terms with regard to register, users, usage, etc. Since, term variants usually highlight certain features of concepts or address the user's level of expertise for cognitive reasons, VariMed intends to become a major source of information about medical language, for research purposes, in the field of cognition and linguistics.[12]

As a result, a terminological database of medical concepts has been built and is currently being developed within the field of anatomical pathology,[13] containing

[12] Tercedor Sánchez, López Rodríguez & Prieto Velasco (2014).

[13] http://varimed.ugr.es/.

terms and term variants naming diseases, signs and symptoms. The following figures illustrate a sample entry for DIABETES MELLITUS TYPE 1, the terms which designate the concept and the features of one of its variants.

Figure 1 shows the main interface of VariMed, where users can choose between concept browsing, image browsing and advanced queries. In the top left display menu, they can also change their queries by variant, category, language, register and familiarity. Sample images and definitions are displayed in presentation mode.

FIG. 1 – *Access screen to VariMed*.

After finding the concept DIABETES, we need to refine our search by choosing the corresponding subordinate concept DIABETES MELLITUS TYPE 1, which is a type of diabetes which needs to be treated with insulin, as shown in Figure 2.

vocabulario médico | varimed | acerca de varimed | equipo | publicaciones | privado

inicio | consultas | más

concepto | exacto | buscar

concepto	variante	categoría	idioma	cat. gramatical	registro	familiaridad
DIABETES	diabetes	enfermedad	en	sustantivo	neutro	
DIABETES	diabetes mellitus	enfermedad	en	unidad fraseológica	formal	
DIABETES	azúcar	enfermedad	es	sustantivo, m	informal	
DIABETES	diabetes	enfermedad	es	sustantivo, f	neutro	
DIABETES	diabetes mellitus	enfermedad	es	unidad fraseológica, f	formal	
DIABETES MELLITUS INSULINODEPENDIENTE	diabetes mellitus type 1	enfermedad	en	unidad fraseológica	formal	
DIABETES MELLITUS INSULINODEPENDIENTE	insulin-dependent diabetes mellitus	enfermedad	en	unidad fraseológica	formal	
DIABETES MELLITUS INSULINODEPENDIENTE	juvenile diabetes	enfermedad	en	unidad fraseológica	neutro	
DIABETES MELLITUS INSULINODEPENDIENTE	T1DM	enfermedad	en	unidad fraseológica	formal	
DIABETES MELLITUS INSULINODEPENDIENTE	type 1 diabetes	enfermedad	en	unidad fraseológica	formal	

<< | < | > | >> 33 resultados (página 1 de 4)

FIG. 2 – *Results for the query DIABETES.*

By clicking on the desired concept, we can access the main entry and find concept-related information: definition, conceptual category (disease, organ, sign, or symptom), linked concepts (TYPE_OF), affected organs, images, and term variants). In this screen, the main features of images are shown (degree of specialization, iconicity/abstraction, and resemblance). In this case, the image clearly matches the definition [chronic disorder of metabolism characterized by increased blood glucose as a result of deficient insulin production] by depicting diminished insulin molecules attracted by cell receptors resulting in a diminished glucose uptake by cell transporters and, consequently, increased levels of sugar in blood. Non-experts will probably find it difficult to understand or even recognize the concept depicted (for example, glucose molecules are conventionally represented by a hexagon for their six carbon atoms); for the sake of knowledge transfer, they would probably need a more iconic, less abstract image, which would make it more representative for a lay audience. On the contrary, experts and people with some prior knowledge may consider it quite useful and would have no problem, for example, in recognizing glucose molecules conventionally represented as hexagonal crystals, for they obviously know glucose is a monosaccharide with a six-carbon backbone. Thus, the image shown in Figure 3a can be regarded as highly specialized, quite similar to the glucose-insulin imbalance in blood (iconic) and with a medium level of representativeness, and well-suited for experts and users with some prior expertise.

Users can also browse the variants designating the concept, as shown in Figure 3b, both in English (diabetes mellitus type 1; insulin-dependent diabetes; juvenile diabetes) and Spanish (*diabetes autoinmune; diabetes de inicio súbito*). Each variant seems to point to a certain feature of the concept. Then, insulin-dependent diabetes highlights the treatment needed; juvenile diabetes recalls the age at which the disease shows a higher incidence; *diabetes autoinmune* points to the aetiology of the problem, whereas *diabetes de inicio súbito* refers to the fact the disease does not start progressively, but with an abrupt increase of blood glucose levels.

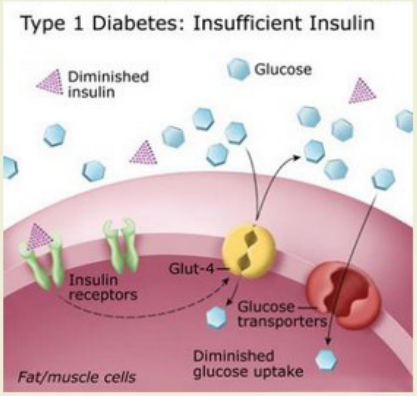
concepto*	DIABETES MELLITUS INSULINODEPENDIENTE
definición*	trastorno metabólico crónico caracterizado por un aumento de los niveles de glucosa en la sangre debido a la deficiente o nula producción de insulina.
tipo*	enfermedad
conceptos asociados	• DIABETES MELLITUS INSULINODEPENDIENTE tipo de **DIABETES**
órganos	• sistema endocrino
imágenes	**You have Type 1a if: Your immune system is so overactive that it is destroying normal beta cell tis** (subido por juan antonio) especializacion alta representatividad media semejanza 

FIG. 3a – *Terminological entry for the concept* DIABETES MELLITUS INSULINODEPENDIENTE.

variantes	• **diabetes mellitus type 1** (en) • **insulin-dependent diabetes mellitus** (en) • **juvenile diabetes** (en) • **T1DM** (en) • **type 1 diabetes** (en) • **diabetes autoinmune** (es) • **diabetes con propensión a la cetosis** (es) • **diabetes de inicio súbito** (es) • **diabetes insulinodependiente** (es) • **diabetes juvenil inicial** (es) • **diabetes mellitus insulinodependiente** (es) • **diabetes tipo 1** (es) • **DMID** (es)
asociado a variantes	
creado por	juan antonio 27/11/2013
revisado por	juan antonio 25/02/2014

FIG. 3b – *Terminological entry for the concept* DIABETES MELLITUS INSULINODEPENDIENTE.

Users can proceed to the lexical information about terms by clicking on each of the variants. Figure 4 shows information provided about grammar (nouns, verbs, adjectives, phrases, etc.), language, register, and other marks (Graeco-Latin origin, MeSH heading, ICD name, etc.) and a 1-4 scale of familiarity.

variante*	diabetes mellitus type 1
concepto*	**DIABETES MELLITUS INSULINODEPENDIENTE** enfermedad
categoría gramatical	unidad fraseológica
idioma*	en
registro*	formal
otra marca	• Nomenclatura MeSH / DeCS • origen grecolatino
dimensiones	
uso geográfico	
familiaridad	2 (escala de 1 a 4, de menor a mayor familiaridad)

FIG. 4 – *Linguistic information for the term* DIABETES MELLITUS TYPE 1.

4. A study of image representativeness and variation

As mentioned above, previous research has revealed that the degree of specialization of images is closely linked to the text in which they appear and the concept depicted. Highly specialized texts tend to include more abstract and less iconic depictions, whereas iconic non-abstract images are more likely to appear in popular science texts. However, the issue of representativeness has not yet been explored from a terminological perspective; that is why SKV requires further research into what images users of terminographical resources, experts and non-experts alike, deem representative.

There seem to be several image-concept traits which need to be taken into consideration, some of which have already been studied. Despite that, a new study should be undertaken to examine how people conceive specialized concepts and how they expect them to be depicted in terminological databases.

A study is currently being conducted to assess the representativeness of medical images in terminological databases. Four stages have been designed surveying different user-profiles:

- English-speaking lay people. State: completed.
- English-speaking healthcare providers. State: in progress.
- Spanish-speaking lay people. State: preliminary results obtained.
- Spanish-speaking healthcare providers. State: in progress.

Our hypothesis is that image-schematic pictures are most representative of the concept depicted because they graphically convey basic experiences rooted in our knowledge about the world. For this reason, we intend to survey both expert and non-expert Spanish-speaking and English-speaking users through the experimental online applications Qualtrics and Lime Survey.

Users are asked to reply to a 50-item survey where they have to choose the picture they deem most representative of the term underlined in the preceding sentence. Register variants are also studied in order to observe whether more or less specialized terms have an influence in the representativeness of images. Each item contains three pictures as distractors and one image-schematic picture as a competitor. Results are analysed considering a chance rate of 0.25.

4.1 Preliminary results

So far, only English-speaking and Spanish-speaking lay users have been surveyed, therefore only preliminary results can be presented in this article, which means that they need to be considered with caution.

In general, image-schematic pictures appear to be preferred both by English-speaking (38%) and Spanish-speaking users (42.8%). Moreover, in the case of Eng-

lish-speaking non-experts, register does not influence image selection to a great extent, since similar results have been obtained in the case of formal specialized terms (37.2%) and informal accessible terms (39.3%). For Spanish-speaking non-experts, however, formal terms apparently show a closer relationship with image-schematic pictures (47.7%) than informal terms (37.9%). As a consequence, a) we have not been able to identify any linguistic or cultural constraints for image selection, and b) formal terms in Spanish are more likely to trigger the selection of image-schematic pictures.

Trying to find an explanation for these figures would be somewhat hasty, since further analysis is still required. Nevertheless, Spanish informal language appear to lead to the selection of images depicting everyday scenes, for example, when representing pain-related concepts like toothache (vs. *odontalgia*) or headache (vs. *cephalalgia*). In these cases, Spanish-speaking lay people seemed to prefer images showing patients with gestures of discomfort with their hands close to the painful area. Be that as it may, we also need to continue researching among experts in order to be able to contrast data and reach significant conclusions.

5. Prospective research

As mentioned above, we can only present preliminary results at the moment since healthcare professionals have yet to be tested, and our study is still in progress. In order to offer a holistic view of the representativeness of medical images as considered by the potential users of the terminographical database VariMed, we need to obtain data from medical experts and compare the results.

For this reason, English-speaking doctors and nurses are being tested at the University of Lancaster (United Kingdom), while Spanish-speaking professionals are currently being tested at the Universidad Pablo de Olavide (Seville, Spain).

6. Conclusions

VariMed aims at researching, from an experimental perspective, the issue of denominative variation in Medicine, and to design and populate a terminological database accounting for such term variants both in Spanish and English, as well as their graphical representations.

It is our assertion that Specialized Knowledge Visualization contributes to a better understanding of the semantic content of concepts, and facilitates knowledge transfer by experts and knowledge acquisition by nonexperts. To this end, terminological databases should be enriched with multimodal resources (images and audio files).

However, the selection of such resources should be criterion-based and carried out in a principled way. Among the useful criteria we have already identified in this

and previous studies are: the conceptual relations between concepts, the information provided by definitions and contexts, and the underlying image-schemas – because they can be regarded as conceptual primitives which arise from our everyday interaction with the surrounding environment and are rooted in our experience in the outside world.

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Résumé

La représentation et la description de concepts pertinents revêtent pour les terminologues un intérêt majeur. Dans le domaine de la terminologie, les images sont devenues un moyen sémiotique parmi d'autres pour la représentation du concept, qui est l'objectif principal de la *Specialised Knowledge Visualisation* (SKV). En effet, les concepts peuvent être représentés à la fois par des termes verbaux et par des signes non linguistiques. La SKV prend en compte la nature de concepts spécialisés et la représentation multimodale des connaissances dans les bases de données terminologiques. Dans cet article, nous décrivons l'approche de la SKV et présentons une sélection d'images incluses dans VariMed, sur la base des schémas cognitifs qui sous-tendent le traitement des connaissances: les relations sémantiques et les image-schémas.

Perceptual Cognitive Systems of Knowledge Representation and Communication in Organisations: the New Frontiers of Terminology

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Abstract. Starting from specialized language, terminology draws its resources mainly from texts. On account of this, the term is almost exclusively a linguistic unit. However, when one studies the terminology of knowledge which must be mustered by a company or organization in order to achieve results, it becomes apparent that this knowledge may rely on other ways of formalizing the conceptual processes in the specialized communication of experts. On the one hand, specialized experts allow knowledge from different origins to coexist; secondly, they use nonverbal forms reflecting both their needs and the circumstances. Therefore, terminological description cannot rule out other means of transmitting terminological information where knowledge and information involve other non-linguistic means of cognitive perception.

1. Introduction

"Terminology is the study of terms of a field of knowledge" is a very common and useful presentation of terminology. It is defined in ISO 1087 as the science that studies "the structure, formation, development, usage and management of terminologies in various subject fields". These definitions are brief and precise, but call for further reflection in the case of companies and organisations (hereafter simply referred to as organisations). If one assumes that the activities carried out by organisations are based on knowledge referred to by staff in their work, and that staff, when they express what they do in such activities, thereby shape and specialise the natural language they use for their own communication needs (= company-speak or organisation-speak), then it is legitimate to explore the terminology they use in such knowledge communication. The question to be addressed here is: "What has to be known to perform a task, and how is it formalised and expressed"? At the same time, knowledge, in the context of a company, is neither a single unit nor is it isolated. It interacts with other bodies and fields of knowledge, and becomes part of the cultural behaviour of the organisation. In other words, people do not only know one thing. In the workplace, staff comprises specialists and experts in their field,

[1] The author thanks Patrick Leroyer for his valuable comments and suggestions.

without the knowledge of which they could not carry out their tasks. In their communication, they use verbal terms, simultaneously supported by nonverbal forms. Consequently, the non-linguistic nature and usage of such terms needs to be explored in order to generate a full picture of the terminology of organisations.

In this article, we will present evidence of other cognitive supports of concepts, different from those of natural language and used by organisations. By "support" we mean the tangible and accessible aspect of a term (as opposed to the intangible aspect of a verbal form). ISO 1087 defines the object as "anything perceivable or conceivable",[2] and, thus, terms are objects. In the case of natural language, the support can be visual or aural data (or tactile, if we consider Braille). The sensate representation of concepts, which helps people construct, communicate and share their knowledge in order to optimise the results in their work, requires a perspective of analysis quite different from considering only the linguistic aspect. In fact, Wüster made provision for other types of signs in his General Theory of Terminology (6.1.1).

As already mentioned, staff in companies use knowledge from different and various origins and fields of knowledge. For example, an aircraft pilot's knowledge is not limited to his knowledge of physics: he also uses his knowledge of law, his company's internal and external regulations, his own job, etc. This means that the terminology of aviation does not fulfil the terminological needs of an airline pilot. Aviation, considered as a field of knowledge, does not cover every cognitive need of a pilot, and likewise for numerous other jobs. Individual employees carrying out various tasks in companies or, indeed, independent workers gather knowledge from the different origins and fields of knowledge needed in their work.

The notion of "field" appears too narrow, and at the same time much too wide, as in the case of an airline pilot. It is therefore useful to recategorise this notion, bearing in mind that the cognitive needs of the staff in an organisation may call for quite different fields. Some people's knowledge overlaps with that of others, and the overall organisational knowledge in an organisation involves a useful chain in order to optimise results. It is what Roqueplo[3] calls a 'savoir-décalé' – a knowledge "shift" – which is very important for a company in the chain of its actions: one must know one's own activity and also part of the activities of other members of staff. A business is the result of the many activities of many people working together, not just of one person.

Many types of knowledge are involved in aviation. Breaking down a field of knowledge into different subfields of activity enables us to distinguish effectively between for example different types of aviation. They all share the same laws of physics, but each has specific cognitive and communicative needs, such as for example, civil aviation, military aviation, sports aviation or private aviation. At the

[2] ISO 1087:2000, 3.1.1.

[3] Roqueplo (1990).

same time, fields of activity can be subdivided into operational fields, which allows for alternative terminologies used by different companies operating in the same field of activity. For example, two different airlines use different terms for their own cognitive and communication needs.[4] This situation gives rise to a specific sociolect, a company-speak,[5] which includes terms from other fields of knowledge and activity, such as human resources, marketing, etc. A term like 'charge' (*forfait*) may belong to a field of knowledge (commerce, services), and be used in a field of activity (mobile telephones). But the generic definition of 'charge' will not carry all the business references of the term in a field of operations such as in the case of a specific company.

2. From the linguistic support to a variety of supports

There seems to be a gap between knowledge, as expressed in language for special purposes (LSP), and professional activity. Professionals need more than texts in LSP: they also rely on – and to a great extent require – sensorial experiences, which means that perceptions of how to do things also have to be taken into account. Professions and knowledge are interdependent. Therefore, much more than only linguistic knowledge is required for performing a given task.

It is true that natural language has a central place in terminology, but it should be specified however, that Wüster gave priority to the graphic form as opposed to the phonic form.[6] In fact, purely linguistic treatment limits the impact of work carried out by the staff of a company. Currently, information science is central in the terminology management of a specific knowledge or activity field and is generally text-based, but speech should not be excluded or marginalised. Information is often only expressed orally and never produced in the form of written and computer-readable texts. Staff must, however, be considered as experts. They may use words and utterances in their work which are rich in information and crucial for their communication, but will never be written down. Their messages may also take other forms than these, *e.g*. use the Braille system. Thus, natural language can be accessed through sight, hearing or touch, and it is the channel used which is important for our purposes. Insofar as a term in an organisation is a sign whose perception depends on the type of channel used, it is necessary to redefine it in an adapted way. It should not be defined only in natural language and, as stated above, Wüster included such units of knowledge and specialised communication in his classification of signs.[7]

Staff in organisations should have a shared vision and a consensual view of the concepts and processes upon which their actions are founded in order to achieve the

[4] de Vecchi (2005).

[5] de Vecchi (2005), (2013).

[6] Wüster (1998), 0.2.2.3.

[7] Wüster (1998), §6.

results expected by the organisation.[8] In this way, a term is consensual mainly in its form, which has been agreed upon, and its capacity to represent a concept. It then becomes "standard" within the community of users.[9] Terms used by the community cannot be satisfactorily defined following ISO 704 alone, which states "A term is a designation consisting of one or more words representing a general concept in a special language".[10] ISO 1087 also fails to provide a full definition: "Verbal designation of a general concept in a specific subject field".[11] In light of these two definitions, one question must be raised here: are these definitions really suited to encompass the case of organisations in which experts construct, express and share their knowledge? Not in our view. In a community such as an organisation, we suggest that a term should be seen as the semiotic and dynamic result of a conceptualisation process;[12] as such, it is part of the knowledge of every expert in interacting fields. Shared experiences and a common vision are prerequisites – although not the only ones – to term recognition in natural language.

Natural languages can convey any semiotic system. We can use French or English to read a mathematical formula or road signs. These impart information and construct knowledge, and are also language-independent. In many professions and companies, several competing semiotic systems are used simultaneously, and staff must master their diversity. When someone learns how to perform his job, he does not necessarily state in natural language all the activities he carries. This state of affairs is reflected in Polanyi's famous statement "We can know more than we can tell".[13] Operational and/or experiential knowledge are at work. Indeed, nobody would be able to learn how to cook, ride a bicycle, swim or drive purely on the basis of texts in which propositional knowledge is stated in natural language and is independent of experiences that accompany that knowledge. What is also needed is operational knowledge and it is impossible to drive or learn how to drive while ignoring information conveyed by other semiotic systems such as road signs. Driving requires knowledge from many fields other than merely driving. A pilot is in the same situation. These situations are so common that they are normally overlooked. In our opinion, the failure to pay attention to the importance of this obvious part of the real world is partly due to the fact that information sciences mainly explore digital data or digitally-transformed data – principally texts using propositional knowledge – in order to be processed. But besides texts that convey part of necessary knowledge and that have to be seen, heard, or touched (as in

[8] Midan & Potteck (2004).

[9] *Cf. normaison* [usage-based standardisation], Gaudin (2003).

[10] ISO 704:2009, 7.2.1.

[11] ISO 1087:2000, 3.4.3.

[12] de Vecchi (2010).

[13] Polanyi (1966), 4.

Braille), other senses are also required to acquire, construct or represent knowledge which is necessary to carry out an action or a job, or to manufacture a product.

At the same time, actions carried out by staff and accompanied by the use of terms are not normally considered to be part of terminology work. In a company, what must be known in order to achieve a conceptual process is not only what terms mean, but also by whom and how, as well as how to proceed, and this may very well call for other systems. The whole conceptual domain is part of the knowledge of a company and is used to communicate and transfer knowledge between experts, and thus a holistic, terminological approach is needed.

Staff may use other ways to construct and transmit their knowledge when engaged in a business activity. All five senses may be used in their activity and, perhaps, used concomitantly. In consequence, other "supports" of term construction, dissemination, and application will normally emerge, particularly in businesses in which sensory constructs are part of the core business of the organisation. Among these activities we can find much evidence of nonverbal term constructs in olfactory marketing, as well as in the textile, painting, signalling or food industries, to name just a few. Knowledge is expressed through such channels, but how is this sensorial experience transformed into terms, and how is it formalised? Nonaka and Takeuchi state: "The basic role of practitioners is the embodiment of knowledge".[14] In the famous case of the bread machine, the programmer Ikuko Tanaka learned how to make bread from the baker at the Osaka International Hotel; then she expressed the activity through short statements (*e.g.* make the propeller move with more force, move faster). These were interpreted by engineers who transformed the statements into instructions in the form of mental and physical operations in order to design and operate the machine. What is important here is that different actions were identified, named, sequenced and transformed into instructions to the machine in order to obtain a result. The example of the propeller movement prompts us to reflect on the nature of "what has to be known".

3. Perception and cognitive material supports

3.1. Sight

Terms expressed in natural language generally take one of two forms: visual or auditory (and tactile in the case of Braille). In the field of aviation, when a marshal directs an aircraft on the ground, he uses his arms to communicate with the pilot and make statements meaning *e.g.*: "Turn to your right", "Place yourself facing me", "Move ahead", "Slow down", "Stop", "Cut engines" and "Connect to ground power" are conveyed through gestures.[15] At night, the same signs are conveyed by

[14] Nonaka & Takeuchi (1995), 152.

[15] http://en.wikipedia.org/wiki/Aircraft_marshalling.

the use of light sticks (since a marshal would not be seen in the dark). The knowledge conveyed by these gestures which leads to actions is part of aviation knowledge and communication. Knowledge and communication are here codified in a symbolic, semaphoric system which is not linguistically motivated (by either phonemes or graphemes), but which relies on a series of perceptual cognitive supports translated into natural language.

In railway signalling, a similar method is used both day and night, as well as whistles. A message like "Slow down" can be expressed through movement, or a sequence of long-short, long-short, long-short whistles, represented "_._._." in documents. These signals are standardised. Once a manoeuvre has been established, the signal conveying the relevant information may be transmitted through various channels. We thus have: one concept, one term, three supports. There can be no doubt about the interpretation of a sign, whether it is viewed (in one of two ways) or heard. If such instructions are part of an LSP in the form of linguistic expressions, the other nonverbal supports must also be taken into account since the knowledge they represent is also necessary.

This conative function of language[16] is also found in the use by some companies of icons rather than discourse to represent concepts. This enables the company to avoid translating all their instructions into many languages. The furniture company IKEA only translates the assembly warnings (about 20 words) into 33 languages, whereas the rest of the instructions are essentially iconic. The company Brita, a producer of water filters, does the same to demonstrate the use of a domestic water filter. In both cases, the result is that something expressed in natural language can also be expressed and perceived using other supports. The value of such supports is significant and should not be ignored.

3.2. Touch

The French "Centre National de Resources Textuelles et Lexicales" (CNRTL) defines velvet as follows: "fabric made of cotton, wool, silk, etc. that generally has a matt and smooth back side, and, on the front, a soft lustrous surface of short upright tight pile" (*étoffe de coton, laine, soie, etc. qui présente généralement à l'envers une surface mate et lisse, à l'endroit une surface lustrée et moelleuse, formée de poils courts, dressés, serrés*).[17] The expression "velvet" is clearly explained in a language for general purposes (LGP), but it is not qualified or adapted for a particular company that produces velvet, nor is the industry (field of knowledge) LSP either. The LSP of the textile industry (field of activity) is more precise, but only the LSP of a particular weaver's work (field of operations) may include what the business requires in terms of experience and perception through the sense of touch.

[16] Jakobson (1963), 213-214.

[17] CNRTL, velours: http://www.cnrtl.fr/definition/Velours.

This is important when distinguishing manually produced fabrics from mechanical or industrial fabrics, and this difference may finally be reflected in the price (*e.g.* in the case of carpets). As with the bread machine, procedures have to be conveyed via formalised instructions. There are many types of velvet. General-language definitions do not fully reflect all the knowledge of an expert. For example: "Lyons Velvet: A densely woven, stiff, heavier-weight pile velvet used for hats, coat-collars and garments." "Pile-on-pile Velvet: A particularly luxurious type of velvet woven with piles of differing heights to create a pattern"[18] or "*Le velours ciselé est un velours avec des poils rasés selon diverses formes. Le velours côtelé est en coton avec des diverses dispositions des fils en trame*."[19] But, if there is no visual or tactile referent, the knowledge remains incomplete.

A natural-language definition may well inform a non-specialist, but a specialist requires more information. In the case of velvet (and apart from the name), an expert/specialist knows considerably more about it and needs to refer to the texture and appearance, which are part of his knowledge of velvet. It may well be difficult to conceive that a term can have a tactile support, but it cannot be denied that tactile characteristics are part of the cognitive processes that contribute to distinguishing – and, thus, defining – one concept/object from another. It would be interesting to investigate how blind people describe such processes in order to distinguish different objects using touch.

3.3. Taste

The systematic exploration of sensate marketing (sensory branding) has a history of a few decades. It is a technique that calls on the senses of the consumer via visual, auditory, tactile, gustative, or olfactory marketing. The last of these was greatly developed during the 1990s. The subject of wine description has been extensively treated in the literature. It is mainly linked to the gustative experience (and also to the retro-olfactive experience). The taste of cherry is only conceivable to someone who has already tasted a cherry and remembers it. The food industry and its marketing departments pay close attention to these phenomena because their markets depend heavily on the consumers' taste.

All agree on four main characteristics of taste (sweet, sour, salted, acid) apart from any subjective consideration, and on five characteristics when we include umami (recognised in 1908 by the Japanese Kikunae Ikeda). But the industry must find the right formula (a designation), one that customers are willing to buy and which is much more specific than these five tastes. For example: "cola taste" is not sufficient when different types of cola have to be distinguished. The artificial flavour corresponds to a formula and to a fabrication process, but the expected commercial

[18] http://en.wikipedia.org/wiki/Velvet.

[19] Yahoo! Questions réponses, Maison et jardin.

result is adjusted to correspond to a specific taste (vanilla, orange, etc.). As in the case of touch, it is difficult to speak about the gustative support of a concept or term, but it is impossible to ignore experience and experiential knowledge when naming tastes.

3.4. Smell

Taste and smell are closely linked. In both cases, descriptive precision is a key component in the construction and composition of the required knowledge in the food and perfume industries. In contrast to that of the other senses, the language of smell is weak. Candau and Jeanjean mention "olfactory silence".[20] Many smells have no name. In a recent linguistic study of smells,[21] the authors point to a problem of denomination and designation: is it smell of lemon, smells like a lemon, lemon-smell? The olfactory lexicon is unstable and smell sensations are difficult to describe and name, and so is their categorisation:[22] is it smell of lemon, citrus, fruity, vegetal, natural?

Two main types of smell have been distinguished: natural and artificial. This type of marketing attempts to make a referential link between a smell and a product based on the sensations felt by the consumer. When this is achieved, the result is a referential link represented as: molecule X → sensation X → product X → purchase X. The function of the smell is to influence the consumer's behaviour in places like hotels, bakeries, aircrafts, shops for luxury products, etc.

One of the companies in France working in this market is Emosens which presents five "universes" in its catalogue (see Table 1), using suggestive names within each universe (e.g., coffee, vanilla, chocolate, log fire, musk, paint, new car), and sometimes names of unknown suggestion (Bubble Gum, Dandy, Iceberg, Palm Beach), which it is necessary to smell in order to establish the referential link between the name and a smell.

[20] Candau & Jeanjean (2006), 51.

[21] Kleiber & Vuillaume (2011).

[22] Dubois (2006).

	Smell terms
Universe "Nature"	Sandalwood, Fig, Cedar, Forest, Melon, etc.
Universe "Gourmet"	Bubble Gum, Strawberry Candy, Malabar, Vanilla, Vanille/Bourbon, Milk sugar, Chocolate, Peanut Brittle, Coffee, Roasted Coffee, Brazil Coffee, etc.
Universe "Elegance"	Aoud, Light Aoud, Blue man, Dandy, Musc, Musc Blanc, Musc Brun, Musc Gris, Poudre de Musc, Rock'n Roll, So British, Seduction, Silks, Yacht, etc.
Universe "Escapism"	Alaska, Indian Dream, Iceberg, Modern Orient, Palm Beach, Escapade, Sea sprays, etc.
Universe "Thematic"	Fireside, Log Fire, Fireside, Paint, New Car, etc.

TAB. 1 – *Emosens' smell terms.*

These smell names and universes are part of Emosens' company-speak in their field of operations. They contribute and belong to the knowledge of Emosens. These terms have a value insofar as the referential link is established for both staff and customer. There seems to be quite a gap between the field of knowledge (*e.g.* learning the perfume industry in a school like the IPSICA in France), the sector of industry in which it is applied (*e.g.* olfactory marketing) and the field of operations (Emosens). While the perfumer knows how to obtain his fragrance (which differs from those of his competitors), the consumer only recognises brands. Only smell makes it possible to distinguish and differentiate between Guerlain, Carven, Puig, and Creed Vetiver.

3.5. Hearing

We have not systematically explored the world of sounds so far. Nevertheless, we want to mention here that sounds may be closely linked to a company as part of its identity and that, in some cases, they may replace verbal communication. For example, in the SNCF (the French national railway company), a short tune or jingle precedes all train announcements. Much in the same way, Airbus Industries and Boeing use very different sounds for the types and origin of intercom calls inside their aircraft (emergency, pilot, flight attendants, passengers), and these are company-speak terms. What must be memorised and known is what each sound means and which actions to perform.

4. The semiotic triangle revisited

Ogden and Richards formalised the semiotic triangle in 1923.[23] Klinkenberg includes stimulus in his 4-sided model of the sign.[24] Before we understand (or misunderstand) a sign, we must perceive it. A stimulus has to be perceived. Then, we establish a link between a symbol (term), a concept, and its referent (object). In the examples we saw above and from the point of view of what has to be known in fields of knowledge, activity and operations, sensate experience contributes greatly to the cognition of staff in their work. In other words, a term is also intimately linked to the way it is perceived. It therefore seems necessary to widen the idea of term to include its mode of perception, which the first model of the triangle does not (FIG. 1).

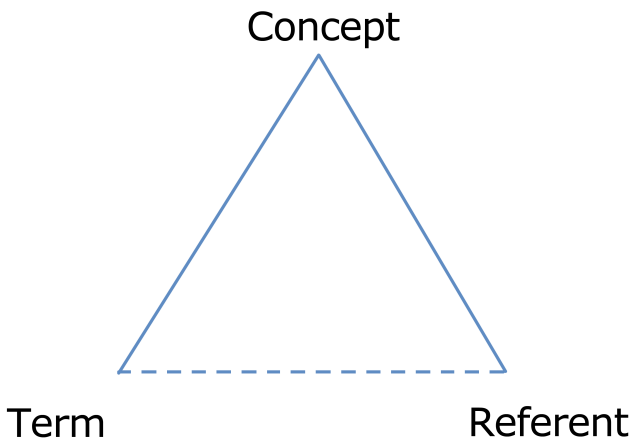

FIG. 1.*Ogden and Richards' semiotic triangle in the case of terminology*.

We therefore suggest elaborating a new model (Fig. 2 below) in which the term appears through – and is identified *firstly* via – its mode of perception, and is *subsequently* formalised as a term. Depending on the situation, what people need to know in order to perform a task is not limited to the appropriation of terms through speech by listening (phonemes) or reading (graphemes) because their knowledge also requires sensate experience via other channels. In short, terms are not only linguistically-motivated symbols; they are also cognitively-motivated and -generated mental spaces that are triggered by perceptual, indexical and iconic sign systems. In that sense, terms are truly multimodal.

[23] Ogdens & Richards (1923), 11.

[24] Klinkenberg (1996), 72.

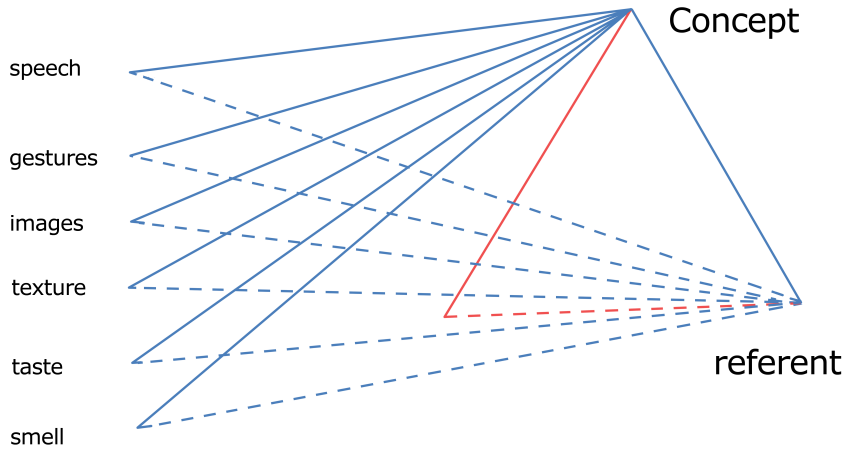

FIG. 2. *Semiotic triangle including modes of perception.*

5. Conclusion: terms as perceptual cognitive blends in the workplace

The analysis of experience leading to knowledge or to knowledge transformed into action should not ignore the possible simultaneity of different term-supporting channels, because part of the central information is actually encoded in the support and, thus, is a constituent part of the term and of all its characteristics.

In the workplace, special languages are not the only medium for the exchange of messages, and the way messages are shaped is also part of the knowledge related to the workplace. The perceptual dimensions of terms "transporting" information or "contributing" to communication also belong to knowledge. In consequence, besides written documents other types of communication channels containing terms need to be considered. Terms are units of information and knowledge, but they are also truly polymorphic and multimodal in the sense that they may also depend on sensate experience providing them with a specific "support", thus triggering corresponding perceptual cognitive blends. We have shown some examples of perceptual terminological multimodality above, but further research is required in order to map out the systematic aspects of cognitive supports, spaces, frames, and blends in all aspects of organisations' knowledge at work and, particularly, in knowledge interaction and communication. Such new insights have vast consequences for the selection, description and systematic representation of terminologies in organisations, be it specialised lexicographic resources or ontology-based knowledge bases.

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Résumé

En partant de langue spécialisée, la terminologie puise ses ressources principalement dans les textes. De ce fait, le terme est une unité linguistique de manière quasi exclusive. En revanche, si l'on cherche la terminologie des connaissances à mobiliser par une entreprise ou une organisation pour obtenir des résultats, on s'aperçoit que ces connaissances peuvent s'appuyer sur d'autres manières de formaliser les processus conceptuels dans la communication spécialisée chez les experts. D'une part, les experts-spécialistes font coexister des connaissances en provenance de différentes origines et, d'autre part, ils utilisent des formes non-verbales motivées par leurs besoins et selon les circonstances. En conséquence, la description terminologique ne peut écarter d'autres supports terminologiques où la connaissance et l'information font appel à d'autres moyens de perception cognitive non-linguistiques.

Perceptual cognitive systems

L'espace du concept, la parole de l'image : pour une typologie des représentations non-verbales dans la terminologie des tissus

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Résumé. La pratique du rapprochement visuel a toujours été privilégiée dans le domaine de la mode, afin de préciser la description du concept et de fixer le rapport entre concept, image et terme correspondants. Cette pratique offre un espace de représentation non-verbale efficace dans la communication entre producteurs/créateurs et grand public. L'analyse d'un cas d'utilisation des représentations non-verbales en terminologie diachronique illustre des représentations de la mode et du textile sous le Second Empire, au moment de la création des premiers colorants artificiels et de la diffusion de l'impression sur étoffe. Fait suite la présentation de deux produits terminologiques différents du secteur de la mode contemporaine : le premier construit pour la commercialisation de leur production dans les pays asiatiques, et le deuxième ayant recours aux représentations non-verbales, en fonction des buts de la communication professionnelle. Ces modèles peuvent constituer l'exemple d'une typologie de représentations verbales et non-verbales dans une terminologie professionnelle spécialisée.

1. Introduction

La pratique du rapprochement visuel a toujours été privilégiée dans le domaine de la mode, afin de préciser la description du concept et de fixer le rapport entre concept, image et terme correspondant. Cette pratique offre un espace de représentation non-verbale efficace dans la communication entre producteurs/créateurs et grand public.

Notre analyse se développe en deux parties. D'abord, nous allons proposer un cas d'utilisation des représentations non-verbales en terminologie diachronique, grâce à l'analyse des représentations de la mode et du textile sous le Second Empire, au moment de la création des premiers colorants artificiels et de la diffusion de l'impression sur étoffe. À une époque où fleurs, rayures et ornements orientalistes envahissent le textile, les ateliers du tapissier et de la couturière travaillent aux étapes de mise en forme des textiles et de leurs accessoires (passementeries, dentelles, broderies et rubans...) : d'une part, l'image met en code les nouvelles créations et, d'autre part, elle met en scène les textiles dans la diversité de leurs usages.

La deuxième partie concerne l'illustration de deux produits terminologiques du secteur de la mode contemporaine qui montrent l'organisation différente de représentations non-verbales en terminologie, en fonction des buts de la communication commerciale et professionnelle :

- un glossaire de la maison Versace envisagé pour la commercialisation de leur production dans les pays asiatiques,
- un cahier de tendances pour le cuir.

Ces modèles, tous exploités dans le monde de la mode, peuvent constituer un exemple d'une typologie des représentations verbales et non-verbales dans une terminologie professionnelle spécialisée.

2. Des représentations non-verbales en terminologie diachronique

L'augmentation et l'intensification des échanges commerciaux internationaux caractérisent l'époque des Lumières et le textile constitue l'une des composantes essentielles de la croissance économique. Au XVIIIe siècle, le lexique autour du dessin, des toiles et des soieries, de tous les biens qui font l'objet du commerce extérieur de la France était un lexique ouvert à la diffusion internationale. Ferdinand Brunot rappelait la foule de noms des draps et d'étoffes de laine et de fil pour lesquels une Ordonnance, adressée aux marchands drapiers, sergiers, ouvriers et façonniers des villes, bourgs, et villages du royaume, fixe les largeurs des pièces[1]. Il soulignait le foisonnement lexical de ce vaste domaine et il se demandait d'où venait toute cette créativité lexicale autour des noms des étoffes :

« Ainsi, qu'on songe à la soierie, qui n'est pas enfermée, je le veux bien, dans la région lyonnaise, qui y a du moins peu à peu fixé son centre principal et qui s'y est développée par de continuels perfectionnements. La *canuserie* a formé elle-même son dialecte, qui s'est modifié, mais vit encore.

Dans d'autres cas, plusieurs pays ont concurremment pratiqué une industrie, tissage, filature, clouterie, exploitation de carrières, etc. D'où des nomenclatures propres, normande ici, là angevine ou ardennaise[2] ».

Des noms d'étoffes qui ne se produisent plus, des noms de fantaisie occasionnels et sans rapport avec aucun référent forment des listes terminologiques dont la définition est difficile à saisir.

[1] AA.VV. (1701), 1-2, *in* Brunot (1930), 393.

[2] *Ibid.*, 393-394.

La langue du savoir technique se trouve à la frontière du linguistique, du cognitif et de l'épistémologique. Il est difficile d'imposer des priorités de procédés dans la création lexicale, puisqu'elle se produit dans une alternance entre la présentation de dénominations étudiées, qui vont de pair avec la création notionnelle (les nouvelles productions textiles), et la profusion - voire l'ambivalence – de la terminologie technique, qui passe du niveau de la production à celui de la commercialisation des produits. Cette terminologie fait référence au monde du luxe français, qui fait école aujourd'hui encore en tant que point de repère international. Tout au long du XVIIIe siècle, la production d'objets de qualité est liée à la demande de la noblesse, mais ces produits commencent à devenir objet d'engouement de la part de la bourgeoisie même, ce qui commence à donner naissance au commerce des boutiques parisiennes. L'essor économique et commercial contribue à la diffusion des termes, des produits et des productions: si la renommée de la production des manufactures françaises se répand, ce sont les termes de tous ces objets qui en sont les ambassadeurs principaux[3].

Dans le *Supplément* à l'*Encyclopédie méthodique*[4], l'*Avertissement* de la section concernant les tissus relève l'ensemble de noms confus et disparates pour désigner les étoffes chinoises, indiennes et persiennes et se plaint de l'état de cette nomenclature:

« Traitant des matières qui entrent dans la fabrication des diverses étoffes, & décrivant les procédés d'où résultent celles-ci, j'ai dû, tout au moins, dénommer chacune d'elles; mais mon embarras a été grand, je l'avoue, lorsqu'il a été question de parler des étoffes étrangères, principalement de celles de la Chine, des Indes, de la Perse, & autres contrées lointaines. Des marchands ignorants, des voyageurs aventuriers & autres, aussi peu instruits que les premiers, nous ont donné un amas de noms mal entendus, mal compris, mal rendus, prononcés ou écrits d'une manière par ceux-ci, d'une autre manière par ceux-là; ce qui a souvent donné lieu de supposer divers objets où il n'en existait qu'un seul, & de faire une nomenclature si bizarre, qu'on n'auroit su l'imaginer plus[5] ».

Il ne faut pas oublier que la nécessité de la représentation non-verbale de la fabrication des tissus était présente dans l'*Encyclopédie* de Diderot et d'Alembert : il suffit de lire les pages concernant le métier textile et de voir les planches relatives aux sections des machines-outils, des armures, pour comprendre l'importance de l'image pour diffuser les nouveaux savoirs techniques de la production des tissus (fig. 1).

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[3] *Cf.* Zanola (2014), 129-130.

[4] Panckoucke (1790).

[5] Zanola (2014), 173-183.

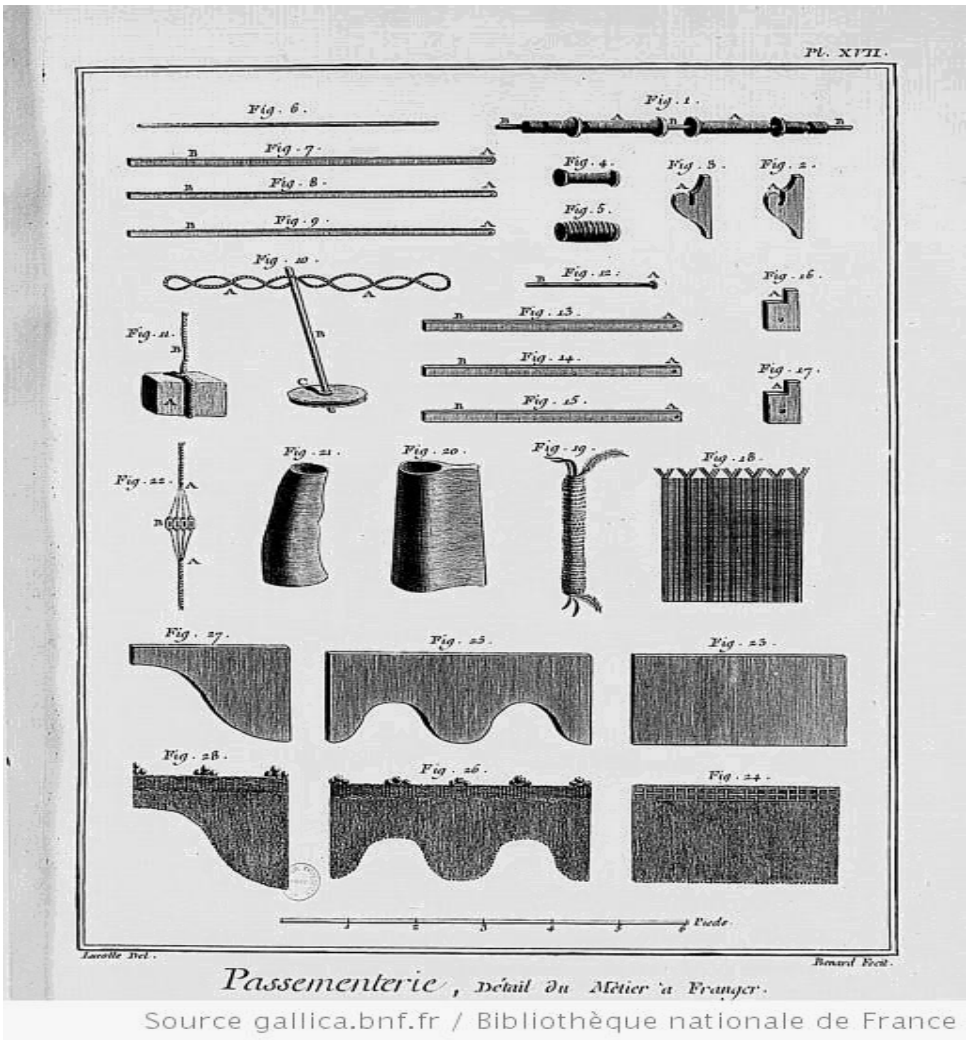

FIG. 1 – *Des franges, passementerie. Détails du métier à franger. Encyclopédie, pl. XVII (http://gallica.bnf.fr/ark:/12148/btv1b2100119j).*

Répertorier les images sous le Second Empire

L'analyse des représentations de la mode et du textile sous le Second Empire offre l'occasion d'observer les modalités de diffusion de la terminologie de la mode dans les documents écrits qui accompagnaient la production. Il faut rappeler que la période 1852-1870 est particulièrement féconde pour ce secteur. Les dessinateurs

industriels utilisent les nombreux livres d'ornements disponibles pour proposer un large choix de motifs évoquant tous les styles européens et orientaux[6].

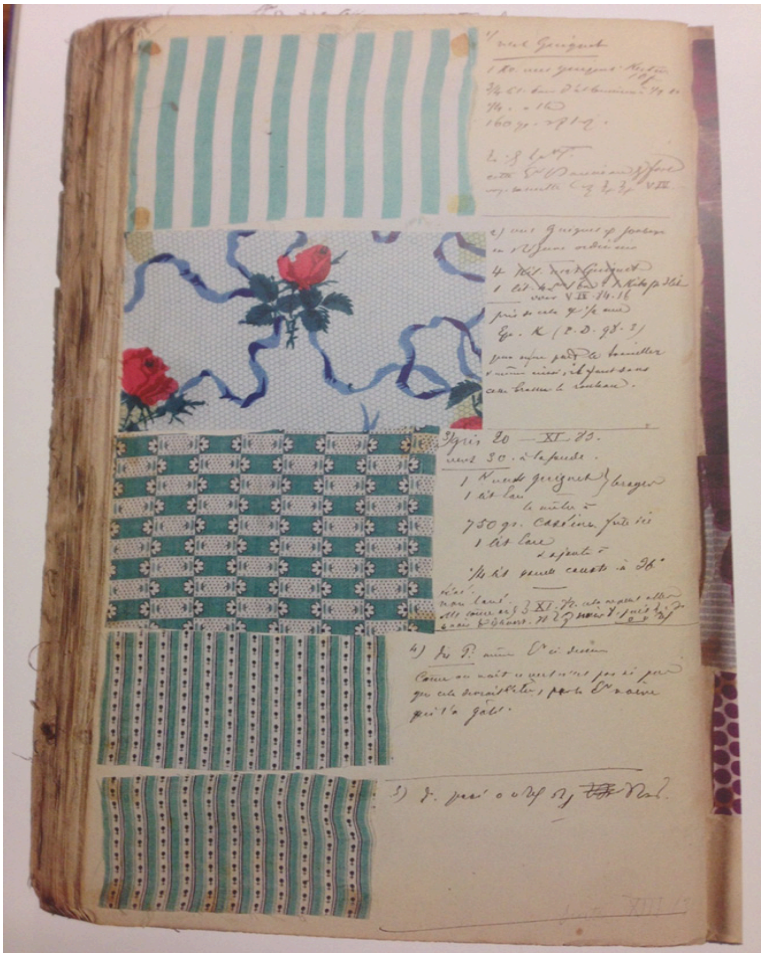

FIG. 2 – *« Carnet avec échantillons de toiles de coton imprimés et glacées », Cahier de laboratoire, Essais vapeurs et applications, Manufacture Fries-Robert, Kingersheim (1854-1855); Mulhouse, musée de l'Impression sur étoffes.*

Le Second Empire est marqué par un bouleversement économique et créatif dans le monde de la mode, avec un extraordinaire épanouissement de l'industrie du vêtement. C'est une époque où la création des premiers colorants artificiels et la diffusion de l'impression sur étoffe vont ouvrir les portes à de nouvelles productions.

[6] *Cf.* Starcky & Dubois-Brinkmann (2013).

Grâce à la mécanisation de la production textile, le vêtement se répand et la figure du couturier trône en maître : c'est celui qui dicte les tendances qui seront reprises par les grands magasins et les magasins de confections, et qui seront imitées par les petites couturières et les marchandes à la toilette.

Les représentations non-verbales jouent le rôle actif de repères de connaissance pour le lexique spécialisé : la pratique du rapprochement visuel étant une pratique privilégiée dans le domaine de la mode, permet de préciser la description du concept et de fixer le rapport entre concept, image et terme correspondant. Cette possibilité de créer un espace de représentation non-verbale est très utile dans la communication entre producteurs/créateurs et grand public. L'image met en code les termes de ces nouvelles créations mettant en scène les textiles dans la diversité de leurs usages.

Livres d'échantillons, carnets avec échantillons, registres de dessins, gouaches, lithographies, gravures, panneaux, dessins préparatoires, empreintes constituent l'ensemble des représentations non-verbales des tissus du second Empire. Un travail de préparation qui était un art en soi, alors qu'aujourd'hui les photos et l'audiovisuel remplacent l'ensemble de cette mise en scène des nouveaux produits. Le Musée de l'Impression de Mulhouse conserve de nombreux exemples de représentations non-verbales accompagnés de la description et de la terminologie relative : il suffit de citer les échantillons (fig. 2 et 5), les gravures et les lithographies (fig. 4) et les dessins (fig. 3).

FIG. 3 – *Registre de dessins caractéristiques; Manufacture Hofer-Grosjean, Mulhouse 1866-1871.*

FIG. 4 – *Gravure de mode pour robe ; Manufacture Steinbach, Koechlin et Cie, Lacour & Morin dessinateur ; Mulhouse-Paris 1867, lithographie.*

FIG. 5 – *Manufacture Thierry-Mieg & Cie, Échantillon avec oiseaux, coraux, coquillages et flore ; coton, toile imprimée à la planche ; Mulhouse, Musée de l'impression sur étoffes.*

3. Un glossaire pour la commercialisation de la production

Quelle est la limite entre la terminologie de la production, qui ne sort pas des ateliers, et celle de la commercialisation, qui partant des ateliers envahit le marché, déversant toute la fantaisie évocatrice dans la dénomination des tissus ? Il est possible que cette distinction ait toujours suivi l'histoire de la terminologie des tissus, ainsi que Brunot le rappelait. Cependant, il est vrai également que le XIXe siècle marque la naissance de la haute couture et du prêt-à-porter, suite aux inventions des premiers métiers mécaniques qui ont changé le travail sur le filage : au XVIIIe siècle la *mule-jenny* ou jeannette, une machine à filer à énergie hydraulique, le métier Jacquard, qui permet de réaliser des motifs complexes grâce à un seul ouvrier et, à partir de 1830, la machine à coudre de Barthélémy Thimonnier.

Si la production en série permet la démocratisation de la mode, en parallèle naît la haute couture, pour laquelle le grand couturier – un artiste plus qu'un artisan - crée des vêtements qui doivent être des pièces extraordinaires, faites pour éblouir et non pas pour être portées au quotidien. Tant le catalogue que l'illustration de mode font partie du stylisme pour l'élaboration de motifs, d'imprimés, pour la réalisation des planches pour des magazines et sont le point de référence pour la présentation de nouveaux modèles et de nouvelles collections. La distinction entre haute couture et prêt-à-porter se démocratise aussi, grâce aux systèmes des licences qui ont permis à la haute couture de griffer sacs, chaussures, bijoux : la haute couture influence le prêt-à-porter jusqu'à se confondre. Dans ce dialogue de création et de commercialisation, le rôle joué par les tissus semble disparaître en faveur de l'intérêt porté sur la gamme des vêtements que le secteur de l'habillement génère. Dans cet article, nous focalisons notre attention sur un glossaire conçu au sein d'une maison de la haute couture, Versace, réalisé en 1989 par une société japonaise pour les besoins linguistiques de la communication professionnelle.

Le *Quadrilingual Fashion Glossary*[7], en quatre langues – français, japonais, anglais et italien – compte environ cinq mille mots les plus fréquemment utilisés dans le vocabulaire de la mode et de la couture. Il rassemble des termes de divers domaines allant du costume à la couleur et au matériau, en passant par les accessoires et la bijouterie, jusqu'à l'outillage pour la couture et le tricot et aux activités commerciales. Les quatre langues sont présentées de la manière suivante : le mot français, pris comme référence de base, se trouve dans la colonne de gauche et à droite apparaissent les équivalents, dans l'ordre, japonais, anglais et italien. En français et en italien, la catégorie grammaticale est donnée entre parenthèses après chaque mot. Quatre-cents termes de mode les plus utilisés sont illustrés dans un appendice, et indiqués en japonais et en anglais (fig. 6 et 7).

[7] Miyao (1989).

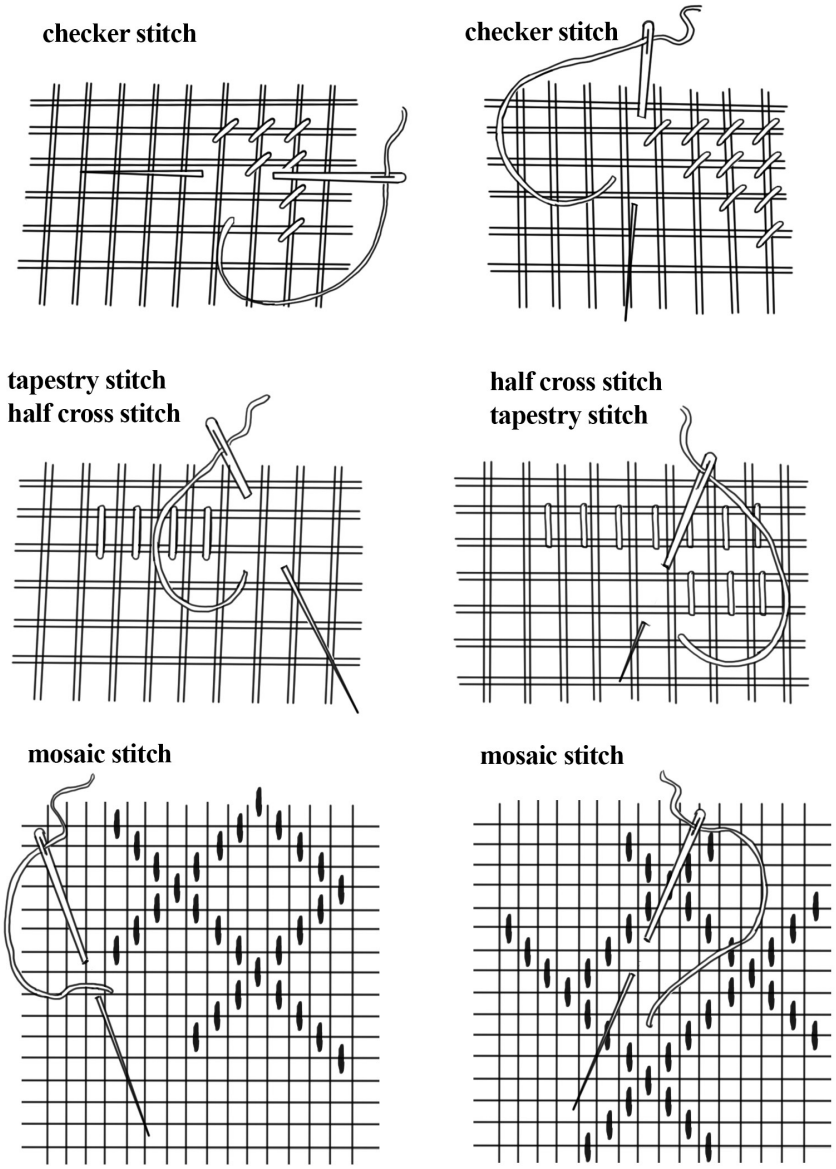

FIG. 6 – *Types de point, Quadrilingual Fashion Glossary.*

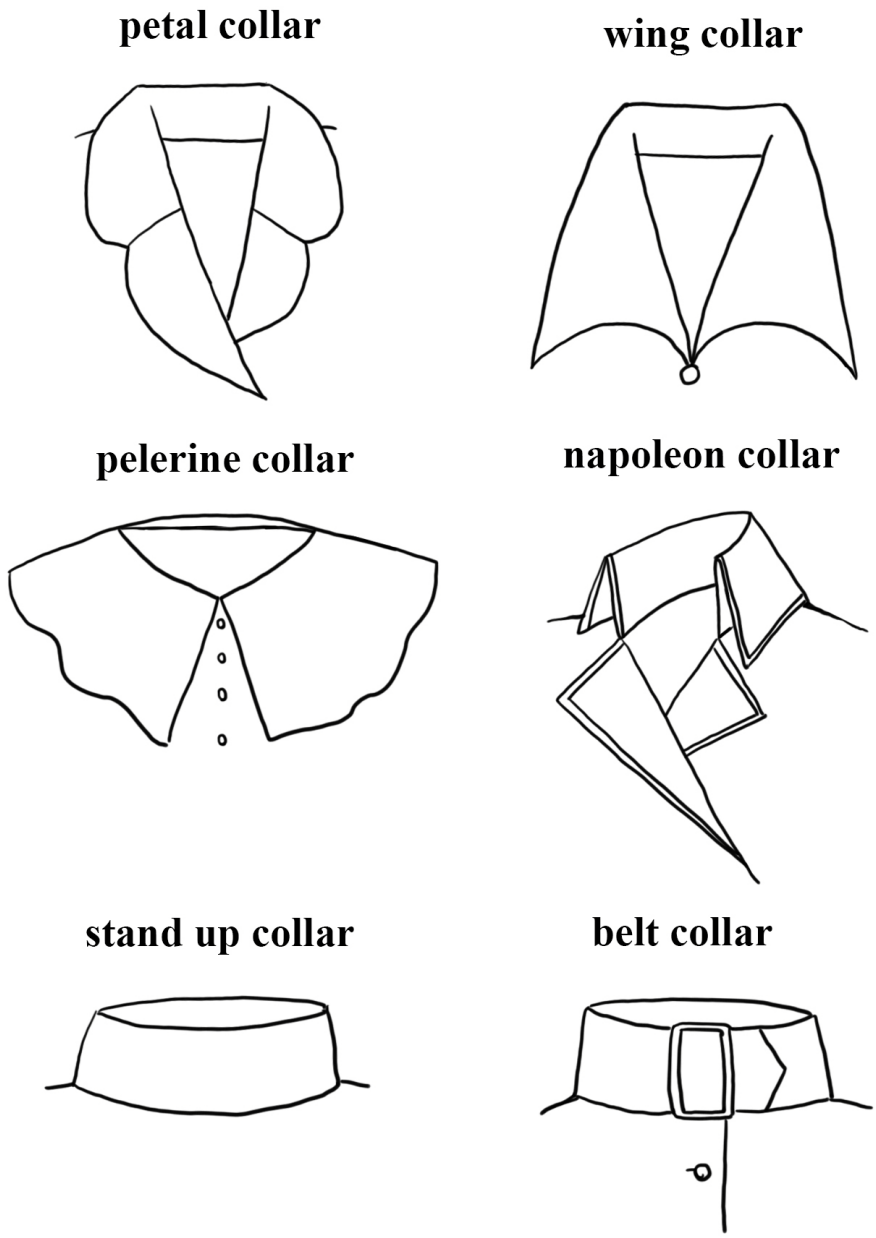

FIG. 7 – *Types de col. Quadrilingual Fashion Glossary.*

4. Les tissus dans la représentation d'un cahier de tendances

Le cahier de tendances illustre les tendances concernant les tissus, les formes et les couleurs qui vont caractériser les produits de la saison à venir – normalement il s'agit d'anticipations d'un an et même plus –, ce qui permet de définir les stratégies de marque et de style les plus novatrices et de lancer les collections de produits les plus intéressantes du point de vue des marchés nationaux et internationaux.

Le texte se fait minimal dans un espace occupé principalement par l'image qui, elle, se fait de plus en plus suggestive et allusive des émotions à susciter et ne fait que rarement mention aux données terminologiques des tissus concernés. Ces modèles, tous exploités dans le monde de la mode, constituent l'exemple d'une typologie des représentations verbales et non-verbales dans une terminologie professionnelle spécialisée.

Photos-collage, détails de photos, agrandissements de détails, photos estompées, l'image passe au symbole et le tissu devient évocateur de mondes possibles. Dans le numéro présentant la collection automne/hiver 2013/14 de *Lineapelle's Trend Selection*, on présente « A season balanced between ranges of neutrals and coloured tones. These ranges will be easy to interpret in tones which are pale and light, intense and warm or dense and dark », au cours de laquelle on reconnaît trois thèmes principaux: « Nordic lights, warm coloureds [*sic*!], neutral darks ».

La qualité des tissus est présentée par des images séduisantes en alternance avec des listes de caractéristiques attendues. Pour le style dit « The magic of the spirit », qui prévoit un caractère de sobriété, des lignes essentielles et un style androgyne, les tissus ont les caractéristiques suivantes[8]:

« TEXTILES
- Opaque looks
- Elegant, serious, compact textiles
- Knitwear, double face knit+textiles
- Precious cloths, thickened and carded, like loden
- Felts, overworking on felt
- Colour on cut
- Small matelassé, light padding
- Single colour three-dimensional jacquards
- Two or three colour geometries ».

[8] Voir AA.VV. (2012). *Cf.* aussi Buss (2013) : le volume présente l'étude d'une très rare collection de soies italiennes, à partir de 1628, conservée auprès des Archives d'Etat de Milan. Cette collection présente à côté de l'échantillon le nom du tissu et celui de la couleur correspondante: c'est la première fois que des termes si connus paraissent dans un document écrit qui témoigne de leur emploi et de leur diffusion.

La terminologie spécialisée n'existe plus, dans cette communication professionnelle où c'est le renvoi émotionnel qui compte. Le référent se transforme en notion archétypale: on parle de « felts », « overworking on felt », mais à quel type de feutre fait-on référence ? Feutre de laine, feutre en poils de lapin, feutre en poils de castor ? Qu'entend concrètement par « tissu tweed façon Chanel » ?

Les exigences du marketing imposent des termes de référence:

- « Vaporous and compact knits » : quel type de lainage veut-on indiquer ?
- « Mohair, elaborated knits, elaborated stitching, also three-dimensional » : quel est le tissu que l'on veut proposer ?
- « Silky surfaces, shiny and compact » : s'agit-il d'un tissu mélange cachemire ?

FIG. 8 – *La présentation des tissus dans un cahier de tendances.*

La terminologie utilisée dans ce cahier des tendances mérite que nous y portions notre attention quant à la distribution du degré de sa spécialisation. Il n'y a pas le recours à une terminologie hautement spécialisée – le cahier de tendances est un texte de marketing pour la commercialisation et la promotion des produits et non un

catalogue descriptif –, alors que la terminologie de moyenne spécialisation a droit de cité : *double face knit*, *three-dimensional jacquards*, etc. Ce sont les termes moins spécialisés qui figurent surtout et qui permettent à n'importe quel type de public – spécialiste et non – de profiter de ces textes et d'exploiter les informations utiles de manière rapide et efficace.

Le cahier de tendances est conçu pour évoquer les orientations de la saison à venir plus que pour donner une description exhaustive d'un vêtement ou d'un accessoire : il doit suggérer des idées qui donnent l'envie de choisir des tissus donnés, les couleurs indiquées, en vue de la réalisation de ce que la mode exige et de ce que la fantaisie des dessinateurs et des couturiers impose au public. Il doit inviter à d'autres imaginations et à d'autres découvertes, il ouvre les portes sur les désirs de demain. Ce qui compte n'est pas la composition réelle du produit, mais ce qui reste dans l'imaginaire avant la mise en forme, avant la matérialisation en objet de luxe.

Le producteur et le distributeur vont trouver dans le cahier de tendances les éléments utiles à éveiller l'intérêt pour le produit du futur, au-delà d'une description pointue et rigoureuse. Le besoin de protéger les données de la production cache le produit sous un voile de mystère qui initie l'acheteur au profil identitaire de celui qui sera l'acteur de la mise en forme du rêve évoqué. Il sera séduit par la force évocatrice des images qui vont faire oublier les phases concrètes de la réalisation du produit : c'est l'effet final provoqué par l'image qui a la partie belle, et la terminologie survit là où elle peut collaborer à cet impact émotionnel.

Ce type de texte sera utile pour examiner quelle est la terminologie diffusée dans les contextes de commercialisation, qui peut être différente par rapport à la terminologie de la production. C'est une enquête que nous considérons une issue possible au désir de compréhension et de rationalisation descriptive du foisonnement terminologique du domaine des tissus, tel qu'il était déjà reconnu dans l'*Avertissement* du *Supplément* à l'*Encyclopédie méthodique*[9], cité plus haut. Nous croyons que les sources textuelles pour l'étude de la terminologie des tissus doivent prendre en considération la différence entre l'analyse des textes descriptifs référentiels - liés à la production (des catalogues des sociétés de production, des manuels techniques, etc.) – et des textes pour la commercialisation (journaux, bulletins, cahiers de tendances, presses féminine, pour ne citer que les principaux).

Conclusion

La terminologie des tissus a pu changer dans le temps suivant l'évolution de l'histoire de la technique et de la production des tissus, mais c'est surtout l'emploi qu'on en fait qui a marqué ces changements. La terminologie spécialisée est cachée à l'intérieur des ateliers et des entreprises, alors qu'elle peut être distribuée à l'extérieur de manière différente, suivant les indications de la communication merca-

[9] Panckoucke (1790).

tique. Cette attitude peut comporter des risques, sous-estimant la valeur de la précision terminologique: si l'on n'utilise que des mots d'évocation, on peut perdre le sens de la réalité d'un objet, on ouvre la voie à l'imitation d'un référent qui n'est ni défini ni identifié. On peut arriver à oublier l'expertise des personnes pour lesquelles le choix d'un terme correspond à un processus de travail.

Alain Rey, parlant du mot « luxe », rappelle que « dans l'expérience quotidienne, et indépendamment de toute théorie socio-économique, le luxe est éprouvé comme un état de plaisir raffiné, et les métaphores sur le mot français en font le synonyme de 'plaisir rare' ou de 'réalité recherchée', beaucoup plus que de 'chose précieuse' (…). Alors, contrairement aux valeurs originelles, le luxe a cessé d'être un excès, mais est devenu une résistance à l'insensibilité collective supposée, un raffinement de sensation, une 'distinction', qui peut même être gratuite[10] ». Notre espoir est que la terminologie de ce secteur ne deviendra pas un luxe.

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Abstract

The use of visual association has always been favoured in the field of fashion in order to clarify the description of the concept and to create a link between a concept, an image and the corresponding terms. This provides an efficient means of nonverbal communication between producers, designers and the general public. The analysis of a case of using nonverbal representations in diachronic terminology illustrates the representation of fashion and textiles during the *Second Empire*, when the first artificial colours were introduced and imprinted textiles began to spread. Subsequently two different terminological products of the contemporary domain of fashion are introduced: the first was created for the marketing of their production in Asian countries, and the second resorted to nonverbal representations, serving the aims of professional communication. These models provide an example of a typology of verbal and nonverbal representations in specialized professional terminology.

The 'Language of Textiles': Textiles in Verbal and Nonverbal Communication in Ancient Mesopotamia

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Abstract. This contribution investigates how textiles and their terminology emerged in verbal and nonverbal communication in the ancient urban society of Mesopotamia. The discussion of the occurrence of textile designations as seen at different stages of the diachronic development of the cuneiform writing system addresses the question of how the peculiarities of manufactured textiles were rendered and how textile terms and concepts were represented in the cuneiform writing system.

1. Introduction

Textile terminology is an important field for the historical investigation of how concepts and terms emerged and developed in the first urban societies, reflecting geographical environments, material resources, technologies, and knowledge organization.

This article presents a further contribution to the ongoing discussion of nonverbal representations of textiles and textile terminologies[2] and shows how the relations between signifier and signified were realized in the writing system of ancient Mesopotamia. This region of the ancient world played a significant role in the process of conceptualization of the *realia* through verbal and nonverbal representations and in the formation of textile terminology in the Ancient Near East and beyond.

[1] This article was written during a research period as Marie Curie Intra-European Fellow at the Danish National Research Foundation's Centre for Textile Research, SAXO Institute, University of Copenhagen. The Danish National Research Foundation (DNRF 64) is also acknowledged for its support. I would like to express my sincere thanks to Susanne Lervad for inviting me to the TOTh Workshop in November 2013.

[2] See Lervad, Nosch & Dury (2011).

2. The "language of textiles" as a verbal and non-verbal code of communication

Representing a concept through a nonverbal description has the advantage of transmitting a sender's information more directly and explicitly to the recipient. This system was consistently used in antiquity, as witnessed by the use of pictograms and logograms by different ancient state administrations. Forms of representation for textiles in the first writing systems are attested at different stages of the history of the cuneiform writing system. Studying textile terminology from the evidence of ancient Mesopotamian written sources involves the understanding of logography as nonverbal representation, namely as a means to represent external characteristics of textiles through a graphic code accepted in a given community. Furthermore, for a number of cuneiform logograms, it is also possible to identify a previous pictographic stage in the writing system which has its roots in the fourth millennium use of clay tokens as *calculi*. These tokens constituted a medium of communication, or "language", which was essential in the economic transactions managed by the temple administrations of Mesopotamian cities.

The economic and bureaucratic needs of the first Mesopotamian administrators strongly influenced the way concepts were represented in terminology. Peculiarities of the exchanged end products became the basis for delimiting and defining the concepts of those items and for representing them in writing. In the pictographic and logographic stages of the Mesopotamian script, which we can define as a "script of things", we can detect a plurality of specialized languages or terminologies referring to different sectors of the first urban economies, for example, the terminology of ceramic and wooden vessels, and that of woollen garments and other textile products. Considering both the nonverbal and the verbal stages of the Mesopotamian writing system, we may then define the specific sector of the textile terminology as a "language". Through the development of this "language of textiles", in light of the history of cuneiform writing system, we can see how the peculiarities of manufactured textiles were expressed in written documentation.

2.1 The role played by textiles in the genesis of the first writing system

The "language of textiles" emerges from the early beginning of written documentation of the cuneiform culture in the cities of southern Mesopotamia. Wool textiles were the manufactured products of the world's first urban economies. They shaped these societies not only in socio-economic aspects of the everyday life of people but also in the genesis and development of the first writing system from the pictographic stage of writing to the cuneiform writing system. The first attestations of textiles are found in the so-called "tokens": pieces of clay of different shapes and sizes which were enclosed in clay *bullae* in order to record the main goods managed by the bureaucratic systems of the first urban societies in Mesopotamia and adjacent areas

(fourth millennium BC). These clay objects served as *calculi* for the exchanged goods.

The introduction of tokens of various shapes and markings in the Ancient Near Eastern accounting systems is the result of the spread of manufacturing activities in the urban societies of the mid-fourth millennium BC. These objects, whose first examples date back to the eighth millennium BC, developed into more elaborated shapes with a considerably larger variety of markings during the fourth millennium BC. The workshops of the cities of the Mesopotamian alluvium produced vessels, tools, garments and other textile products, processed foods and luxury goods. The growing complexity of the economic scenario of urban activities promoted the development of a standardized accounting system by the central administrative organizations to manage these products.[3]

2.1.1 Tokens as a nonverbal language

The tokens testify to the socio-economic changes and the bureaucratic procedures concerning the urban societies in fourth millennium BC Mesopotamia. Clay tokens may be considered a nonverbal language: they were used as tridimensional representations of counted items (animals, artefacts, etc.). Tokens representing raw textile materials (wool) and finished textile products (articles of clothing) come in a variety of forms. The most attested typologies of tokens for textiles are in the form of discs, paraboloids, and quadrangles. Some of them also show marks of punctuation, strokes, horizontal and vertical lines on their surface (see Figure 1).

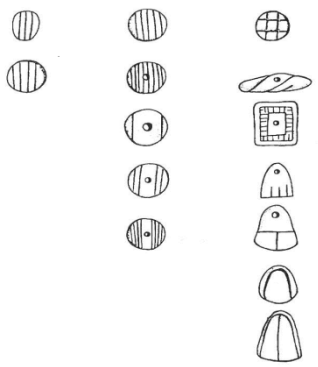


FIG. 1 – *Tokens representing textiles in various shapes and sizes (from Schmandt-Besserat (1992), vol. I, 144-146).*

[3] Schmandt-Besserat (1992), vol. I, 168-170.

In light of the fact that tokens referred to the everyday *realia* that were recorded and counted in the first urban administrations, we may ask whether the shape and internal pattern of the textile-related tokens bore any relationship to the garments and other textile products used in these communities. The forms of the tokens and their peculiarities were presumably inspired by everyday items, although many of them have a highly simplified and stylized appearance. If we look at the numerous disc-shaped typologies indicating textiles, for example, it is evident that a process of abstraction was at work here.

The main characteristics of the nonverbal language of tokens are their shape and internal pattern. In the case of abstract forms, it is reasonable to assume that the message was especially conveyed by the internal pattern. This is characterized by punctuation marks, strokes, horizontal and vertical lines. If we compare these graphical elements to the visual representations of everyday life in the Sumerian cities, we see that the discs with vertical lines indicating wool seem to be directly inspired by the fleece of sheep. Another and perhaps more plausible possibility is that the internal design is a visual rendering of the woven pattern of the textile in question. On the other hand, the paraboloid tokens with punctuation marks, strokes, and lines indicating garments seem to replicate features of very common woollen fringed gowns (see Figure 2).

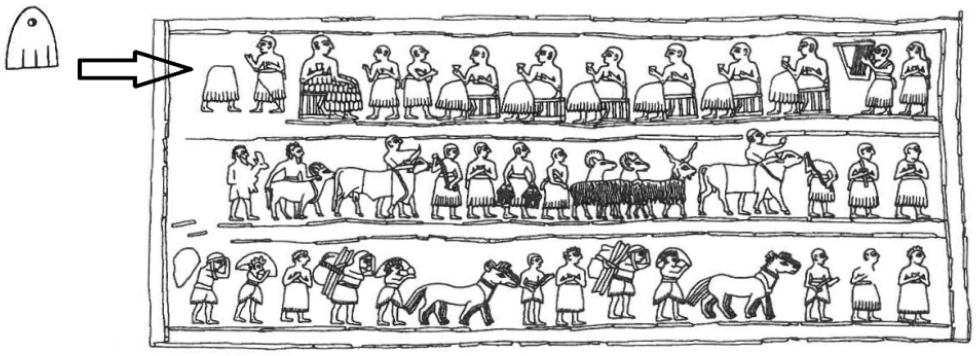


FIG. 2 – *Marked paraboloid-shaped tokens reproduce types of woollen fringed gowns (designs of the token and of the Ur standard from Schmandt-Besserat (1992), vol. I, 146, 173).*

These marks on tokens inspired – at least in part – by the main external characteristics of the textiles used in southern Mesopotamian cities represent an important stage in the abstraction process leading to the general concept of textiles. Through

this concept and its graphical rendering(s), all the textile *realia* were classified in the mental map of the Mesopotamians.

2.1.2 Tokens as the basis for the development of the cuneiform writing system

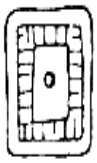
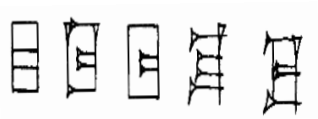
The next step in the development of the accounting system consisted of the visual representation of these tridimensional clay counters. Instead of creating clay tokens, the administrators preferred to represent them on clay tablets in a bidimensional rendering. Some of the characters belonging to the Sumero-Akkadian inventory of around 600 cuneiform signs are the result of the development and simplification of the significantly more numerous pictographic signs of the fourth millennium BC into the cuneiform-shaped characters. This is also the case with the cuneiform sign for "textile" (TÚG – see section 2.2 below). Interestingly, among the various types of forms of tokens, the quadrangle token seems to have been chosen as the most representative of the category of textiles. Exemplars of this type have been discovered in Uruk (modern Warka, southern Iraq) and Susa (modern Shush, western Iran).[4]

The same design was also reproduced as a pictograph in pictographic tablets from Uruk of Uruk IV and Uruk III periods.[5] Variants of this pictograph represent types of mats or rugs with a decorative outer part bordering all four sides or only two of them. In one example, the horizontal lines characterizing the short sides of the mat probably reproduce the fringed borders of the textile, while the crossed horizontal and zig-zag lines of the internal quadrangle seem to be a stylized rendering of the internal decoration of the mat.[6] External peculiarities of rugs or mats exchanged in everyday transactions functioned as delimiting characteristics in the process of conceptualization of this kind of manufactured product. In all likelihood, these characteristics were also relevant in the process of abstraction, resulting in the general concept of textile and in its graphical rendering, which served to classify all the end products of the Mesopotamian textile workshops. The mat-shaped token (and its variants) probably inspired the creation of the cuneiform sign for "textile". In fact, this cuneiform character, in all its variants and historical stages of development, shows a basic shape characterized by two internal parallel horizontal lines, evidently reproducing the pattern of a common mat or rug. The early archaic forms of the sign are very similar to the pictograph and to the mat-shaped token of the fourth millennium BC (see Table 1).

[4] Schmandt-Besserat (1992), vol. II, xxvii (types nos. 7:5-6 from Susa).

[5] Falkenstein (1936), pl. 32 (tablet 343, col. ii 4), pl. 48 (tablet 511, reverse side), and p. 139 (pictographs nos. 589-590); Schmandt-Besserat (1992), vol. I, 146 (token type 7:18).

[6] Green & Nissen (1987), 333, sign no. 764.

Token (4th mill. BC)	Pictograph (end of 4th mill. BC)	Archaic forms of the cuneiform sign (3rd to 2nd mill. BC)	Standard form of the cuneiform sign (1st mill. BC)
			

TAB. 1 – *The sign for textiles in the Sumero-Akkadian cuneiform script probably developed from the pictographical rendering of the token reproducing a stylized patterned mat or rug.*

2.2 TÚG: the sign for "textile" in Sumerian and Akkadian cuneiform

Textiles were not only part of the nonverbal accounting and communication system of the first urban society of the fourth millennium BC but they also became part of the inventory of signs through which the first recorded language in history was rendered in script. Sumerian was the language spoken by Sumerians from around the end of the fourth millennium BC/beginning of the third millennium BC to the first centuries of the second millennium BC in southern Mesopotamia, while Akkadian was the language used by the first Semitic people of Mesopotamia from around 2350 BC to AD 100. Once the writing system developed into an inventory of cuneiform-shaped signs, the characters lost their pictographical resemblance to the objects to which they referred. Thus, the sign for "textile", which originally designated one object or referent, became the sign for the Sumerian word for "cloth". This represented a fundamental stage in the process of conceptualization of reality: the writing system developed from a "script of objects" to a script of words. The change produced a more complex system of signification, however, since the new writing system never became a purely phonetic representation of reality. In cuneiform writing, signification is a continuous chain, since the sign does not have a direct and unequivocal access to the signified.[7] In fact, the cuneiform sign designates a variety of referents. The sign indicating "textiles", TÚG, was used in the Sumero-Akkadian cuneiform script as: 1) a logogram representing the Sumerian word TÚG, "cloth,

[7] Bahrani (2003), 114-115.

garment, robe"; 2) a determinative or semantic classifier for words indicating textiles (*e.g.*, Sumerian: TÚG.gú-lal, "shawl", Akkadian: TÚG.*šad-di-nu*, "tunic"); 3) as a logographic component of composite logograms (*e.g.*, LÚ.TÚG.UD [= ÁZLAG], "washer, fuller"; LÚ.TÚG.KA.KEŠDA, "tailor", and so on).[8] Polysemy was another peculiarity of this writing system. The sign TÚG could also be read as *ku*, *qú*, *dúr*, *ṭúr*, *tuš*, *tur*$_7$, *tukul*, *gu*$_5$, *iš*$_9$, *úb/úp*, *zì*, *ḫun*, *ši*$_4$, and *šè*. Some of these readings were also used as logograms giving access to different referents (nouns, verbs, and prepositions). With the addition of the semantic classifier for plants (GIŠ), the sign TÚG could also mean "boxwood". To facilitate the correct reading of polysemic signs, Mesopotamians often added the syllabic-rendered reading to the logograms. In the *Ḫarra-ḫubullu* lexical list, for example, the writing $^{tu\text{-}ug}$TÚG indicated that the sign in question had to be read by the scribe as "TÚG".[9]

The situation was complicated by the fact that the script and its system of signification continued to be used after the disappearance of Sumerian as a living language. With the adoption of the Sumerian writing system by Akkadian-speaking scribes, logograms originally designed for Sumerian words were used to represent another signified belonging to the language of the scribe. Accordingly, the sign for the Sumerian word TÚG was used to indicate the Akkadian word *ṣubātu*, "cloth, textile, garment", as well as the homophonous word meaning "bark of the palm". The textile term *ṣubātu* designated a woollen article of clothing used by both genders; it generally consisted of an untailored and undecorated square-shaped piece of fabric.[10] It seems that after the Old Babylonian period (first half of the second millennium BC), there was no one-to-one semantic relation between the sign TÚG and the Akkadian word *ṣubātu*; in fact, the logogram TÚG could also be used for other general terms for "garment", such as *lubāru*, *lubartu*, *lubūšu*, or *lubuštu*. This is especially true for the logographic plural form TÚG.ḪI.A, to be read with the corresponding plural form of the word *lubāru* or *lubūšu*. This reflects the high degree of conservatism of the sumerograms inherited by Akkadian-speaking scribes, who continued to use them for different words, thus increasing the level of polysemy in their writing. The immediate connection between object and pictographic representation was lost, and the access to the signified given by the logographic sign for textile was now motivated by an autonomous set of concepts determined by the script itself: the sign TÚG is graphically similar to the sign DAB, although these two characters have different meanings. The cuneiform shape of signs favoured a different level of conceptual relations between signs (terms) and contents of the signs (concepts); things conceived as similar could be expressed by similarly shaped characters.[11] In the case of Mesopotamian textile terminology, it is worth noting that the above-mentioned

[8] Borger (1981^2), 187.

[9] See *CAD* Ṣ, 221b *s.v. ṣubātu* (lexical section).

[10] *CAD* Ṣ, 225b *s.v. ṣubātu*.

[11] Bahrani (2003), 106.

Akkadian word *ṣubātu*, expressed by the logogram TÚG, is etymologically connected to the verb *ṣabātu*, "to seize, take, hold".[12] Perhaps it is not by chance that this verb was expressed in script by the logogram DAB, which was graphically very similar to TÚG. Moreover, in the orthographical traditions of some periods (*e.g.* Old Assyrian, Old Babylonian), the complex (and ambiguous) access to the signified was solved by using variant forms of the TÚG-sign for some of the phonetic values expressed by this character, as in the case of the values KU and ŠÈ.[13]

Many signs used as logograms were also employed by the scribes to express phonetic values of their languages, namely syllables of Sumerian and Akkadian words. In the case of the textile-related logogram TÚG, it seems that its use in cuneiform script was generally confined to textile designations, while in syllabic writing the scribes prefer to use the homophonous sign TUG.[14] In any case, what is clear is that the use of a verbal representation of a given textile through either logography, syllabograms, or a mixed system of logograms and syllabograms, gave the scribes an inventory of expressive possibilities for the accounted textile products. This would have been unimaginable in the pre-cuneiform period, since the use of the pictograph for textile (see Table 1, second column) could not convey the whole gamut of details characterizing the manufactured product in question. The pictographic connection with the mat or rug of the fourth millennium economic transactions could not be detected in the cuneiform shape of the TÚG-sign. More importantly, the signifier TÚG referred to the whole domain of textiles, both raw materials and manufactured textiles, including articles of clothing and other textile products for everyday use (sacks, tents, etc.). This was one of the limits of the cuneiform system, since the scribes never felt the necessity to create specific textile logograms for the new items of clothing produced in contemporary textile workshops.

The complex writing system developed by the Sumerians and then inherited by the Akkadians and other peoples of the Ancient Near East clearly reflects the significant role that administrative practices of accountancy and classification had in the first urban societies. In other words, the cuneiform writing also shows an ontological vision according to which every element of the real world had to be properly classified in semantic categories. Every object had its own "destiny", to use a Mesopotamian-oriented world view. Unsurprisingly, the image of the world in Mesopotamian religious thought mirrors the bureaucratic organization of information which was at work in the first administrative systems in history. In this perspective, every textile designation (by material, function, shape, size, colour, techniques of production, decoration, geographical origin, etc.) preceded by the TÚG-sign functioned as a

[12] *CDA*, 331a, 339b.

[13] Borger (1981[2]), 31.

[14] This is evident in the syllabic writing of the Neo-Assyrian dialect (first millennium BC), where the phonetic value *tug* (also *tuk* and *tuq*) was rendered in script by the sign TUG, not TÚG, see Luukko (2004), 51; 67.

qualification or modifier of the basic term and concept "textile/garment". When details of the described textile product were not needed, the scribe could always use only the TÚG-sign without any other qualification to indicate the item in question in a condensed way. This element of logography shows a process of standardization and condensation of information which is typical of the way administrative systems organized the knowledge related to economic affairs.[15] Moreover, by using the TÚG-sign with further qualifications concerning characteristics of the textile product, the cuneiform script conveyed the concept that the individual object (i.e. the specific textile product in question) maintained its connection with the universal and basic concept of textile. Both these elements, namely the TÚG-sign used as a determinative indicating the conceptual category of textile and the word designating the specific textile product, participated in the semantic pro-cess resulting in the textile term. From a terminological perspective, every new textile term, for example, a term designating a garment of foreign origin, easily became an integral part of the ordered knowledge of the Mesopotamian administrative system through the use of the TÚG-determinative.

3. Conclusions

The observations presented above concerning nonverbal representations of textiles in the writing system of ancient Mesopotamia have shown that the system of signification through logography appeared strictly in connection with the development of bureaucratic recording and classification of information. In particular, the discussion of textile representations in the Mesopotamian writing system demonstrates that this abstraction process was far from confined to the mature stage of cuneiform script. On the contrary, it was already at work in the tridimensional accounting system of the tokens which preceded the appearance of writing. Secondly, graphical affinities between cuneiform signs were also important in the formation of terminology; for instance, etymologically-related terms could motivate signs having a similar shape, as seen in the case of the TÚG-sign and of the Akkadian textile designation *ṣubātu*. It is also important to emphasise that the dynamics of signification in the designation of *realia* became more complex with the appearance of the cuneiform script, since the interplay of logograms as semantic classifiers and syllabograms enabled the scribes to expand the inventory of terms with new items and to maintain the connection of the individual item to the universal and basic concept corresponding to that object.

These observations lead us to consider the formation of textile terminology (as well as that of other lexical sectors of the material culture) in Sumero-Akkadian civilization as strictly related to the conceptualization system which was shaped by

[15] For the use of logography in the highly standardized textile term repertoire of Mycenaean administrations, see Lervad, Nosch & Dury (2011), 215.

the graphical (and pre-graphical) conventions used by the first bureaucracies managing everyday problems of accountancy.

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Résumé

Cette contribution porte sur l'émergence des textiles et de leur terminologie dans la communication verbale et non-verbale dans la société urbaine ancienne de la Mésopotamie. La discussion autour de l'attestation de désignations de textiles au cours des différentes étapes du développement diachronique du système d'écriture cunéiforme porte sur la question de savoir comment les particularités des produits textiles étaient rendues et comment les termes et les concepts du domaine des textiles sont représentés dans l'écriture cunéiforme.

What's in a Name? What's in a Sign? Writing Wool, Scripting Shirts, Lettering Linen, Wording Wool, Phrasing Pants, Typing Tunics

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Abstract. This paper examines the verbal and nonverbal means to express textiles in the three writing systems of the Bronze Age Aegean: Cretan hieroglyphs, Minoan Linear A and Mycenaean Linear B. A strong continuity and resilience in the logogrammatic rendering of textiles is attested. The Linear B script, in particular, combines various means – endograms, abbreviations, adjuncts, textile terms and logograms – in order to convey the full complexity of a textile or garment.

1. Introduction

How do we graphically represent a soft, coloured, 3-dimensional, flexible item of varying size and quality, coarse or smooth surface, made using many different techniques and based on animal, plant and synthetic fibres? How can we represent textiles?[1]

1.1 Textile terminologies in the 20th and 21st centuries AD

Textiles and clothing are expressed in modern languages in a wealth of terms.[2] After WWII, sociologists and linguists woke up to a massive new phenomenon: the language of fashion. Roland Barthes, in his seminal work *Système de la mode* from 1967, addressed the new phenomenon systematically, browsing through two French weekly fashion magazines from 1958-1959 and exploring the language of fashion, which he considered to constitute a system, thereby following the sociological

[1] Acknowledgements: I thank Dr Maria Papadopoulou and Prof. F. Stjernfelt for introducing me to Charles Peirce; Dr Jörg Weilharther for sharing his research and reflections on logograms; Prof. Zhao Feng for explaining the Chinese sign for loom to me; Dr Joanne Cutler for sharing her knowledge about Minoan culture; Dr Susanne Lervad for inspiring discussions on terminology and classification; and my other CTR colleagues for their motivating and stimulating discussions.

[2] Barthes (1967), 14.

tradition of exploring systems. It is interesting to observe how Barthes must also draw on concepts developed in contemporary linguistics by Louis Hjelmslev (1959), and also refers to older works of sociology by Marcel Maus and Émile Durkheim.[3] In the chapter "Le vêtement écrit" Roland Barthes discusses the challenges of translations, terminology and semiology.[4] In his opinion, there are three approaches (Barthes employed the term 'structure' inspired by linguistics) to a garment:

1. The garment image (French: *vêtement-image*),
2. The written garment (French: *vêtement écrit*),
3. The real garment (French: *vêtement réel*).

Barthes' discussion is articulated through these three approaches, but with a strong emphasis on the written garment: "Le vêtement écrit est porté par le langage, mais aussi il lui résiste, et c'est dans ce jeu qu'il se fait."

Modern **garment terms** are generally specific in their terminology. Some examples in English of the principles generating these garment terms are:

- The use and way to wear a garment: *underwear, leggings, tie, overcoat.*
- The place and circumstance to wear a garment: *trench coat, raincoat, housecoat, dinner jacket.*
- The fibre material: *cotton coat, nylon stockings.*
- The toponymic designation of origin: *bikini* (named from the Bikini islands in the Pacific).
- Loanwords: *kimono, cravat, banyan.*
- The shape of the garment: *T-shirt.*
- Other: *cardigan* (named after the 7th Earl of *Cardigan,* 1797-1868).

Modern **textiles and textile fibre terms** indicate various modalities of a textile, English, French and German examples include:

- The technical treatment of the fibres: Engl. *worsted*, Germ. *Kamgarn.*
- The weave type: Engl. *velvet*, *damask.*
- The toponymic designation of origin: Fr. *crêpe de Chine*, Engl. *denim* ('de Nîmes' from the French town of Nîmes), *DeDeRon* (nylon from DDR), *damask* (from Damascus), *muslin* (a fine cotton textile, from Fr. *mousseline*, It. *mussolina*, from Mussolo, the Italian name for the city of Mosul).
- The physical appearance and origin of a fibre: Germ. *Baumwolle* (wool from trees = cotton).
- Loanwords: *cotton* (from Arabic *qúṭun*).

[3] Barthes (1967), 20: "La sociologie de la Mode est tout entière tournée vers le vêtement réel; la sémiologie vers un ensemble de représentations collective. Le choix de la structure orale entraine donc, non vers la sociologie, mais vers cette *sociologique*, postulée par Durkheim et Maus; la description de Mode n'a pas seulement pour fonction de proposer un modèle à la copie réelle, mais aussi et surtout de diffuser largement la Mode comme un *sens*."

[4] For further discussion on garment and fashion terminology, see (Balut) 2013.

Textile and garment terminology has probably always been a very rich semantic field of etymological and morphological variations. In the 21st century we are perhaps witnessing a new rise in terminological awareness and precision relating to garment terms, due to the internet. While a consumer in previous centuries could choose clothing visually and based on touch, today's consumer needs to know the exact terminology in order to purchase clothing through a website. Garment categories are presented in a default menu and cannot be combined in their upper categories. The primary constituents of web-based garment terminology are:

1. Gender and age: men's wear and women's wear, children's wear;
2. Garment types according to their place on the body: tops, trousers, skirts, jackets, underwear, and their subcategories, *e.g.* crop top, tank top, etc.;
3. Sizes and colours;
4. Companies and brands.

Along with this terminological selection, we also operate with a logographic system designating textile fibres, washing and maintenance instructions. These icons are internationally recognised logograms, and sometimes include endograms[5] of numbers indicating maximum washing temperatures, or endograms of Latin letters indicating the various solvents used by professional dry cleaners. In addition, the country of manufacture is given, and a percentage scale indicates the composition of fibre types, *e.g.* 100% cotton. And logographic innovation continues, with new logograms currently being established, certifying sustainability, chemical treatment, fair trade and other elements of the environmental and social aspects of textile production.

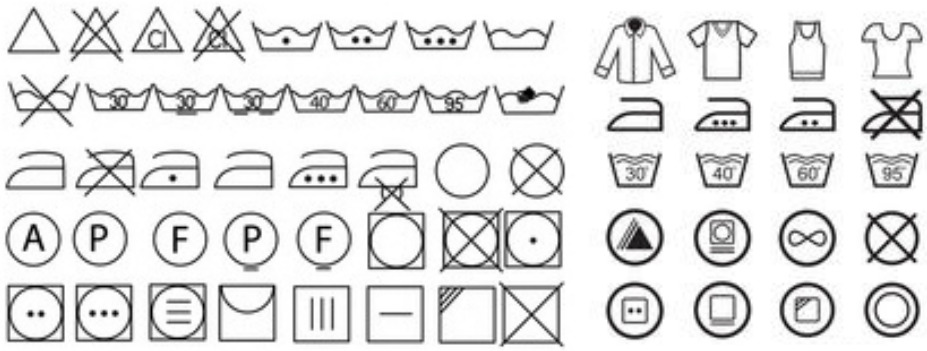

FIG. 1 – *International nonverbal laundry icons.*

[5] Signs written inside another sign.

Today, textiles and garments draw on these two graphical traditions of representation: logograms and words. It seems that both terms and logograms are useful means of expressing all the modalities of cloth: qualities, sizes, colours and origin. If we compare textile terminology with another field of commercial vocabulary of a commodity, *e.g*. that of wine, an elaborate vocabulary is similarly attested, but the same conventional use of logograms is not evidenced.

1.2 Bronze Age conventions for recording textiles

In the eastern Mediterranean area in the Bronze Age of the 3rd and 2nd millennia BCE, textiles and garments also drew on these two graphical traditions: logograms and words, and their combinations.[6] The verbal and nonverbal methods were also the praxis when recording textile and garment terms in the Bronze Age Aegean, as will be presented in this paper.

According to Leonard Cottrell in *Reading the Past – The Story of Deciphering Ancient Languages*, writing can be defined as a "way of making speech permanent."[7] In this contribution I wish to challenge this definition by discussing the field of textile terminology. While Cottrell's definition is certainly true for writing contracts, correspondence, poetry and literature in the past, I believe that the tactile, technical and visual properties of a textile are not easily expressed in speech and words alone; in the Bronze Age, textiles are expressed by a range of verbal and nonverbal means; thus, an elaborate amalgam of verbal and nonverbal expressions of textiles is not the tentative results of recording speech, but rather a well-chosen strategy.

2. Verbal and nonverbal expressions in the Bronze Age Aegean scripts

In the Minoan and Mycenaean palace societies, textile production was an integral part of the economy, and the palace administration took a keen interest in controlling the production and circulation of textiles and garments. The same phenomenon can be observed in Bronze Age palace administrations in 2nd millennium BCE Ebla and Mari in present-day Syria, in 3rdmillennium BC Ur in Mesopotamia, in the private correspondence of private entrepreneurs in Anatolia and Assur, in Egyptian temple inventories, in Neo-Assyrian temples and in Hittite records.[8] All these administrations and scribes have access to verbal and nonverbal methods of expressing the types, qualities, and sizes of textiles and garments. It is interesting to

[6] Michel and Nosch (2010a).

[7] Cottrell (1971), 8.

[8] See contributions in Michel and Nosch (2010b).

observe how many different traditions develop with the common aim of finding the best and most precise graphical and verbal expression of this complex category of material culture – textiles.

The Minoan culture is attested archaeologically in the southern Aegean and in Asia Minor. In Minoan palace contexts two scripts were for a while employed simultaneously, Cretan hieroglyphs and the Linear A script. They were used for economic transactions in and between the palaces, and focused on commodities expressed by logograms. As John Bennet states, both Cretan hieroglyphic and Linear A represent logo-syllabic writing systems.[9] They are formed of logograms, *i.e.* signs representing a word or an item, and syllabograms which are signs of phonetic values.

2.1 Verbal and nonverbal expressions of textiles in Cretan hieroglyphs

The writing system termed Cretan hieroglyphs dates to the Middle Bronze Age, *i.e.* the first half of the 2nd millennium BCE and there are several hundred examples of the script from Crete, primarily from Knossos, Mallia and Hagia Triada, and also from the Greek islands of Kythera and Samothrace. The script has not yet been deciphered.[10] However, even though we cannot understand it or read it, it is evident that the script uses syllabograms and logograms, and some of these have a distinct textile form: the syllabic sign **041* is in the shape of a textile, and sign **163* is a logogram of a textile, similar to syllabogram **041* but with a sign of a 'branch' inside.

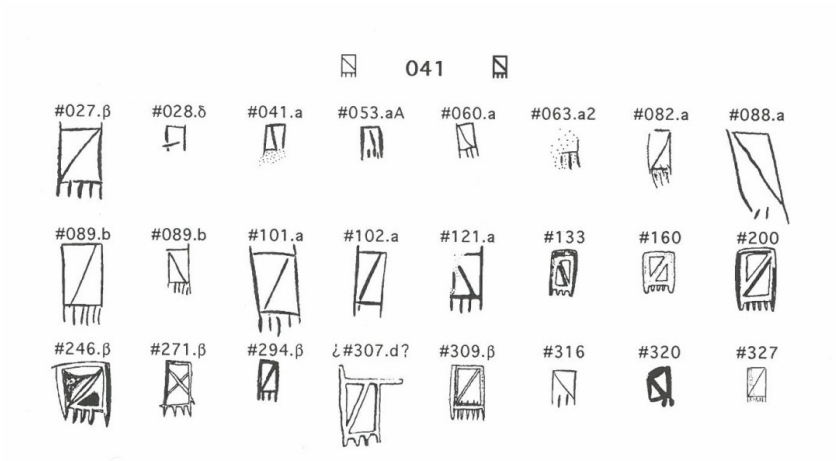

FIG. 2 – *Syllabogram *041 in Cretan hieroglyphs. From Godart and Olivier 1996, 401.*

[9] Bennet (2008), 5.

[10] Younger (1996-1997).

In an inscription from Quartier Mu in Mallia, in combination with syllabogram **041*, we find the *hapax **084* which resembles a 19th century AD gentleman's tail-coat or jacket with sleeves and revers in the front. The sign is enigmatic and has given rise to much debate. The similarities to a piece of sleeved clothing may be entirely coincidental, or may suggest the tailored purpose and use of Middle Minoan textiles. According to the editors of the *Corpus Hieroglyphicarum Inscriptionum Cretae* (*CHIC*), Jean-Pierre Olivier and Louis Godart, the 'jacket' sign is a syllabogram.[11] On the inscription #089 from Mallia (MA/M Hf (04) 01) syllabogram **041* is attested twice with the *hapax **084*.

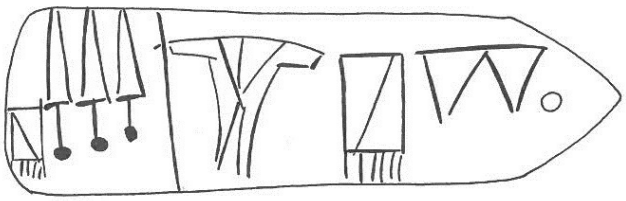

FIG. 3 – *Syllabogram *041 twice with the hapax *084 on inscription #089 from Mallia (MA/M Hf (04) 01), from Godart and Olivier 1996, 140-141.*

Thus, in the Aegean in the first part of the 2nd millennium BC, the rectangular textile sign had already acquired two meanings and two functions: a syllabogram **041* with an unknown phonetic value, and as logogram **163* probably a textile. It should also to be noted that logogram **163* encloses an unidentified sign signifier.

2.2 Minoan verbal and nonverbal expressions of textiles

Minoan is an unknown language, and, like Cretan hieroglyphs, the Linear A script is as yet undeciphered. It is, nevertheless, evident that the script uses syllabograms and logograms, and we can identify the logograms for textiles. Textiles are expressed by logogram AB 54, sometimes combined with adjuncts/ligatures/endograms which are syllabograms, probably abbreviating Minoan textile names. In Linear A, textiles are counted in pieces or, surprisingly, in fractions.[12]

In the Linear A documentation of logograms, we may question whether logogram AB 54 actually depicts a textile or a loom. This dilemma is illustrated by two logograms from Hagia Triada in Crete.

[11] Olivier and Godart (1996), 17.

[12] Del Freo *et al*. (2010).

FIG. 4 – *Linear A textile or loom logogram on tablet HT 38.*
From Godart and Olivier 1976, 72.

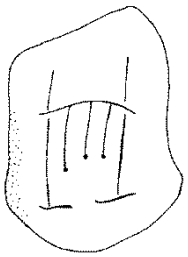

FIG. 5 – *Linear A textile or loom logogram on roundel HT Wc 3019.*
From Godart and Olivier 1979, 78.

This same roundel, a Minoan administrative document, also contains three seal impressions and the drawing of a fraction sign. The same sign, Linear A syllabogram AB 54, also works as a syllabogram and is attested as a syllabogram in inscriptions from several places in Crete and developed its shape towards its Linear B counterpart *wa-* already in LM IB.[13]

2.3 Transition from Minoan to Mycenaean

Around the mid-2nd millennium BC, the Minoan political structures in Crete seem to have been taken over by the Mycenaeans from mainland Greece. The Mycenaeans adapted the Linear A script to their own language (Greek), and developed the variant script called Linear B. In this transition, 75% of the Linear A syllabograms were re-used in Linear B, but 80% of the some 180 Linear A logograms did not continue into Linear B and were lost. Instead, many new Mycenaean logograms were created.[14] There is, however, a significant exception: the textile logograms of Linear A continue in the Linear B script.[15]

[13] Palaima (1988), 298, 307-308.

[14] Duhoux (1985); Palaima (1988); Schoep (2002); Bennet (2008).

[15] Nosch (in press).

3. Mycenaean verbal and nonverbal expressions of textiles

The Mycenaean language is Greek, and Linear B thus denotes an early form of Greek before the alphabetic Greek known from classical Greece and until our own time. From the earliest discoveries, it could be understood that the script uses syllabograms and logograms as in Linear A, and that textiles are counted in pieces. Textiles are mostly combined with adjuncts/endograms/ligatures and textile names. It was only in 1952 that the Linear B script was deciphered, and from that moment on it was possible to read the names of textiles. Some were known from classical Greek sources such as *ki-to*, Gr. *khiton* (a Semitic root in a loan word for a (sleeved?) garment worn on the upper body and shoulders, and of varying length from lower waist, to knees, to feet), and *we-a$_2$-no, weanos/heanos*, a cloak to wear on the shoulders and used as an outer garment. Moreover, the Mycenaean textile term *pa-wo* corresponds to *pharos*, a textile and cloak in 1st-millennium BC Greek.

Other textile and garment terms, *tu-na-no, te-pa* and *to-mi-ka*, are only known in Mycenaean Greek and are not attested in the 1st millennium BC. Likewise, well-known garment terms of classical Greece, such as *peplos, chlamys* and *himation* are so far unattested in Mycenaean Greek texts.

The Linear B script has a very complex strategy for representing the Mycenaean textile terms and textile types graphically: textiles are expressed by logogram **159*, transcribed TELA which is a plain logogram of rectangular shape, sometimes with fringes below. This logogram can stand alone or be combined with other signs:

- Logogram (TELA).
- Logogram+endogram (TELA+*KU*).
- Logogram+endogram+adjunct (TELA+*TE pe*).
- Logogram+endogram+adjunct+textile term (*we-we-e-a* TELA+*PA *161*).
- Logogram+textile term (*to-mi-ka* TELA) (*pa-we-a re-u-ko-nu-ka* TELA).
- Textile name (*ki-to*) alone without a logogram.

Some textile types, such as TELA+*TE* and TELA+*PU*, are mostly recorded by their logograms and endograms and are only in a few instances also recorded by their textile names so that we can verify that the abbreviations indeed stand for *te-pa* and *pu-ka-ta-ri-ja*, respectively. Other textiles are more often rendered by the plain textile logogram TELA combined with the textile name: *ki-to* TELA, *to-mi-ka* TELA and *tu-na-no* TELA. A third example is the widely attested *pa-we-a,* which is mostly written out as a textile term with a plain logogram, but is only very rarely recorded by the complex logogram TELA+*PA*.

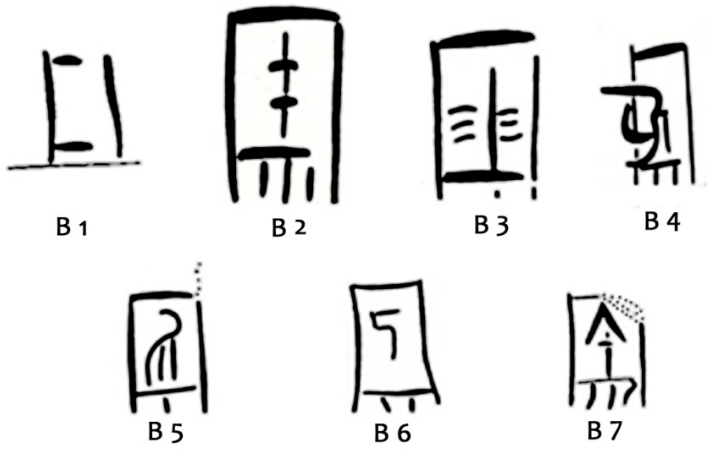

FIG. 6 – *Linear B textile logograms in the shape of logogram *159 TELA filled with various endograms: B1: plain TELA, B2: TELA+PA, B3: TELA+TE, B4: TELA+KU, B5: TELA+PU, B6: TELA+PO, B7: TELA+ZO.*

Mycenaean scribes thus created a series of combinations of textile terms, logograms and abbreviations and adjuncts for representing textile concepts or textile qualities. Together they render the complexities of different textiles. The same scribes also widened the repertoire of textile logograms and created new cloth logograms: **146, *160* (only attested at Pylos and a variant form of **146* but without the endogram *we-* inside), **161* (only attested at Knossos and, in reality, a monogram formed from two syllabograms), **164, *166* and TUNica. Logograms **168, *158* and **178* may perhaps be added to the list.[16]

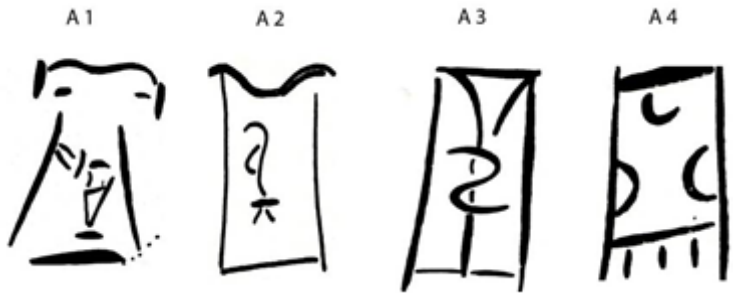

FIG. 7 – *Linear B logograms A1: TUN+KI, A2: TUN+RI, A3: *146+WE, A4: *164.*

[16] Nosch (2012).

I have demonstrated elsewhere that the choice between a logogram combined with a textile term (such as *tu-na-no* TELA) and a logogram combined with a textile term in the shape of an abbreviated endogram (such as TELA+*PU*) is not due to individual scribal habits, but is determined by the textile type.[17] Thus, in order to designate certain textile types, Mycenaean scribes would nearly always choose a logogram, often qualified by an endogram abbreviating the textile name (TELA+*TE,* TELA+*KU,* TELA+*KU, *164, *146*). This convention is directly related to the Minoan recording praxis in Linear A. For other textiles types, Mycenaean scribes would instead choose to write the full name of the textile (*tu-na-no, to-mi-ka, pa-we-a*), and reinforce and visualise the message by adding the plain TELA logogram.

Below I will illustrate with a few examples what strategies and choices the Mycenaean scribes made in order to graphically represent a textile, and how they successfully combined these choices.

3.1 Mycenaean combinations of textile logograms, monograms, endograms and textile terms

Tablet KN L 178 displays quite well the full range of possible combinations of Mycenaean verbal and nonverbal textile expressions. The scribe called "124" records two types of textiles:

- Logogram TELA+endogram *PA*+textile monogram/logogram **161*+textile term *we-we-e-a,*
- Logogram TUN+endogram *RI*+textile term *u-po-we.*

KN L 178 + 281 ("124"/RCT)

we-we-e-a '**161*' TELA[1]+*PA* 6 / u-po-we TUN+*RI* 2

Translation: woollen, 6 pieces of *pa-we-a* cloth of *161 type; 'to wear under', 2 linen tunics

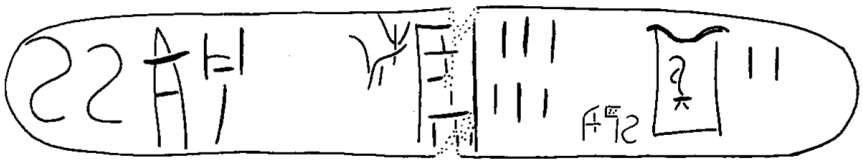

FIG. 8 – *Linear B tablet KN L 178. From Chadwick et al. (1986), 86.*

[17] Nosch (2012).

This tablet is one of the oldest textile records in Linear B and it suggests that the creative combinations of textile terms, logograms, monograms (sign combined of two syllabograms) and abbreviations were not a late innovation but were well developed and were already being explored in Aegean graphical systems at an early stage, both in Linear A and Linear B.

3.2 Logogram+endogram+textile term

KN L 870 + *fr.* (114?/I3)

o-]da-ku-we-ta / we-we-e-a TELA[1] 1 TUN+*KI* 1

Tentative translation: 'something decorated (?) with teeth (?)', woollen, 1 piece of plain textile, 1 tunic of the type *KI*

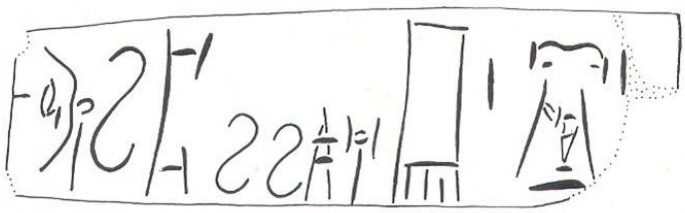

FIG. 9 – *Linear B tablet KN L 870. From Chadwick et al. (1986), 351.*

4. Nonverbal signs and symbols of textiles in the Aegean Bronze Age

The Saussurian distinction between *signifiant* and *signifié* is not a very useful tool for understanding textile signs, since textile logograms are situated in both categories and in-between them:

Signified (Fr. *signifié*): the meaning, concept or idea expressed by a sign, as distinct from the physical form in which it is expressed. The basic textile logograms represent the signified because they all refer to the concept of textiles and weaving.

Signifier (Fr. *signifiant*): a sign's physical form (such as a sound, printed word, or image) as distinct from its meaning. Textile logograms, such as TELA+*TE*, TELA+*KU*, represent signifiers when they convey an acoustic image, a sound. They also represent the materiality of these particular textiles.

Louis Hjelmslev discusses the differences and similarities between his and Ferdinand de Saussure's concepts of language. De Saussure abandoned the concept of a language constructed of phonetics, morphology and semantics. Instead, he

argued that it is the relations between and within these entities which characterise a language. Thus, the true units of a language are the relations between sounds, signs and significations. These relations form the system of a language. In this way, the fields of phonetics and semantics become auxiliary disciplines in linguistics, rather than constituent parts. De Saussure made a fundamental distinction between form and substance, between *langue* and *parole*, where *langue* = form, and he coined *sémiologie* to cover the entire research field of signs, of which linguistics is only a minor part. Hjelmslev employed concepts of structure, relations and models and distanced himself from the content and substance; he focused on the relationships between entities rather than describing the entities. Following this model of a language, Hjelmslev coined the *glossématique* = the purely structural linguistic research.[18] Hjelmslev then dove into hitherto understudied and uncongenial fields of signs and language such as traffic lights, clocks, and the Morse alphabet. Perhaps this partly explains why Roland Barthes used Hjelmslev as his theoretical model in his fashion magazine analyses.[19]

The relationship between signs can be defined as either syntagmatic or paradigmatic. A syntagmatic relationship is where signs occur in sequence or parallel and operate together to create meaning. Syntagmatic relationships are often governed by strict rules, such as spelling and grammar. A paradigmatic relationship is when an individual sign may be replaced by another.

For textile logograms we should question whether they have a partly paradigmatic relationship and can replace each other, or whether they have a sequential (syntagmatic) relationship, and thus occur in sequence or parallel and operate together to create meaning. The two textile logogram signs **165* and **166* are paradigmatic, and perhaps also textile logograms **146*, **160* and **166*, since they seem to substitute or replace each other, depending on the contexts and scribes.[20] Conversely, there is a syntagmatic relationship in TELA+*TE pe-ko-to*, where the *te-pa* cloth seems to be further qualified by *pe-ko-to* and its abbreviation *pe*, and this syntagmatic combination refers to a *te-pa* type containing more wool and, perhaps, of another quality.

As Georgia Flouda has suggested, we can approach Aegean Bronze Age writing and especially the logograms of textiles from the perspective of Peircean

[18] Hjelmslev (1971), 39.

[19] Hjelmslev remains very critical towards philosophy dealing with language: "La théorie logistique de langage a été établie indépendamment de la linguistique, et il est évident que les logiciens, bien qu'ils parlent constamment du langage, négligent d'une façon sans doute indéfendable les résultats d'une approche linguistique du langage. Ce qui eut pour effet de desservir la théorie logistique du langage. En particulier, le concept de signe proposé de ces savants a des défauts considérables et reste sans aucun doute inférieur à celui de Saussure. Les logiciens ne comprennent pas que le signe linguistique a deux faces, un contenu et une expression, dont chacune peut être soumise à une analyse purement structurale." Hjelmslev (1971), 41.

[20] Nosch (2012).

semiotics.[21] A logogram is a symbol based on a habitual and thus arbitrary and also conventional connection between 'sign'[22] and 'object'.[23]

The philosopher Charles Sanders Peirce (1839–1914) analysed and discussed the theoretical framework of signs and categorises a sign according to its relation to an object, as *iconic*, *indexical,* or *symbolic*, an approach which is highly pertinent to textiles:[24]

- Icon: the icon is the simplest since it is a pattern that physically resembles what it stands for. For example, a picture of a loom is an icon of a loom.

- Index: the index is defined by a sensory feature that correlates with and points to an object; the index can be visible, audible, or can represent a causal relationship, both the origin and the consequence, for example, dark clouds are an index of rain, smoke is an index of fire. The indexicality of the textile logogram is its interchangeable graphical representation in Linear A as sometimes a loom (the origin of a textile) and sometimes as a textile (the result of a loom).

- Symbol: symbols are patterns that acquire their meaning from their mental association with other symbols. In order to understand what a given sign denotes, the mind needs experience of that sign's place in a sign system, and its relationship to other signs; Charles Peirce coined this collateral experience, collateral observation, or collateral acquaintance. This collateral acquaintance is also necessary to recognize a textile logogram. Surprisingly, the excavator of Knossos, Sir Arthur Evans, who grew up in 19th-century Hertfordshire, Britain, the global leader of the contemporary textile industry, did not recognise the textile logogram. Brendan Burke has highlighted and discussed how Evans in his 1909 work, *Scripta Minoa Volume* I, read the textile logogram upside down and published it in the chapter 'Buildings and Accessories'.[25] Evans firmly believed it to be the sign for 'Palace': "…it represents a plan of a Palace courtyard with a two storied tower-like building standing in its inmost angle. This building with battlements above, and the diagonal line probably representing a ladder, also stands by itself as the 'Palace' sign (*aha*) and is one of the Egyptian hieroglyphs that can be certainly said to have been taken over into the Minoan signary."[26]

This interpretation indicates Evans' collateral experience with Egyptian archaeology, and his lack of acquaintance with textiles. In *Scripta Minoa,* volume II, published in 1952, based on Evans' manuscripts but edited and supplemented by John Myres, Alice Kober and Emmett Bennett, the sign was re-classified under the

[21] Flouda (2013), 146-147.

[22] According to R. Barthes, "le signe est l'union du signifiant et du signifié", Barthes (1967), 217.

[23] Peirce (1931), 369.

[24] Peirce (1931-1935), vol. 2, 228-229 and vol. 5, 473.

[25] Burke (2010).

[26] Evans (1921), I, 358.

heading 'Signs for Containers', but termed 'banner sign', and subsequently became recognised as a textile logogram.

Another symbol which acquires (uncertain) meaning is the Cretan hieroglyph 'jacket' syllabogram discussed earlier, which we – with our accumulated experience – associate with a modern clothing item, and we are unable to understand the Minoan collateral experience of this sign.

5. The textile logograms in Aegean scripts, and their parallels in iconography

A crucial question is whether a logogram is an element of script or an element of iconography, whether logograms stem from art or from script. The traditional view is to include logograms as a part of script, and logograms are discussed and presented in grammars and dictionaries of Mycenaean Greek.

Another approach to logograms was taken by Jean-Pierre Olivier and Frieda Vandenabele in their book *Les idéogrammes archéologiques* from 1979, in which logograms are seen as graphical evidence for material culture. Their survey and discussion, however, did not include the textile logograms or the material culture of textiles;[27] this was remedied in 2012.[28]

As a new approach to nonverbal textile expressions, it is useful to include recent research on the nexus between logograms and art in the Aegean Bronze Age. Jörg Weilhartner has examined the stylistic and graphic connections between Linear B logograms and humans and animals in Bronze Age art and demonstrated that artistic conventions appear to exist, which influence the design of logograms.[29] The defining features of animals in logograms are primarily their heads depicted in profile, with their horns and ears. Weilhartner observes how, in the graphical treatment, some animals – horse (EQUus) and deer (CERVus) – are rendered with accuracy and details, while others – sheep (OVIS), goats (CAPra), oxen (BOS) and pigs (SUS) – are rendered with highly stylised logograms.[30] This could be due to different graphical traditions, to longer graphical developments, or to the fact that sheep, in particular, are such recurrent commodities that a certain script standardisation naturally came into place. It is, however, noteworthy that the standardisation of logograms predates the division into various palace scribal traditions, and it also predates the settlement of Mycenaeans in the palace of Knossos.

Similar situations may be observed with textiles. Already in the Linear A script,

[27] Olivier and Vandenabele (1979).

[28] Nosch (2012).

[29] Weilhartner (2012); (2012a); (2014).

[30] Weilhartner (2012), 65-66.

the TELA sign seems quite fixed in its visual form; among the oldest tablets from Knossos in the Room of the Chariot Tablets, textile logograms TELA+*PA* and **161* appear as standardised as the textile logograms in the rest of the Knossos archives. We can therefore suppose that the graphic types of TELA and **161* were already fixed in LM II.

The logograms for domesticated animals clearly constitute both logograms and syllabograms, all of which are present in the Linear A and B corpora, and which may refer to abbreviations of Minoan animal names: sheep is *qi-*, goat is *mi-*, ox is *mu-* and pig *au-*. There may also exist an onomatopoetic relationship between animal names and animal sounds. However, in the Linear B texts, these domesticated animals are evidently no longer called by these syllables but are designated by their Greek animal names, e.g. pig is *sus* in classical Greek and contained in Mycenaean *su-qo-ta* 'swineherd', *bous* in classical Greek is the ox and attested in *qo-u-qo-ta* 'cowherd', *aiks* is goat and attested in a_3*-ki-pa-ta*, 'goatherd', *ois* is sheep in classical Greek and attested in Mycenaean Greek in *o-wi-de-ta-i* (perhaps a designation for cult personnel dealing with sheep).[31] Thus, they have lost their Minoan syllabic reference and function purely as logograms with new Greek names for the animals.

A similar situation is attested for flax, a syllabogram used as a logogram, *SA*, plausibly a Minoan plant name starting with *sa-* which in Linear B acquired a Greek denomination by using *ri-no* 'linen' or 'flax'. Likewise, the logogram for wool combines the syllables *ma-* and perhaps *re-* or *ru-*,[32] but in the texts, the scribes write out the Greek form *we-we-e-a*, 'woollen'. This term for wool is actually related to Latin *vervex*, wether, and this suggests that by the Late Bronze Age, Mycenaean Greeks had dismissed the common Indo-European word for wool (Hittite *hulana*, Latin *lana,* Gr. *lēnos*) and instead adopted an alternative (specialised?) term for the fibres stemming from the intensive exploitation of wether wool, as was the case in Mycenaean palace economies.

The same development of obsolete Minoan abbreviated terms acquiring new Mycenaean Greek names is not attested for the syllabic elements inside the textile logograms: the textile endograms *te*(*-pa*), (*pa*)*-we-a, we*(*-*a_2*-no*), *pu*(*-ka-ta-ri-ja*) have not lost their syllabic function in Mycenaean Linear B but still denote the textile names. They are not well attested in Linear A, so we cannot know whether Minoan textile terms and their abbreviations continued to be in use in Linear B or, rather, whether the Mycenaean Greeks inserted abbreviations of their own textile terms into the Minoan textile logograms.

Yves Duhoux was the first to compare the Linear B textile logograms **165* and **166* with the contemporary Egyptian depictions of loincloths worn by the Keftiu

[31] Weilhartner (2012), 69.

[32] Nosch (2007), 11-12.

people and by the Knossos cup-bearer.[33] The drawing of a man wearing a loincloth on MY Oe 106 *verso* was actually executed by a scribe who recorded textiles for the palace administration at Mycenae.

FIG. 10 – *Linear B tablet MY Oe 106. Drawing Annika Jeppsson. Copyright of The Danish National Research Foundation's Centre for Textile Research.*

Regrettably, we do not have artistic representations of standard textile pieces, but there are several attractive and highly pertinent iconographic parallels, such as the use of fringes. It is tempting to compare the iconography of the ladies' dresses on the 13th-century BCE Tanagra larnax with the Tel Haror Linear A textile logogram. Fringes indeed seem to be a diagnostic feature of textiles, both in art and in script.

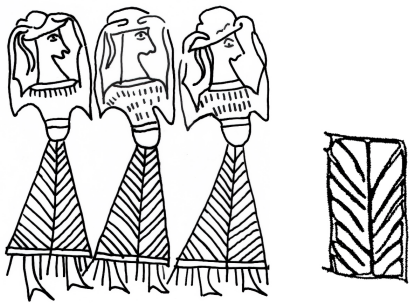

FIG. 11 – *TEL Zb 1 from Tel Haror and Tanagra ladies. Drawing Annika Jeppsson. Copyright of The Danish National Research Foundation's Centre for Textile Research.*

A fundamental human difference/boundary is the male and female dichotomy, and Weilhartner has reviewed how this is rendered graphically in logograms of

[33] Duhoux (1976), 117.

Linear A and Linear B.[34] A first observation is that in Linear A, we have thus far no human gender markers but a common logogram for a person, and this Linear A person wears clothing.

In the animal realm, males are designated in Linear B with two horizontal strokes and females with an additional vertical stroke. In the human world, the logogram for man is designated by an X-shaped form mirroring his shoulders and legs: the same male posture can be found in Bronze Age iconography; women are designated by an additional vertical stroke forming a skirt and a lower horizontal stroke mirroring the hem of the skirt. This is also a prominent feature of female attire in iconography.

Two further observations are intriguing: the similarities in Linear B logograms between the female animal logograms and female human logograms is their 'skirt' form and the question remains open as to whether this reflects a female gender marker of two strokes, which in the case of humans became a skirt? Or, conversely, whether the iconic female human symbol wearing a dress was transferred onto female animal logograms? It is, moreover, noteworthy that the logogram for woman is a clothed woman, while the logogrammatic rendering of a male human could be nude.

6. Concluding remarks

There are several sets of theories and disciplines which are pertinent to the study of verbal and nonverbal textile expressions in Aegean Bronze Age scripts: terminology, specialised languages and vocabularies, semiotics of signs, and the interaction between logograms and art.

Scholars have noted the nexus between the essence of terminology and textiles, and it has been suggested that textiles represent universal knowledge and thus a tool for explaining universality.[35] The essence of terminology and of terminological research was first expressed by Plato, and he explicitly employs a textile metaphor to explain the science of the terminologist. In particular, in the dialogue *Cratylus* 382e – 390e, Socrates and Hermogenes discuss the relationship between things and names, and whether the naming of an object is intrinsic or purely conventional.[36] Socrates exemplifies his point by referring to a textile implement, probably weft beater, the *kerkís*. This textile tool and its verb *kerkízein*, has an intrinsic meaning of 'separating' (388a-388c):

[34] Weilhartner (2012a).

[35] Moxon (2000).

[36] Translation by H. N. Fowler (1921), adapted by Nosch.

"Socrates:	Then if I were to ask "What instrument is the *kerkis*?" Is it not that with which we weave?
Hermogenes:	Yes.
Socrates:	And what do we do when we weave? Do we not separate the mingled threads of warp and woof?
Hermogenes:	Yes.
Socrates:	A name is, then, an instrument of teaching and of separating reality, as a *kerkis* is an instrument of separating (*kerkizein*) the web?
Hermogenes:	Yes.
Socrates:	But the *kerkis* is an instrument of weaving?
Hermogenes:	Of course.
Socrates:	The weaver, then, will use the *kerkis* well, and well means like a weaver; and a teacher will use a name well, and well means like a teacher.
Hermogenes:	Yes."

The sequence of verbal and nonverbal expressions of Mycenaean textiles evidently does not merely accumulate descriptions of textiles but separates, ranks and classifies them into categories on various levels, as suggested in Plato. Textiles belong to either upper categories of 1) TELA textile logograms, or 2) other textile logograms (see above); below this level they are separated into sub-categories defining sizes, decorations, or colours.

When ranked and classified, textile terminologies form their own corpora consisting of specialised language. Specialised language and terminology are fields of research of their own, and the specialised terminology of textiles has a long tradition. The French linguist Pierre Chantraine described the field of research in the following way:

> "Dans sa curiosité à suivre l'histoire concrète des vocabulaires, la linguistique a été amené à étudier les langues spéciales. Les langues techniques, par exemple, se différencient parce qu'elles sont réservées à un petit nombre d'individus qui se sont ainsi façonné un instrument propre à designer exactement les outils et gestes de leurs art (…). Elles se développent sur le fond commun d'une langue vivante, mais elles affirment leur indépendance en s'en distinguant, en se constituant un vocabulaire original, par l'emprunt, par la métaphore, par l'étymologie populaire."[37]

[37] Chantraine (1928), 23.

Along the same lines, the philologist Cousin describes (with a fine textile metaphor) how specialised terminologies such as textile terminology derive from a common foundation, crystallise into specialised sections, and eventually merge again into the common language:

> "[...] il existe une langue commune servant à désigner les objets et les notions ordinaires et des vocabulaires spéciaux servant à désigner les objets et les notions techniques : à une époque donnée, il y a, dans un groupe social déterminé, une langue commune et d'innombrables vocabulaires techniques. Mais ces vocabulaires techniques viennent s'insérer dans la trame du langage commun, à mesure que se banalise l'objet ou la notion qu'ils désignent ; dès lors, ils perdent leur caractère technique. Cette fusion est fonction de l'âge, des habitudes, des gouts, des origines, des fréquentations du sujet parlant ; ainsi, la qualité technique d'un mot ne se définit pas seulement d'après le caractère spécial de ce qu'il exprime, mais d'après la personnalité du sujet parlant et d'après sa qualité sociale."[38]

I find it difficult to determine to what extent Mycenaean textile terminologies in the Bronze Age are a specialised, technical vocabulary, and how far they constitute an integral part of the common Greek vocabulary. Nonetheless, the Linear B textile terminology is one of the richest semantic fields in Mycenaean vocabulary, especially in relation to adjectives of size, colours, decorations, and many other technical terms;[39] it also contains the highest number of occupational titles among all professional sectors recorded in Linear B.[40]

Textiles have existed for at least 24,000 years and have given rise to other technologies and concepts of forms and movements. Many textile and bodily expressions and metaphors share common ground. Textile production would have taken place in every household in antiquity, as textiles were essential to all

[38] Cousin (1943), 38.

[39] *a-ro-ta* "not-sewn", *a-ro$_2$-a* "of better quality", *e-qe-si-ja* "for the *e-qe-ta*", *e-ru-ta-ra-pi* "with red", *ke-ro-ta* "old", *ke-se-nu-wi-ja* "for the guests", *ki-to-pi* "for *khitons*", *ko-ro-ta$_2$* "decorated with *ko-ro-to*", *me-ki-ta* "of large size", *me-sa-to* "of medium size", *mi-ja-ro* (?), *ne-wa* "new", *o-re-ne-ja* "with *o*", *pa-ra-ku-ja /*56-ra-ku-ja* "of *pa-ra-ku* colour", *pe-ko-to* (?), *pe-ne-we-ta* "with *pene-*", *pe-ru-si-nwa* "from the previous year", *po-ki-ro-nu-ka* "with multi-colored *onukhes*", *po-ni-ki-jo* "red", *po-pu-re-jo* "purple", *po-ri-wa* "grey", *pu-ru-wa* "red-brown", *re-u-ko-nu-ka* "with white *onukhes*", *ri-no re-po-to* "fine linen", *wa-na-ka-te-ra* "royal", *we-we-e-a* "woollen".

[40] *a-ke-ti-ri-ja* are describing women who finish textiles; *a-pu-ko-wo-ko* are headband makers; *a-ra-ka-te-ja* are spinners, *i-te-ja* are female weavers; *ko-u-re-ja* are women who make textiles called *pa-we-a ko-u-re-ja*; *ne-ki-ri-de* are women making a kind of textile; *no-ri-wo-ko* are women making a kind of textile; *o-nu-ke-ja* are women making textile items called *o-nu-ke* ; *pe-ki-ti-ra$_2$* are women who comb textile fibres; *ra-pi-ti-ra$_2$* are women who stitch; *ri-ne-ja* are female linen workers; *te-pe-ja* are women who make *te-pa* textiles.

individuals. Thus, the textile vocabulary seems highly integrated in the Mycenaean Greek language and also in the Bronze Age Aegean scripts.

In ancient Chinese script, the loom is written by a monogram consisting of three signs: 1) wood, 2) the loom frame, and 3) silk. This loom sign contains information about techniques, materiality and purpose.

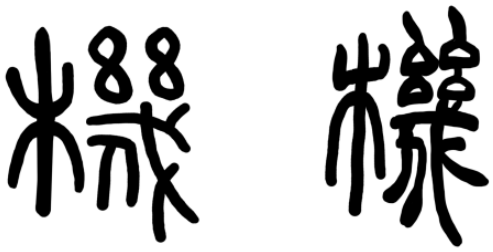

FIG. 12 – *Two versions of the ancient Chinese sign for loom consisting of the signs wood, loom frame and silk. Drawing Sidsel Frisch. Copyright of The Danish National Research Foundation's Centre for Textile Research.*

In its later simplified form, combined with other signs, it generates a wealth of technical and figurative meanings: mechanism, machinery, structure, organisation, good technical device, trap, and personalised adjectives qualifying people, such as to be smart, intelligent, quick, bright, attentive. Again we see a development from the restricted technical sense to a very broad abstract and even moral meaning of a textile term.

As stated in the beginning of this paper, Leonard Cottrell defined writing as a "way of making speech permanent."[41] In this contribution I have challenged his definition by discussing examples from Aegean Bronze Age textile terminology and textile signs. It seems that speech alone is insufficient to render the tactile, technical and visual properties of a textile: they are not easily expressed in speech and words alone; in the Bronze Age, textiles are thus expressed by a range of verbal and nonverbal means; this elaborate amalgam of verbal and nonverbal expressions of textiles is a strategy to overcome the insufficiency of phonetic language.

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[41] Cottrell (1971), 8.

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Résumé

Cet article porte sur les moyens verbaux et non verbaux dont disposaient les trois systèmes d'écriture dans l'Égée de l'âge du bronze pour exprimer les textiles : le hiéroglyphique crétois, le linéaire A minoen, et le linéaire B mycénien. Une continuité et une résilience fortes sont attestées en ce qui concerne le rendu des textiles par les logogrammes. Le linéaire B en particulier combine divers moyens – ligatures, abréviations, adjoints, termes désignant des textile et logogrammes – afin d'exprimer un textile ou un vêtement dans toute sa complexité.

What's in a Name? What's in a Sign?

Phonograms and Logograms in Middle Persian Textile Terminology

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Abstract. The Iranian-speaking scribes of the Sasanian dynasty (AD 224-651) in south-western Iran, heirs of the Aramaic administration of the Achaemenid and Parthian Empires, continued using Aramaic words as logograms. Among more than one thousand Aramaic logograms in Middle Persian, only one belongs to the terminology of textiles, Aramaic <LBWŠYA>, designating Middle Persian *warr* "wool," the rest of the textile terms are only attested in their phonographic form. This fact, however, cannot lead us to assume that the phonographic textile terms were incorporated much later to the Middle Persian vocabulary.

Middle Persian, also called Pahlavi, is a Middle Iranian language that was spoken in the south-western Iranian province of Fārs after the fall of the Achaemenid Empire in BC 330, whose language was Old Persian. Middle Persian was the official language of the Sasanian dynasty (AD 224-651) and was probably no longer spoken in the 8th century AD, when the first documents in New Persian or Fārsi appear.[2] Although it was no longer spoken thereafter, it was still in use some centuries later as a literary language and also as one of the sacred languages of the Zoroastrian communities, being brief texts composed in Middle Persian by Zoroastrian priests as late as the 19th century AD.

The available sources in Middle Persian can be divided into five groups:

1. Inscriptional Middle Persian (1st century BC – 7th century AD): inscriptions in different materials like stone, metal, quartz, etc.;
2. Cursive Pahlavi (1st century BC – 7th century AD): administrative and private documents in parchment, papyrus, pottery and *ostraka*, written in a cursive writing different from the one used in inscriptions;

[1] This article has been written thanks to the funding of the European Commission under the Marie Curie Action FP7-PEOPLE-2012-IEF.

[2] The most recent descriptions of the Middle Persian language and writing systems are found in W. Sundermann (1989) and P. O. Skjærvø (2009). According to G. Lazard (1963), 31, the first preserved texts written in New Persian are the fragmentary inscriptions in Hebrew alphabet found in Afghanistan and dating back to AD 752-753.

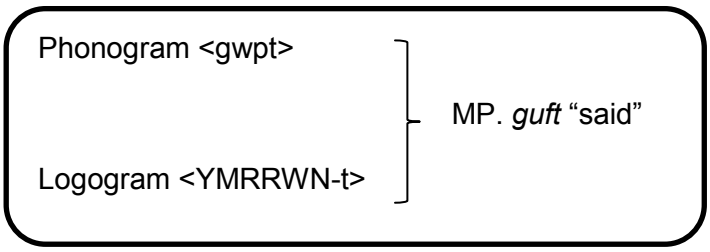
3. Pahlavi or Zoroastrian Middle Persian, in which the Zoroastrian literature was written from the Sasanian period onwards, including Middle Persian translations of Avestan texts (4th – 7th centuries AD), Classical Middle Persian literature (8th – 10th centuries AD) and late Middle Persian and Neo-Pahlavi texts (11th – 19th centuries AD);

4. Manichaean Middle Persian, in which the Manichaean literature found in Turfan was written (3rd – 8th centuries AD);

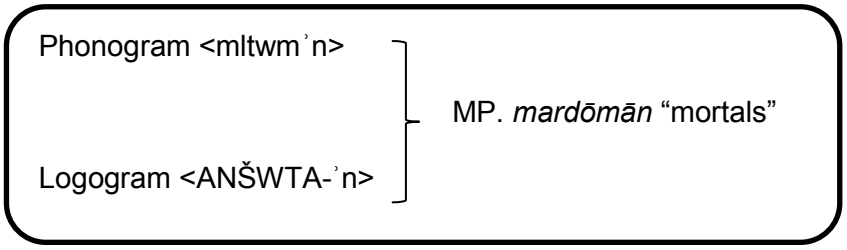
5. Middle Persian of the Psalter (8th century AD): only a fragment of a Middle Persian translation of the Syrian Psalter is preserved.

With the exception of Manichaean Middle Persian, written in a variant of the Palmyrene Syriac script, the rest of Middle Persian writing systems derive from Achaemenid Aramaic. The scribes of the Achaemenid and Parthian administrations were probably Arameans, who transmitted not only their writing system, but also most of the conventions linked to it, to the Iranian-speaking scribes of the Sasanian period: one of these is the use of logograms.

Scribes of both Parthian and Middle Persian (excluding Manichaean Middle Persian) kept using a vast amount of logographic words in their Aramaic form, which sometimes alternated with their Middle Persian phonographic equivalents. The existence of these phonographic equivalents in parallels of the same text, on the one hand, and the phonetic complements in Middle Persian appended to some Aramaic logograms, on the other hand, indicate that these Aramaic forms were never pronounced as such, but simply used in the same logographic way as in other ancient languages of the Mesopotamian milieu, thus being heirs of a very long tradition.[3] Thus, for instance, Middle Persian *guft* "said" was written either in its Middle Persian phonographic form <gwpt> or in its Aramaic logographic one <YMRRWN-t>, where <-t> is the Middle Persian verbal ending. Likewise, Middle Persian *mardōm* "mortal" was written either phonographically as <mltwm> or logographically as <ANŠWTA>; in order to form its plural, the Middle Persian plural ending <-ʾn> *–ān* was added to the logogram <ANŠWTA>, thus producing the Aramaic-Middle Persian hybrid <ANŠWTA-ʾn>, which was pronounced *mardōmān* "mortals" in Middle Persian:



[3] See H. S. Nyberg (1974), 1.



One of the first descriptions of the Middle Persian use of Aramaic logograms, *i.e.* words written in Aramaic but pronounced in Middle Persian, is found in the Arabic literary work *Kitāb al-Fihrist* or "Book of all Nations" by an-Nadīm (10th century):

> "They have a form of spelling called Rawārashn with which they write both the connected and unconnected letters. There are about a thousand words with which to determine things that are similar. An example of this is that anyone who wishes to write *kusht*, which is "meat" in Arabic, writes it *basarā*, but reads it *kusht*, according to this example: ربرامـ.
>
> Or if he wishes to write *nān*, which is "bread" in Arabic, it is read as *nān* but written *lahumā*, according to this example: لحمـ."[4]

Although the tradition of writing Aramaic logograms continued for many centuries in Middle Persian literature, scribes of Middle Persian seem to have had only a limited stock of logograms at their disposal, within which only a single textile term, Middle Persian *warr* "wool", was included. Actually, although there is a relatively long list of textile terms in Middle Persian, all of them are documented in their phonographic form, with the sole exception of the Middle Persian word for wool, written in the Aramaic logogram <LBWŠYA> but pronounced *warr*. This word is attested in the Aramaic logogram <LBWŠYA> in *Vīdēvdād* 6.51b, 9.46c, *Nērangestān* 74.1,[5] *Šāyist nē šāyist* 2.49, *Wizīdagīhā ī Zādspram* 22.9,[6] *Pahlavi Rivāyat accompanying the Dādestān ī dēnīg* 31a3,[7] 34c2, *Zand ī fragard ī*

[4] English translation by B. Dodge (1970), 26-27. These words represent Middle Persian *gōšt* "meat" and *nān* "bread" and are usually written in the Aramaic logograms <BSLYA> and <LHMA> respectively. See MacKenzie (1971), 37, 58.

[5] Wrongly written <LWBŠ'YA> in manuscript HJ.

[6] Wrongly written <L'BWŠYA> in manuscript K35 and <LWBŠ"YA> in manuscript TD.

[7] Wrongly written <LBŠYA> in manuscript BK and <LWBWAAŠ> in manuscripts MR1 and J.

Juddēwdād 503[8] and 507 and *Frahang ī pahlawīg* 8.1, but it is only written in its phonographic equivalent <wl> in *Šāyist nē šāyist* 2.11.

The lack of Aramaic logograms for other Middle Persian textile terms might lead us to suppose that these terms designated techniques, implements or fabrics introduced in the Persian milieu in a later period when Aramaic was no longer the main language of the Persian administration. Nevertheless, this hypothesis is highly unlikely, insofar as other Middle Persian textile terms, such as, for instance, Middle Persian *bāliš* "cushion" or *wastar(ag)* "clothing", which render their exact etymological cognates in Avestan *barəziš-* "cushion" and *vastra-* "clothing" in the Middle Persian translations of Avestan texts, are only attested in their phonographic form, but refer to fabrics commonly used before Middle Persian even existed. Therefore, on the one hand, the fact that only the Aramaic logogram for a raw material, in this case wool, was still used in Middle Persian textile terminology must be interpreted in this particular case as a mere archaism in the writing conventions of the scribes; on the other hand, we cannot infer from the absence of Aramaic logograms for other Middle Persian textile terms that these terms were created in a period after Aramaic was the current language of the Persian administration, even if some of them might, of course, have been incorporated much later in the Middle Persian vocabulary.

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[8] Wrongly written <L'BWŠ'YA> in manuscript TD2.

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Résumé

Les scribes iranophones de la dynastie sassanide (224-651 apr. J.-C.) dans le sud-ouest de l'Iran étaient les héritiers de l'administration araméenne des empires achéménide et parthe. Ils ont continué à utiliser des mots araméens sous forme de logogrammes. Parmi les plus de mille logogrammes araméens attestés en moyen-perse, un seul appartient à la terminologie des textiles, l'araméen <LBWŠYA>, qui désigne le moyen-perse *warr* "laine". Les autres termes dans le domaine des textiles sont attestés seulement dans leur forme phonographique, ce qui ne doit cependant pas nous conduire à supposer que les termes textiles phonographiques ont été intégrés au vocabulaire moyen-perse beaucoup plus tard.

Phonograms and Logograms in Middle Persian Textile Terminology

Nonverbal Aspects of Terminology

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Abstract. Since the topic of this workshop is verbal and nonverbal terminology, and the disciplines of ancient Greek and Latin philology are verbal, the present contribution examines nonverbal aspects of a fundamental set of terms in the discipline of terminology itself and the roots of these terms in past usage and languages.

1. Introduction

According to Cabré, the word "terminology" refers to at least three different concepts, the widest one referring to the whole field of terminology and consisting of "the principles and conceptual bases that govern the study of terms".[2] Since the topic of this workshop is verbal and nonverbal terminology, and the disciplines of ancient Greek and Latin philology are verbal, a different approach is attempted in the present contribution, namely a preliminary terminological investigation of a fundamental set of terms in the discipline of terminology itself and how the linguistic roots of the terms that form the basis of this mostly verbal discipline relate to nonverbal matters.

Plato's dialogue *Cratylus*[3] is concerned with the correctness of terms (ὀνόματα),[4] and

[1] Unless otherwise noted translations are adapted from the Loeb editions. I thank Miguel Ángel Andrés Toledo, Fidelma Ní Ghallchobhair and Matteo Vigo for their help and comments on an earlier version of this article; any errors are of course my own responsibility.

[2] Cabré (1999), 32.

[3] I here follow Ademollo (2011), 1-6; 11-14.

[4] Ademollo (2011), 1: "the term ὄνομα generally applies to any word whose function is not primarily syntactic (hence not to conjunctions and prepositions)" and is "essentially a word that *names* or refers to something". [Emphasis original.]

whether the link between the term and its referent is correct[5] by nature (φύσει) or by convention (κατὰ συνθήκην). The naturalist opinion holds that the term must reveal the nature of its referent through its etymology/informational content: *i.e.* the term "atom" (from Greek ἄτομος "indivisible") would be incorrect because it refers to something subdivisible into quarks, etc. The conventionalist view argues that the term is correct depending only on the agreement between speakers. This does not, however, imply that the views are diametrically opposed; both sides agree that terms have been imposed: in either way a term must be posited. This may be done in accordance with nature (*i.e.* the imposition must conform to a natural criterion) or in accordance with an agreement made with others (the name is a name *qua* its having been imposed).[6] However, we are told that the term is a tool to discern between "what is" or "being":

> ὄνομα ἄρα διδασκαλικόν τί ἐστιν ὄργανον καὶ διακριτικὸν τῆς οὐσίας[7]
>
> "A term is accordingly a kind of didactic instrument which distinguishes being"[8]

The didactic element and its relation to reality have a parallel in the classic treatise of Loïc Depecker, where the concept is explained as:

> "l'élément principal par lequel nous pensons. C'est une unité structurée de pensée par laquelle nous nous formons une connaissance du réel."[9]

While investigating the history of some fundamental terms in the discipline of terminology, the present contribution does not argue for the "naturalist" position. Rather, it considers diachronic aspects of these terms, their roots in past usage and languages, and how the concept they reflected shares important features with those of terminology.

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[5] Ademollo (2011), 3: "a correct name of something is a name which performs successfully the function of a name relative to [a] thing".

[6] *Cf.* Ademollo (2011), 5-6.

[7] Plato, *Cratylus* 388b13-c1.

[8] See Ademollo (2011), 110f. for problems of interpretation.

[9] Depecker (2002), 43; *cf.* Cabré (1998), 42: "a concept is an element of thought, a mental construct that represents a class of objects" and "[l]anguage does not reflect the real world exactly, but rather interprets it".

2. Terminology and term

The discipline of terminology has its name from Medieval Latin *terminus* "term, expression", with the suffix -logy, derived from Latin -*logia*, itself from Greek "-λογία (-*logía*)" roughly meaning "system, account", in English: "the study/discipline of 'X'". The English term was borrowed from German, where it was coined by Christian Gottfried Schütz (1747-1832) and is attested in 1786.[10] According to the *Oxford English Dictionary* "terminology" is first attested in English in 1801, and was given a scientific definition in 1837 by William Whewell as "the system of terms employed in the description of objects of natural history".[11] Also in English, "term" means an "end", and both senses go back to Medieval Latin, where *terminus* was used in various disciplines, *e.g*. geometry, arithmetic and logic, translating Greek ὅρος (*hóros*) "boundary mark".[12] The use of the term ὅρος in the sense of "definition" goes back at least to Aristotle, who in his *Topics* states:

> ἔστι δ' ὅρος μὲν λόγος ὁ τὸ τί ἦν εἶναι σημαίνων, ἀποδίδοται δὲ ἢ λόγος ἀντ' ὀνόματος ἢ λόγος ἀντὶ λόγου.[13]
>
> "A 'definition' is a phrase indicating the essence of something. The definition is asserted either as a phrase used in place of a term, or as a phrase used in place of a phrase."

Terminus used in the sense of the definition or limitation of a word dates back at least to Peter of Spain (13th century) and is used in this sense by Nicole Oresme (14th century); this sense subsequently led to the use of the term *terminus* for a word in a defined or limited sense. In the work of Thomas Aquinas it is used synonymously with words for "word/expression" like *dictio, locutio, nomen*.[14]

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[10] The adjective "*terminologisch*" is attested in 1788; *cf*. Rey (1992), 6 and *OED s.v.* "terminology".

[11] Whewell (1837), III. 307.

[12] *OED, s.v.* term; Du Cange *et al*. (1883-87), VIII, 69; Niermeyer & van de Kieft (2002), 1334.

[13] Aristotle, *Topica* 101b39f.; see further Chiba (2010) and Modrak (2010). It is interesting that initially some apparently favoured this root instead of "*termin*-", *cf*. Kirby & Spence (1815), I, xii: "In the Terminology, or what, to avoid the barbarism of a word compounded of Latin and Greek, they would beg to call the Orismology of the science."

[14] *OED, s.v.* "term". For Oresme, *cf*. Rey (1992), 7. For medieval views and theories of terms and their properties, see Ashworth (2012) and Read (2015).

2.1 Latin

The word *terminus* is not used of verbal limitation in classical Latin, which (as noted above) came with medieval Latin; nor is *terminātio*, *termen*, or *termināre*, but *dētermināre* is used of definition in a wider sense.[15] The term *terminus*, "boundary-post", whose original meaning was extended to denote "limit, end", is related to *termen* "boundary-stone", with further derivatives concerning limitation such as *terminālis* "marking a boundary", *termināre* "to mark the boundaries, limit", *dētermināre* "to delimit".[16] The sense of *terminus* as "boundary, limit" is found in the following passage from the Roman historian Livy:[17]

> *Circumscribit includitque nos terminis montium fluminumque quos non excedamus; neque eos quos statuit terminos observat.*[18]
>
> "The people of Saguntum circumscribe and hem us in with boundaries of mountains and rivers which we may not cross; yet they do not observe those boundaries which they have set."

The roots "*term*-" and "*fin*-" and their derivatives are semantically closely related, as seen in the following passage from Cicero:

> *Non est passus ille vir, qui sceleratissimos cives, qui acerrimos hostes, qui maximas nationes, qui reges, qui gentes feras atque inauditas, qui praedonum infinitam manum, qui etiam servitia virtute victoriaque domuisset, qui omnibus bellis terra marique compressis imperium populi Romani orbis terrarum terminis definisset, rem publicam everti scelere paucorum, quam ipse non solum consiliis, sed etiam sanguine suo saepe servasset.*[19]
>
> "That hero, who by the valour of his victorious arms had conquered our most impious citizens, our bitterest enemies, mighty tribes, kings, savage and hitherto unknown peoples, countless hordes of pirates and a band of slaves as well, who,

[15] Seneca *De beneficiis* 5,18; Pliny *NH* 7,130, 17,34.

[16] *Cf.* de Vaan (2008), 615.

[17] The term *termō* "finishing post in a race" is a loanword from Greek, *cf.* Sextus Pompeius Festus 498 (Lindsay): "*Termonem Ennius Graeca consuetudine dixit, quem nos nunc terminum*".

[18] Livy, *Ab Urbe Condita* 21, 44, 5.

[19] Cicero, *Pro Sestio* 67.

> after he had put an end to all wars both on land and sea, had set the boundary of the Empire of the Roman People at the limits of the world, could not suffer the crimes of a few to overthrow that State which he had often saved not only by his policy, but even by his own blood."

There is also "*Terminus*", the Roman deity presiding over borders.[20] He was celebrated in the festival known as the "*Terminalia*", and both are *e.g.* attested by the poet Ovid, who relates his function of delimitation and keeping peace; the boundary-stones that gave him his name and his antiquity are also mentioned:

> *Nox ubi transierit, solito celebretur honore*
> *separat indicio qui deus arva suo.*
> *Termine, sive lapis sive es defossus in agro*
> *stipes, ab antiquis tu quoque numen habes*.[21]

> "When the night has passed, let the god who separates the boundaries of the tilled lands with his sign receive his wonted honour. O Terminus, whether you are a stone or a stump buried in the field, you too have been deified from ancient times."

> *Conveniunt celebrantque dapes vicinia simplex*
> *et cantant laudes, Termine sancte, tuas:*
> *'tu populos urbesque et regna ingentia finis:*
> *omnis erit sine te litigiosus ager'*.[22]

> "The neighbours meet openly and hold a feast, and sing your praises, holy Terminus: you set bounds to peoples and cities and vast kingdoms; without you every field would be disputed."

2.2 Greek

In Greek terms derived from the root are not used of verbal limitation, only of nonverbal aspects. There is τέρμα (*térma*) "boundary, limit, end, line, turning-post,

[20] Called Τέρμων in Greek, *cf.* Plutarch, *Numa* 16.1.

[21] Ovid, *Fasti* 2, 639-644.

[22] Ovid, *Fasti* 2, 657-662.

highest point, supreme power", while its cognate τέρμων (*térmōn*) means "end, boundary, edge".[23] τέρμα is attested as early as the *Iliad* of Homer:

> στὰν δὲ μεταστοιχί, σήμηνε δὲ τέρματ' Ἀχιλλεὺς
> τηλόθεν ἐν λείῳ πεδίῳ· παρὰ δὲ σκοπὸν εἷσεν
> ἀντίθεον Φοίνικα ὀπάονα πατρὸς ἑοῖο,
> ὡς μεμνέῳτο δρόμους καὶ ἀληθείην ἀποείποι[24]
>
> "Then took they their places in a row, and Achilles showed them the turning-post afar off in the smooth plain; and by it he set as an umpire godlike Phoenix, his father's follower, that he might observe the running and announce the truth."

The noun τέρμων is used by Euripides in the tragedy *Hippolytus* of the limits of the sky:

> Ἑσπερίδων δ' ἐπὶ μηλόσπορον ἀκτὰν
> ἀνύσαιμι τᾶν ἀοιδῶν,
> ἵν' ὁ πορφυρέας ποντομέδων λίμνας
> ναύταις οὐκέθ' ὁδὸν νέμει,
> σεμνὸν τέρμονα κυρῶν
> οὐρανοῦ, τὸν Ἄτλας ἔχει.[25]
>
> "To the apple-bearing shore of the Hesperides, famous singers, would I go my way, there where the lord of the deep-blue mere forbids further passage to sailors, fixing the sacred boundary of the sky, the pillar held up by Atlas."

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[23] *Cf.* Beekes (2009), 1469; Chantraine (1968-80), 1107. For a discussion of the term, *cf.* Lee (1976), especially 73, 77-78. Both are therefore used synonymously with Latin *mēta* (from the root "*meh_1-"), which shares precisely the same semantic extension, originally meaning that which marks a measured space: "cone, cone-shaped turning point > boundary, limit; goal, turning-post; an end, period; turning-point"; Latin also has the denominal verb *mētāri* "to measure off, lay out: use turning-posts to mark off the land". *Cf.* de Vaan (2008), 377. The concept of boundary(-stone) was, as mentioned, also expressed by ὅρος.

[24] Homer, *Iliad* 23, 358-61. See also *e.g.* Herodotus 7.54.

[25] Euripides, *Hippolytus* 742-7.

In Aeschylus' tragedy *Eumenides* we have both τέρμα (*térma*) and ἀτέρμων in the same passage (*atérmon,* the "ἀ-" negates the meaning of the term, like its English cognate "un-"; *i.e*. "without end", describing his inability to escape from the garment):

> ἀπὸ στρατείας γάρ νιν, ἠμποληκότα
> τὰ πλεῖστ᾽ ἄμεινον, εὔφροσιν δεδεγμένη
> <λόγοις, παρέστη θέρμ᾽ ἐν ἀργυρηλάτῳ>
> δροίτῃ περῶντι λουτρά, κἀπὶ τέρματι
> φάρος περεσκήνωσεν, ἐν δ᾽ ἀτέρμονι
> κόπτει πεδήσασ᾽ ἄνδρα δαιδάλῳ πέπλῳ.[26]
>
> "When he returned from his expedition, which had been for the most part a successful venture, she welcomed him with kindly <words and attended him> when he was having a <hot> bath <in a silver> tub, and then at the end spread a garment over him like a tent, hobbled the man in an endless robe she had craftily devised, and struck him down."

The root *term*- also produced the adjectives τέρμιος (*térmios*, always of time: at the end, last) and τερμιόεις (*termióeis*, warp-fringed/"thrummed"), which designates the "thread-end",[27] presumably the end of the warp-thread, as in the *Works and Days* of Hesiod:

> Καὶ τότε ἕσσασθαι ἔρυμα χροός, ὥς σε κελεύω,
> χλαῖνάν τε μαλακὴν καὶ τερμιόεντα χιτῶνα[28]
>
> "Then put on, as I bid you, a soft coat and a fringed cloak to shield your body"

We furthermore have the verb τερμονίζω (*termonízō*) "to delimit borders" and τερμονισμός (*termonismós*) "delimitation" attested in an inscription from Epidauros concerning border regulations:

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[26] Aeschylus, *Eumenides* 633-5.

[27] Like its English cognate "thrum"; *cf*. Mallory & Adams (2006), 236; Barber (1991), 274.

[28] Hesiod, *Opera et Dies* 536-538.

> (..) ἀντιλεγόντων δὲ τῶν Κορινθί|[ων τ]ῶι τερμονισμῶι πάλιν ἀπέστειλαν τοὶ Μεγαρεῖς τοὺς τερμο||ν[ιξ]οῦντας ἐκ τῶν αὐτῶν δικαστᾶν ἄνδρας τριάκοντα καὶ ἕνα κα|[τὰ] τὸν αἶνον τὸν τῶν |Ἀχαιῶν. οὗτοι δὲ ἐπελθόντες ἐπὶ τὰν χώραν | ἐτερμόνιξαν κατὰ τάδε· (..)[29]
>
> "(...) But when the Corinthians objected to the delimitation of the borders, the Megarans again dispatched 31 men of their own judges to delimit the borders according to the decree of the Achaeans. These, having arrived in the area, delimited the borders according to the following: (...)"

Yet another verb, τερματίζω (*termatízō*), has the meaning "to limit, bound" (also "to make an end of, finish"); *e.g.* in the Geography of Strabo:

> Κῦνος δ' ἐστὶ τὸ ἐπίνειον, ἄκρα τερματίζουσα τὸν Ὀπούντιον κόλπον σταδίων ὄντα περὶ τετταράκοντα.[30]
>
> "Cynus is the sea-port, a cape which delimits the Opuntian Gulf, the gulf being about forty stadia in extent."

3. Further parallels

The concept of limitation is of course essential to the discipline of terminology and the situation seen in "term" has parallels in other fundamental terms in the discipline. For example "definition", derived from Latin *dēfīnīre* with *dē-* prefixed to the root *fīni-*; the word *finis* (again) denotes (the concept of) "boundary, limit, border; territory [pl.] (*i.e.* as a set of borders)" and *dēfīnīre* translates as "to bound, to set bounds to; to limit, terminate, define; to fix".[31] The verb is used both of nonverbal and verbal limitation.[32]

The same is true of "designation", ultimately derived from Latin *sīgnum*, "mark, sign", etymologically from the same root as the verb *secāre* "to cut", implying a

[29] *Inscriptiones Graecae* IV^2, 1,71, 8-12.

[30] Strabo, *Geographica* 9.4.2.

[31] There is also *e.g.* the noun *definitio,* attested in the sense of "fixing or marking a boundary", but it is more often used of "a precise description, definition", of "specification" or "classification", and in rhetoric of "a method of argument based on the definition of a term", *cf.* Glare (1996) 501.

[32] *E.g.* Cicero, *Pro Sestio* 67; Varro, *De agricultura* 2.1.10; Quintilian, *Institutio oratoria* 7.3.16.

semantic shift from the root **sek-no-* "what is cut out, carved out" > "sign".[33] *Secāre* itself derives from Proto-Indo-European **sekh$_1$-ie/o-* "to cut off" with the interesting cognate in Hittite *šākk-^{i}/šakk-* "to know, pay attention to", approximately "to carve out (in the mind)"; this has a further parallel in Latin *scīre* ("to know", *cf.* the term "science") < *secāre* ("to cut"). There is also the verb *sīgnāre* "to mark with a sign, indicate, seal" and furthermore *dēsīgnāre*: "to mark out, trace out; to describe, designate, define", also used both of nonverbal and verbal aspects of limitation.[34]

The concept is a mental entity[35] and the term "concept" ultimately derives from the Latin verb *concipere* "to receive (conceive), perceive", composed of the prefix *con-* and the verb *capere*. The prefix *con-* here expresses "enclosure or containing",[36] while the verb *capere* signifies "to take"; *concipere* therefore, in our context, signifies "to conceive or grasp in the mind",[37] *i.e.* the concept is that which is enclosed in the mind, or as stated by Cabré terms do not express the real world as it is "but rather how the individual and community have internalized it".[38] *Conceptum*, however, also denoted nonverbal concepts: the foetus (which is enclosed in the womb), and a measurement of volume or capacity (that which is enclosed in the recipient).[39]

4. Concluding remarks

Terminology, both verbal and nonverbal, has the concept at its core. Since ancient times the term has enclosed the world, allowing us to distinctively represent that which is. In the words of Depecker: "Si l'on se rappelle que, dans notre démonstration, le terme est formé d'une désignation renvoyant à un concept, on comprend que ce n'est pas sur le terme en tant que signe dans une langue que s'appuie l'élaboration de la définition terminologique, mais sur le concept traité".[40] As we have seen in the ancient languages, the roots "*term-*", "*fini-*" and "*sign-*" are concerned with limits and

[33] *Cf.* de Vaan (2008), 563; 550-551.

[34] *E.g.* Virgil, *Aeneid* 5, 755-7; Ovid, *Metamorphoses* 6, 103-4; Cicero, *De oratore* 1, 109.

[35] Depecker (2002), 43: "le concept est l'élément principal par lequel nous pensons. C'est une unité structurée de pensée par laquelle nous nous formons une connaissance du réel"; Cabré (1999), 42, the concept is "an element of thought, a mental construct that represents a class of objects".

[36] Glare (1996), 383.

[37] Glare (1996), 388. See *e.g.* Quintilian, *Institutio oratoria* 8.5.1-2.

[38] Cabré (1998), 42.

[39] *Cf.* Glare (1996), 385

[40] Depecker (2002), 73.

limitation. Diachronical considerations are important and provide a key to the concept behind the terms in them. Knowledge of the roots of terms is also essential in the formation of new terms. Ancient Greek and Latin are of course especially important in scientific terminology and LSP, and the use of neoclassical stems and affixes to form new terms is therefore explicitly recommended by international terminology standards in order to encourage the international nature of designations".[41]

The concept reflected in words formed of the root "term-" are remarkably consistent both diachronically and synchronically in a broad array of languages, both ancient and modern: one of limitation of both the verbal and the nonverbal, as seen in English "term", French "terme", Italian "termine", Spanish "termino", Portuguese "termo", who all continue to represent both verbal and nonverbal aspects of the concept of limitation. Terms and concepts are, as stated by Plato and Depecker, didactic tools through which we are taught to distinguish and delimit reality and our understanding of the world. This concept of limitation is shared with the terminology of the nonverbal world. The discipline of terminology and its own terminology in a multitude of past and present languages is therefore one which is concerned with limits, both of world and word. Terminology teaches us how to designate concepts and to distinguish them through verbal boundary stones. Or, in the words of ten Hacken: "A term is created when precise boundaries are defined".[42]

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[41] Cabré (1999), 89, *cf.* Sager (1990), 87: "Transfer of pure scientific knowledge may benefit from the relatively widespread use of Greek and Latin word elements, especially in those fields of knowledge in which terminology has traditionally been regulated by international committees". Kytzler & Redemund (2007) and Kytzler *et al*. (2007) are useful.

[42] ten Hacken (2015), 7.

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Résumé

Étant donné que le sujet de ce workshop est la terminologie verbale et non-verbale et que la philologie grecque et latine est verbale, cette contribution examine un groupe fondamental de termes dans la discipline de la terminologie elle-même et les racines de ces termes dans l'usage et les langues du passé.

The term "schema" as garb: two incompatible notions? Some examples from ancient Greek

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Mens unum ex duplici schemate schema facit.[1]
The mind makes one schema out of two.
Paul Fleming (1609-1640)
German physician and poet

Abstract. This paper investigates the Greek term *schêma* from a terminological and lexicographical viewpoint. *Schêma* denotes "shape"; it also denotes "dress". Both designations of *schêma* have shown remarkable resilience in the diachrony of Greek. The Medieval and Modern Greek term denotes "monastic dress". The Ancient Greek term combines the concepts of "dress" and "shape". The main thrust of the paper is that the Ancient Greek concept of *schêma* designates the structuring of perceptions that go beyond the shape of the garment clothing the body. The *schêma* of the wearer, it is argued, can be defined as a mode of visual representation which enables the viewer to identify the wearer by means of a set of interpretations or judgements including but not restricted to his/her gender, ethnic origin, social role, or status.

1. Introduction

The terminological study of *schema*[2] is a challenging endeavour for the following reasons:

- because of its dynamic presence in the everyday vocabulary of many spoken languages;[3]
- because of its terminological interdisciplinarity, *i.e.* its prolific use as a term

[1] Epigram 4.10 (Sperberg-McQueen 1993: 408).

[2] Note on the transcription of the word: the reader will find *schêma* for Greek, *schēma* for Latin and *schema* for English.

[3] Σχήμα in Modern Greek, *schema* and *scheme* in English, *schéma* and *schème* in French, *schema* in Italian, *eschema* in Spanish, *eschema* in Portuguese, *Schema* in German are inherited from Ancient Greek σχῆμα directly or via Latin.

in knowledge areas as diverse as medicine and music.[4] This paper is a contribution to the archaeology of *schema* in its specialized usage as a Greek garment term.

Schêma (*σχῆμα*) as a dress term first appears in classical Athens (5th c. BC). It has remained a garment term ever since. It has been part of the specialized vocabulary of ecclesiastical dress since the beginning of the Common Era. Despite the fact that it is continuously attested in the Greek garment lexicon for almost three millennia, it has not caught the attention of scholars in classics, terminology or textile studies.

Schêma lexicalizes a concept which combines the abstract notion of "form, outline" and the concrete notion of "clothing".[5] In the first part of this paper, the "dress" designation of this term is investigated from a lexicographical viewpoint. Both general and specialized dictionaries are examined. This investigation is complemented by a textual approach to attestations of this term which arguably capture some of its previously unnoticed semantic aspects. What follows is, firstly, an outline of the history of this garment term; secondly, a discussion of its treatment in monolingual and bilingual general and specialized dictionaries of Greek; thirdly, a text-based approach to instances of *schêma* with the aim to unfold the complexity of its meaning.

2. The LGP and LSP of *schêma*

The relationship between Terminography, Lexicography for Special Purposes (LSP) and Lexicography for General Purposes (LGP) is a matter of unresolved debate.[6] Our definition of terminography is in accordance with the ISO 704 description of a terminographer's job as "recording and presenting of terminological data, principally in print and electronic media". LSP is addressed to users of various degrees of expertise, students or laypersons.[7]

Schêma is etymologically derived from the ancient Greek verb *ekhô* (ἔχω) *i.e.* to have. Its Latin calque is *habitus*, whence comes Modern English *habit* denoting both "customary manner" and "monastic dress".[8] *Schêma* is polysemous and dynamically present in multiple discourses, both (pre-)scientific and non-scientific. It is attested in literary sources (both poetry and prose) since the 8th/7th c. BC and continuously

[4] *Schema* is a "néologisme de sens" (as opposed to "néologisme ordinaire", Bastuji 1974: 6) covering a wide range of disciplines and knowledge areas as diverse as computer science (*e.g.* database *schema*), linguistics (as a synonym for *frame* and *script*), medicine (*e.g.* nosological *schema*), logic (*e.g.* axiomatic *schema*), music (*e.g.* musical *schema*), philosophy (*e.g.* transcendental *schema*), psychology (*e.g.* image *schema*, *schema* theory), robotics (body *schema*).

[5] "Concept" and "notion" are used interchangeably.

[6] Bergenholtz & Kaufmann (1997); Humbley (1997); Alberts (2001).

[7] Bergenholtz & Tarp (1995), 11.

[8] In the *OED* the etymology of *habit* is from Middle English (early 13th c.), and Old French (12th c. *abit*, *habit)* via Latin *habitus* “condition, appearance” and *habere* "to have". In Lewis & Short (1879) *habitus* (1) B is a synonym of *vestis* "dress, attire".

throughout antiquity. It is also attested in late antique documentary papyri as well as epigraphical sources.[9] It can designate a geometric figure (Plato, Aristotle, the Stoics, Heron of Alexandria),[10] a representation of numbers in the form of geometric figures (Pythagoreans), a figure of a syllogism (Aristotle).[11] It is a term of the specialized medical vocabulary of the *Corpus Hippocraticum*.[12] The Greeks applied *schêma* to visual, acoustic[13] and kinetic sensory data.[14] Besides designating the shape and movement of the human body, it denotes the movement of a cosmic body and is a term in ancient rhetoric[15] and grammar.[16] Several of these senses of *schêma* have attracted the attention of scholars in classical studies;[17] the notion of *schêma* as dress, however, has largely been overlooked.

What follows is a preliminary, non-exhaustive study of the term *schêma* designating dress in dictionaries of Greek and Latin and in the ancient Greek texts spanning the classical to Roman period. Our dictionaries include the standard general dictionaries of Greek and Latin and the only terminological dictionary on Ancient Greek dress.

Despite its limitations due to the appearance of new material and the advances in lexicography since its last (9th) print edition (1925-1940), the Liddell-Scott-Jones (*LSJ*) *Greek English Lexicon* is considered the standard dictionary for Ancient Greek.[18] It contains definitions, translations, synonyms in English and brief referenced citations arranged in chronological order which is deviated from only if the metaphorical sense is attested earlier than the literal sense. We used the online edition which is open source and can be accessed through the online *Thesaurus Linguae Graecae* project (*TLG*).[19]

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[9] *E.g.* the Florence papyrus of the *Biblioteca Medica Laurenziana* (*P. Flor.* 3288, 6th c. AD) mentioning "a soldier's or a priest's or a monk's attire" (*schêma*).

[10] Mugler (1957: 86-87) suggests that the first attestation of *schêma* in the sense of "geometric shape" goes back to Plato.

[11] Aristotle, *Prior Analytics* 26b33.

[12] Jouanna (2004), 47.

[13] *I.e. schêma* of the voice. Plato connects it to tune (*melos*) (Kowalzig 2003). Aristotle identifies it with rhythm (*rhythmos*) (*Metaphysics* 985b16; 1042b14).

[14] *Schêma* denotes a well-ordered pattern of bodily postures and transitions between them (Vallozza 2005:187), and steps (figures) in a dance (Lawrer 1954; Mancini 2004-2005).

[15] *Schêma logou* translates into "figure of speech" via the equivalence between Greek *schêma* and Latin *figura*.

[16] Lallot (2004).

[17] Recent interest in *schêma* (with no particular reference to the garment term) has led to the publication of an edited volume (Celentano *et al.* 2004) and a monograph (Catoni 2008).

[18] Liddell, Scott & Jones (1996). In the first volume ever published on Ancient Greek lexicography Stray (2010: 94-118) and Lee (2010: 119-138) discuss both the history and limitations of the *LSJ*.

[19] http://www.tlg.uci.edu/. The references to instances of *schêma* analyzed in this paper are to the editions accessible through the online TLG digital corpus.

"Dress" is the best candidate as regards translating *schêma* into English, as it is considered an unambiguous and value-free term by modern dress theorists.[20] This sense is placed fairly high up on the list: it is sense 4b out of 10. In lieu of an explanatory or descriptive definition, the LSJ defines *schêma* by means of two synonyms: “dress” and “equipment”. This sense is considered to be an extension of the following two designations: "fashion", "manner".

Montanari's Greek-Italian *Vocabolario dell Lingua Greca (GI)* (first edition: 1995, second edition: 2004),[21] covers the same period as the LSJ, but incorporates new sources along with providing a collation of citations from LSJ and Lampe's Patristic Greek dictionary. It records the following senses of *schêma* in the garment domain: "fashion, type of dress" and "piece of clothing".[22]

Schêma is defined in Lampe's *Patristic Greek Lexicon* as “clothing, habit” and is distinguished into "a. secular", "b. Jewish ecclesiastical", "c. monastic". The last one is further distinguished into "monastic dress of a novice", "big or angelic *schêma*" and "small *schema*".

In Trapp's *Lexikon zur byzantinischen Gräzität* (LBG) the rank of a monk is also defined by his clothing (*schêma*) and is further distinguished into *megaloschêmon* or *megaloschêmos*, *i.e.* "*mit großem Habit*" and *mikroschêmon* or *mikroschêmos*, *i.e.* "*mit geringerem Habit*".[23] It denotes the habit given to both monks and nuns, which is distinguished into the Lesser and the Greater *schêma*. Each successive grade is given a portion of the habit, the full habit being worn only by those in the highest grade. Donning the *schêma* is what distinguishes between orthodox monastic clergy and laity.

The term *schêma* (σχῆμα/σχήμα) denoting "monastic dress" survives in Modern Greek. The compound *megaloschêmos* is used both to designate the high rank of a monk and, derogatorily, to denote a person who falsely appears to be important (roughly equivalent to the English slang *bigwig*). This compound Modern Greek term conceptualizes the element of deceptive external appearance and metaphorizes it into an internal character trait.

Schêma is defined as "diadem, dogma" as well as "shape, figure, form, fashion, manner, posture, attitude" in the standard dictionary of Latin by Lewis and Short.[24] Of all these synonyms only the first one is a garment term and it designates a type of

[20] Lee (2015), 21.

[21] Montanari (2013). Lampe's *Patristic Greek Lexicon* (1968) covers roughly the first millenium of our era (2-8 c. AD); Trapp's *Lexikon zur byzantinischen Gräzität* (2001-2011) picks up after Lampe and covers the height of Byzantine times.

[22] The Italian synonymous terms used to define *schêma* are "moda, foggia, tipo" and "vestito, abito, abbigliamento".

[23] On the *schêma* of monks see Kazhdan (1991), *s.v. schema* and Musin (2010); see Ball (2009-2010) on the *schêma* of nuns. On *schêma* denoting a military costume see Ball (2005), 49.

[24] See Lewis and Short (1879), *s.v. schēma*.

head-dress.

The rising interest in the body and dress in ancient cultures has led to a vast literature on Ancient Greek dress. There has been, however, only one attempt to produce a dictionary on Greek and Roman dress. This reference book on the special lexicon of dress in Greek and Roman culture is part of a well-known series of specialized dictionaries targeted at a mixed readership ranging from the general reader to the specialist (classicist, historian, dress or textile scholar, lexicographer). In the specialized dictionary of terms for dress in Greek and Latin, *schêma* is described as a Greek term only.[25] No reference to the Latin *schēma* (a loan from Greek) is made. *Schêma* is defined as "generally, a shape, or figure, for garments, a fashion or manner of dress or equipment". The coverage of passages and types of texts referenced under *schêma* in this specialized dictionary is limited to literary texts.[26]

Resorting to any or all of these dictionaries does not get one very far as to what type of attire an ancient Greek *schêma* is. The definition "a type of dress" implies any type, an indefinite number of types. Is a typology of *schêmata* at all possible?

3. Modes of dress: decoding textual information

Due to the fact that Greek is a highly inflected language one has to search 29 different grammatical or orthographic variant forms of *schêma* in the TLG alone, which amounts to several thousand instances, not to mention the occurrences in inscriptions and papyri. A second limitation is that the text mining tools available to the classicist do not mine the digital corpora for specific senses. String-based searching is lexeme-based, and the need for a new generation of digital sources and tools to complement the great strides towards e-classics is acknowledged by digital humanities experts.[27] The passages that follow have been selected as indicative illustrations of the usage of *schêma* in ancient Greek literary texts. This is a preliminary investigation into the complexities of this garb term.

3.1 Ethnic *schêma*

In the following extracts *schêma* is used as a visual marker of Greekness, independently of or in conjunction with verbal communication. Sophocles' *Philoctetes,* first performed in Athens in 409 BCE, deals with the story of a Greek warrior who spends ten years on a desert island, abandoned by his comrades. Ten

[25] Cleland *et al.* (2008), 166.

[26] The entry references two citations of Aristophanes (*Knights* 1331, *Acharnians* 64) and one of Xenophon (*Household Management* 2.1 [*sic*]). This is a misprint; the correct citation is Xenophon *Household Management* 2.4.

[27] Crane *et al*. (2007); Stewart *et al*. (2007).

years later, they sail back to the island. In the scene of their first encounter Philoctetes recognizes nothing but the *schêma* of the men; he judges from their *schêma* that they look Greek. His first impression is based on nonverbal data provided by their *schêma*. He asks them to speak so that he can judge by their tongue, whether they are Greeks or not.

> "Your attire (*schêma*) is Greek, and most welcome to my sight; but it would please me to hear your voices and the language you speak."[28]

Greek dress is used as a visual, nonverbal mode to define Greekness. The *Constitution of the Athenians*, a treatise of unknown authorship, describes the political system of ancient Athens in an unfavourable light. In the following extract the Athenians are criticized for dressing in styles that are not wholly Greek:

> "the Greeks rather tend to use their own dialect, way of life, and type of dress, but the Athenians use a mixture from all the Greeks and non-Greeks."[29]

Lucian's *Anacharsis* is a dialogue set in early 6th c. BC Athens between Solon, one of the seven Sages, and a Scythian philosopher, Anacharsis, who was the most famous barbarian to adopt Greek ways. The dialogue starts with Anacharsis' request to find a shady place. The eponymous *persona loquens* had not brought his Scythian hat (*pilos*) with him because he "did not wish to be the only person among the Athenians to look like a foreigner".[30] Anacharsis could speak the local language of Athens proverbially well. His claim to a Greek identity would be thwarted only by his wearing foreign headgear. He would rather sweat in the sun than wear his Scythian hat, which would make him stand out as the barbarian other. In this particular instance *schêma* carries information on ethnic and cultural provenance.

3.2 Canonical and non-canonical *schêma*

In the extracts below, *schêma* applies to funeral attire, the personal style of dress that Socrates adopted and refused to abandon, the typical dress of philosophers, and several cases of reclothing motivated by an attempt to dissimulate the identity of the wearer.

Demetrius was one of Alexander the Great's successors to the throne of

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[28] Sophocles, *Philoctetes* 223-225. The translations of the Greek texts are my own unless otherwise mentioned.

[29] *Constitution of the Athenians* 2.8.

[30] Lucian, *Anacharsis* 16.27: ὡς μὴ μόνος ἐν ὑμῖν ξενίζοιμι τῷ σχήματι "for I do not wish to be the only one dressed in foreign attire".

Macedonia. The following extract from Plutarch, his biographer of Roman times, describes the majestic funeral arranged by his son:

> "Moreover, there was something dramatic and theatrical even in the funeral ceremonies of Demetrius. When his son Antigonus learned that his remains had been sent home, he put to sea with his entire fleet and met them off the islands. They were given to him in a golden urn, and he placed them in the largest of his admiral's ships. Of the cities where the fleet touched in its passage, some brought garlands to adorn the urn, others sent men in funeral attire (*schêma*) to assist in escorting it home and burying it."[31]

Plato's *Crito* is a dialogue on justice between Socrates and his wealthy friend Crito. Crito had suggested to Socrates to escape from prison, leave Athens and go to Thessaly. In the following extract Socrates talks of what would happen if he opted for escaping to Thessaly. He says that the people there, who had the reputation of being the most profligate among the Greeks, would enjoy hearing about how he had changed his *skeuê* (trappings) and his *schêma* (dress) so as not be recognized. Socrates' final choice was to refuse to change both externally and interally. He stayed in prison and drank the hemlock. Changing his *schêma* would also mean changing his way of life. The type of dress that Socrates refuses to wear (*diphthera,* "animal hide") points to the culturally inferior way of life led by the Thessalians.

> "You will go to Crito's friends in Thessaly; for there great disorder and lawlessness prevail, and perhaps they would be amused to hear of the ludicrous way in which you ran away from prison by putting on a disguise, an animal's hide (*diphthera*) or some of the other things in which runaways dress themselves up, and changing your fashion of dress (*schêma*)."[32]

What was the *schêma* of a philosopher? What was Socrates' *schêma*? Socrates dressed in very simple, threadbare clothes, that he did not change in any kind of weather. Cynic philosophers donned a threadbare cloak, carried a stick in the hand, and a leather pouch strapped round the neck. This was an easy style to adopt and the number of pseudo-philosophers was growing. The Roman historian Herodian (2nd - 3rd c. AD) mentions that a man appeared before Commodus "dressed like a philosopher" (φιλοσόφου φέρων σῆμα),[33] and the philosopher Epictetus, in a chapter of his *Discourses as Reported by Arrian*, refers "to those who quickly jump

[31] Plutarch, *Life of Demetrius* 53.3.

[32] Plato, *Crito* 53d 1-7.

[33] Herodian, *History of the Empire from the Death of Marcus* I 9.3.7.

to adopting the *schêma* of a philosopher".[34] His aim for writing it is to complain that anyone can simply pass for a philosopher by adopting the *schêma* of the philosopher: wearing a cloak and growing a beard.

Xenophon's *Education of Cyrus* is the fictional biography of Cyrus the Great, the author's contemporary Achaemenid king. Xenophon portrays Cyrus as the ideal ruler. In the following extract Cyrus is told about how the wife of a Susian, whose husband was away on an embassy when the Assyrian army was captured, was spotted to be the lady among the slave-girls even though she was dressed exactly like them. Her humble attire (s*chêma*) was in contrast with her noble countenance (*euschêmosynê*). By adopting humble clothes she intended to conceal her social status. But her *euschêmosynê* along with her height, grace and beauty made her stand out.[35] In the following passage *schêma* designates "clothes", while the noun *euschêmosynê* refers to the woman's elegance despite the humble clothes she wears.

> "When we came into the tent, we did not make her out at first, for she was seated on the ground with all her maidens round her, and she was clad in the same attire as her slaves, but when we looked at them all to discover the mistress, we soon saw that one outshone the others, although she was veiled and kept her eyes on the ground. And when we bade her rise, all her women rose with her, and then we saw that she was marked out from them all by her height, and her noble bearing (*eu-schêm-osyne*), and her grace, and the beauty that shone through her humble apparel (*schêma*). And, under her veil, we could see the big tear-drops trickling down her garments (*peploi*) to her feet."[36]

Disguising by donning different clothes indicates a change in form. In the following passage from Flavius Josephus' *Antiquities of the Jews* (1st c. AD), Jeroboam asks his wife to disguise herself as a man so that she could travel more freely without being recognized. The most obvious change was to leave her woman's clothes aside and take the garments of a private person, one who is not engaged in public affairs. Obviously, this meant that she changed to simple attire:

> "[Jeroboam] urged his wife to lay aside her robe (*stolên*) and to dress in the garments of a private person (*schêma idiotikon*)....She did as her husband admonished her, and changed her habit (*meta-schêma-tisamenê*) and came to the city Shiloh."[37]

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[34] Epictetus, *Discourses as Reported by Arrian* 4.8. The Greek title of the chapter is Πρὸς τοὺς ταχέως ἐπὶ τὸ σχῆμα (*schêma*) τῶν φιλοσόφων ἐπιπηδῶντας.

[35] In ancient Greek culture physical beauty depended a lot on the concept of shape. *Euschêmosynê* denotes the property of having a nice *schêma*. Ugliness was also conceived as want of form (*schêma*): "ugly" is *a-schêm-os*, which literally means "lacking shape or form", *cf.* "misshapen".

[36] Xenophon, *Education of Cyrus* 5.1.5. Translation by W. Miller (1914).

[37] Flavius Josephus, *Antiquities of the Jews* 8.266.

Meta-schêma-tisamenê is a participle of the verb *meta-schêmatizô*, a cognate of *schêma* and a compound verb form of *schêmatizô.* The simple verb *schêmatizô* means "1. give a certain form to a thing, shape, fashion" and "2. deck out, dress up". The compounds *kata-schêma-tizô* and *meta-schêma-tizô* also have primary senses related to dress: the former means "dress up" or "invest with"; the latter means "disguise oneself". The compound noun *metaschêmatismos* means "transfiguration, transformation".

Diogenes Laertius wrote accounts of the lives of the cynic philosophers, Crates of Thebes and Hipparchia of Maroneia. Hipparchia followed Crates in adopting the cynic way of life: assuming the same clothes (*schêma*) that he wore, she lived on equal terms with him. Hipparchia appeared in public dressed in men's clothes. This was unheard of in ancient Athens, where women spent most of their time leading very secluded lives in the *oikos*, hidden from public eyes and did not go out, not even to the market place:

> "She [Hipparchia] chose [to be with Crates] and, adopting the same dress (*schêma*), she went about with her husband and lived with him in public and went out to dinners with him."[38]

Written at roughly the same time as *Philoctetes*, Euripides' *Bacchae*, the poet's last tragedy, was written during his final years in Macedonia and staged for the first time in Athens just before the close of the civil war between Athens and Sparta. The theme is the god Dionysus' return to Thebes to spread his religion and avenge his mother's death. In the guise of a human, Dionysus convinces king Pentheus to dress in women's clothes in order to observe their orgiastic rituals unnoticed.

PENTHEUS	What is the robe (*stole*) to be? A woman's? I am ashamed.
DIONYSUS	Your eagerness to see the Maenads goes no further?
PENTHEUS	But what dress (*stole*) do you say you will dress me in?
DIONYSUS	I will make your hair grow long.
PENTHEUS	Describe the second adornment (*kosmos*) used for my disguise (*schêma*).
DIONYSUS	You will wear a robe (*peploi*) reaching long to your feet; on your head you will wear a mitra.[39]

[38] Diogenes Laertius, *Lives of Eminent Philosophers* 6.9 6 - 9 8 .

[39] Euripides, *Bacchae* 827-833.

When Pentheus asks twice "how am I to dress?" Dionysus answers "in a *peplos* (a kind of dress) and a *mitra* (a kind of headdress)". There is no doubt here that *schêma* refers to Pentheus' deceptive manner of dress consisting of women's clothing and headgear.[40] This passage, cited by LSJ and GI, is a particular case of *schêma* used for deception. While *kosmos* refers to the typically female *peploi* and *mitra*, *schêma* adds a nuanced meaning. It denotes the deviation from what Pentheus, being a man, would typically wear.

3.3 *Schêma*-dress is a political statement

In the following two instances, *schêma* is a nonverbal political statement. The mode of dress is not only socially but also politically important: the democratic leader, the tyrant, the supporter of the conservative wing differ in terms of the way they dress, their *schêma*.

In his *Life of Romulus*, the cofounder of Rome with his brother Remus, Plutarch uses the *exemplum* of Romulus’ change in *schêma* to point out the corrosive effect power has on people when they become leaders:

> "This was the last war waged by Romulus. Afterwards, like many, nay, like almost all men who have been lifted by great and unexpected strokes of good fortune to power and dignity, even he was emboldened by his achievements to take on a haughtier hearing to renounce his popular ways, and to change to the ways of a monarch, which were made hateful and vexatious first by the state (*schêma*) which he assumed. For he dressed in a scarlet tunic, and wore over it a toga bordered with purple, and sat on a recumbent throne when he gave audience."[41]

Schêma-dress forms the body of the wearer while shaping the mind of the viewer. The same term is used in the context of systems of government as a synonym of "form of governance" (*schêma* of the *archê*).[42] This conceptual link is exploited by Aristophanic comedy. In Aristophanes' *Knights* the rejuvenated *Demos*,[43] a

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[40] *Cf.* Casevitz (2004), 20-21.

[41] Plutarch, *Life of Romulus* 26.1-2. Translation by B. Perrin (1914).

[42] In the *Life of Numa* 2.7.6 Plutarch uses the term *schêma* to refer to the Roman system of government called "*interregnum*" (*mesobasileia*). In classical Athens Thucydides in his *History* (6.89.6.1-4) of the civil war between Athens and Sparta uses the term *schêm*a to refer to the form of government that made Athens a strong and free city (*polis*). Strabo, a historian and geographer of mid 1st c. BC - mid 1st c. AD, writes in his *Geography* (1.1.18.12) that the law provides the type (*tupos*) and the form (*schêma*) to the state (*polis*).

[43] Aristophanes, *Knights* 1331-2. The personal name *Demos* is a pun on the noun *demos* which denotes the body of citizens in the Athenian democracy. Aristophanes puts on the theatre stage a man whose name is "People"!

personification of the body of Athenian citizens, changes into new clothes, but is now dressed in "antique style" (*schêma*), with golden cicadas, the hair-style accessory of the old Athenians, a symbol of their authochthony, *i.e*. the fact that they inhabited Athens from earliest known times. The antithesis between *Demos*' old and the new style, reflected by his clothes and accessories, becomes a symbol of the state. His *schêma* is a powerful assertion of an ancient and noble identity which is authentic and better than the new one, which is, in turn, replaced by the old one. The old style symbolizes the oligarchs, the new symbolizes the democrats, and the old which replaces the new one reflects Aristophanes' own political affiliation. The *polis*, the political parties and *Demos*' clothes are intertwined so as to produce a comic effect through symbolic associations which put across the latent political message that Aristophanes wished to suggest.

4. Discussion

In concluding this study of the term *schêma* we would like to note that s*chêma* is perhaps the term with the longest presence in the Greek vocabulary of dress. Since its first occurrence in the sense of "dress" it never lost its sartorial meaning. While starting out as a hyperonymous term in the semantic field of clothes, around the first centuries CE the term shifted its semantic content to designate "monastic dress" and it forms part of the Greek nonsecular vocabulary of dress to the present day.

We would like to underline two main characteristics of *schêma*:

1. The term highlights the conceptual connection between the shape of the clothed body and the fabric that wraps it. Clothes surround and “re-create” the body by defining its shape against the surrounding world. Ancient Greek clothing consisted of loose draped fabric. Besides texture, pattern and colour, shape is a striking feature of handwoven textiles that we amply observe in ancient Greek art, especially on painted pottery scenes. *Schêma* is shared with the viewer to communicate the material presence of the clothed body, but it can also be manipulated by the wearer for the purpose of deception.

The concept of form is not foreign to garment terms. The English compound garment term *uniform* also contains the element of shape. A *uniform* denotes exactly this: a stable, consistent, unvarying form of a garment. The word literally means “of a single form” and may imply an obligation, membership of a group, a set of rules governing the choice of dress. Unlike *uniform*, *schêma* is not strictly regulated. It is a sort of styling of a person's appearance which is exactly as it appears. It is also a styling created to form the wearer's appearance, or tampered with to change the wearer's appearance. In this case, *schêma* is intentionally deceptive. In both cases, *schêma* is styled according to a set of beliefs and expectations of what a certain style should look like: the style of a Greek or a foreigner (*xenos*), of Socrates, of a philosopher or an impostor who wants to appear to be a philosopher, a democratic leader or a tyrant, a royal woman who wants to pass for one of her maids. *Schêma* engenders, but it can also be used to cross gendered boundaries.

Schêma is the organization of the experience of the form of the garment. But it also has explanatory power over the clothed body, *i.e*. the human figure that it is wrapped around. There is an information-processing mind behind the ancient Greek concept of *schêma. Schêma* unlocks a bundle of complex sensory data concerning the wearer's attire which renders it recognizable and, by extension, the wearer.

2. The study of *schêma* has also shown that dress is embedded in fundamental aspects of ancient culture and cognition. *Schêma* is a stable fashion of dress that one is expected to have as a member of the community. Ancient Greek *schêma* can convey information on the ethnic, cultural, and social background, professional activity, or gender of the wearer, enabling the ancient Greek viewer to identify the wearer by his/her *schêma* and to form judgements about where he/she came from, his/her social rank and role, his/her ethnic origin and cultural affiliation. The possibility of manipulating external components of appearance, especially dress, explains its occurrence in cases of disguise. *Schêma* is central to individual role-taking on the part of the wearer and to forming judgements on the part of the viewer. Changes of *schêma* are not value-free. Non-Scythian dress donned by a Scythian leader is frowned upon by his fellow-Scythians as conflicting with the role of being their leader.

Schêma relates to group membership: it shows that one shares the same cultural and social values as in the case of Anacharsis. *Schêma* can be manipulated to create the false impression that its wearer is part of a team, but it may not reflect the rest of characteristics which are more crucial to membership as in the case of pseudo-philosophers. Change of *schêma* closes off some identities, while it opens others, as in the case of the imprisoned Socrates. The notion of *schêma* is interlinked with a particular societal role. The individual's use of *schêma* is part of their role performance. A military or religious *schêma* facilitates and enhances role execution. In the case of monastic *schêma*, it also means choosing a new way of life. *Schêma* and way of life are interlinked in the case of the imprisoned Socrates, who refuses to alter his *schêma,* because he does not want to change his way of life.

The term *schêma* conceptualizes the use of clothing as a visual language, a way of systematic visual communication within the social system. *Schêma* is beyond adornment, it is the essence of appearance; there is no figure, no presence without it. There is no shared and negotiated space, no connection established between self and others without it. In the classical Greek *polis* culture, the social fabric of clothes forms, shapes and outlines the nexus of the *polis* as a sociopolitical entity. Dressing in a known *schêma* is establishing a common ground. The political sphere is defined by the notions of garment and cloth. Dress as expressed through *schêma* is a defining feature of Greek political tradition.

5. Conclusion

Dress is an important channel of nonverbal communication. This function of dress is captured most effectively by the Ancient Greek term *schêma,* which fulfills a number of functions besides clothing the body. It denotes what forms the outline of the wearer's body, but the information it carries is not limited to the wearer's figure alone. *Schêma* expresses the reality of visual display of clothing, while being a statement of social rank, definition of social role, indication of status, connotation of political affiliations. We hope that this preliminary study has adequately shown the merit of analyzing the term *schêma* from a terminological viewpoint for those engaged in textile studies, classical studies, and also in terminology.

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Résumé

Le mot *schéma* est employé dans plusieurs langues et disciplines. En grec moderne il désigne des vêtements ecclésiastiques, la phrase «schéma monastique» repérant au point de différence entre le clergé orthodoxe et la laïcité. L'article examine quelques exemples du terme provenant du grec ancien portant le sens «vêtement».

The term “schema” as garb: two incompatible notions?

La représentation du verbal et du non-verbal dans le discours de vulgarisation et de semi-vulgarisation technique

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Résumé. Nous partons dans notre étude de la différence qui existe entre le discours technique et le discours scientifique pour montrer le rôle du verbal et du non-verbal dans la transmission du savoir, qualifié de savoir-faire dans le discours technique, par opposition à un savoir « hypothétique » dans le discours scientifique. Les textes étudiés relèvent du domaine d'Internet et sont rédigés en arabe. Nous questionnons le rôle du verbal et des contextes avoisinants dans lesquels baignent les termes. Qu'ont-t-ils de particulier ? Quels sont les mécanismes verbaux mobilisés pour la maîtrise des concepts et l'acquisition du savoir technique dans les textes de vulgarisation et de semi-vulgarisation ? Toutefois, se contente-t-on uniquement du verbal pour diffuser un savoir technique ? Ou le recours au non-verbal vient-il assister les diffuseurs de ce savoir dans leur démarche et affirmer la finalité du discours technique ? Sous quelles formes le non-verbal se manifeste-t-il ?

1. Introduction

Pour définir les textes ou discours techniques, il serait judicieux et probant de les mettre en opposition avec les textes ou discours scientifiques afin de discerner une homologie fausse et inexacte véhiculée rien que par de nombreux titres d'articles et de recherches publiées qui laissent entrevoir une osmose parfaite entre les deux types de discours. En effet, les discours techniques sont axés sur deux points essentiels : la compréhension et l'action. Ils sont construits de manière à ce que le lecteur puisse bien saisir le contenu des informations et des indications afin de les mettre en exécution. En revanche, dans les textes scientifiques, il s'agit de transmettre une information factuelle destinée à des lecteurs qui cherchent à comprendre uniquement un certain phénomène. Il s'agit donc d'une formation purement intellectuelle. *Grosso modo*, dans les textes traitant à titre d'exemple du clonage, il ne s'agit pas d'apprendre aux lecteurs à cloner, tandis que dans les textes traitant d'Internet, on donne toujours aux lecteurs des indices

susceptibles de les aider à bien utiliser et à bien profiter du réseau mondial. Ainsi, avec Fabienne Cusin-Berche :

« [...] nous proposons, à titre d'hypothèse, de considérer qu'un texte technique est un texte qui a pour finalité de transmettre un savoir-faire. Ce critère permet de l'opposer au texte scientifique qui aurait pour fonction de faire découvrir un savoir en construction […]. La démarche adoptée dans le texte scientifique serait, donc, a priori plus hypothétique et démonstrative que descriptive […][1] ».

Tout se joue donc au niveau de la finalité des deux discours. Au travers des discours scientifiques, s'élaborent des connaissances humaines, se construisent et s'affinent des savoirs qui nous permettent de mieux connaître l'univers dans lequel nous évoluons, ainsi que toute sa complexité. Et au travers des discours techniques et des informations qu'ils véhiculent, nous serons capables d'entreprendre des applications concrètes, guidés vers l'utilisation de ces savoirs et vers leur fonctionnement, et tentés par la curiosité d'un essai sans laquelle il serait vraiment absurde de progresser.

Nous passons maintenant à la notion de technicité qui peut être définie comme étant le caractère technique d'un texte. Cette notion implique des degrés différents d'après lesquels sont classés les textes techniques. Ce sont les critères extra-linguistiques, à savoir l'auteur du texte, le public visé, l'utilisation des schémas et figures, et les critères linguistiques, notamment définitoires et reformulatoires, qui décident du degré de technicité des textes spécialisés. Trois degrés ou niveaux de spécialisation pourraient être envisagés :

- des textes hautement spécialisés : émetteur et récepteur, pour reprendre la terminologie de Roman Jakobson[2] dans son schéma lié aux facteurs constitutifs de l'acte de communication verbale, sont tous les deux spécialistes du domaine.
- des textes de semi-vulgarisation : ce sont les textes écrits par des spécialistes pour un public averti ou avisé de niveau de formation universitaire.
- des textes de vulgarisation : dans ce genre de textes, seul le récepteur fait partie du grand public, alors que l'émetteur peut être à la fois un spécialiste et un non-spécialiste du domaine.

Quels sont les mécanismes linguistiques et extralinguistiques mis en œuvre dans ces trois types de discours ? En d'autres termes, un spécialiste en informatique a-t-il besoin

[1] Cusin-Berche (2003), 115.

[2] Voir Jakobson (1963), 213-214.

de définir, d'expliquer ou de reformuler son discours lorsqu'il s'adresse à son homologue ? Ou encore a-t-il besoin de schématiser pour lui dire comment faire fonctionner telle ou telle application ? À cette question, point de doute, la réponse est certainement non. En revanche, des mécanismes verbaux de types explicatifs et définitoires sont mobilisés dans les discours de vulgarisation et de semi-vulgarisation afin d'aider à la compréhension des concepts. Ces mécanismes sont supplantés par d'autres non-verbaux qui permettent, comme le montreront plus loin les exemples choisis, de rendre efficace l'acquisition du savoir-faire technique. De toute évidence, et comme nous le verrons plus loin, le recours au non-verbal dans ce genre de discours vient conforter les diffuseurs de ce savoir dans leur démarche et affirmer la finalité du discours technique, discutée plus haut. Cependant, sous quelles formes le verbal et le non-verbal se manifestent-t-ils ? Et dans quel endroit du texte interviennent-ils ? Ces questions font l'objet d'une réflexion que nous soulevons dans cette présente étude.

2. Spécificités du terme technique

Sur le plan morphologique, il n'est pas question de parler de différences à proprement dit entre termes et mots du vocabulaire général. Pierre Lerat affirme que :

> « les termes sont descriptibles selon les modes d'analyse linguistique, comme tout mot ou toute suite de mots : on peut les répartir en classes grammaticales, leur assigner une fonction syntaxique et une distribution, les conjuguer ou les décliner, évaluer leur orthographe et leur prononciation [...][3] »

Mais comment justifie-t-on très souvent cette difficulté d'appréhension du sens du terme technique ? Est-elle liée à la complexité du système conceptuel auquel ne peut avoir accès que le spécialiste du domaine ? Ou encore à un fonctionnement sémantique particulier des termes techniques comme le note Louis Guilbert : « Notre recherche consiste ici […] à propos des termes scientifiques et techniques, à nous demander s'ils n'ont pas leur manière particulière de signifier[4] » ?

Donc le rôle du référentiel prime souvent sur le rôle du morphologique. Ceci a été souligné aussi par Fabienne Cusin-Berche à travers un exemple relevant du discours culinaire et gastronomique français :

[3] Lerat (1995), 26.

[4] Guilbert (1973), 9.

> « [...] quel que soit le degré de complexité intellectuelle de l'objet discursif ou de l'univers référentiel actualisé – qu'il s'agisse de recette de cuisine ou de théorie mathématique –, le non-initié est confronté à des éléments linguistiques connus dont il est difficile, voire impossible dans certains cas, de saisir le sens particulier. Ainsi, lorsqu'un cuisinier explique à un novice que pour fabriquer une andouillette : « il faut que le charcutier ait gratté puis raidi les chaudins, qu'il ait coulé le menu de bœuf pour embosser les brasses puis qu'il les ait refourrées avec de la robe et réglées dans du bouillon » [...], il plonge son interlocuteur dans un abîme de perplexité plus grand que s'il usait d'une langue étrangère ; car ce dernier éprouve l'impression diffuse d'être en présence d'un système lexical et syntaxique usuel tout en prenant conscience de son incapacité à interpréter l'énoncé[5] ».

Même l'analyse morphosémantique, ou morphologique de type compositionnelle pour accéder au sens d'un terme peut s'avérer trompeuse au dire de Fabienne Cusin-Berche[6]. Prenons un exemple de notre domaine : le terme « firewall » (pare-feu en français). Cette métaphore anglaise a pour origine le vocabulaire général dans lequel nous trouvons le mot « firewall ». Employé métaphoriquement dans le discours d'Internet, le terme « firewall » signifie un rideau qui interdit, neutralise et met fin aux flux d'information en provenance des réseaux publics. Donc il existe un lien d'analogie entre le mot « firewall » et le terme relevant du domaine d'Internet « firewall » qui est le suivant : /rideau qui arrête un danger/. Or, une analyse morphosémantique de la dénomination anglaise « firewall » montre que cette dernière est un composé nominal formé de deux noms (fire + wall) et portant en lui un trait d'opacité au niveau sémantique. Autrement dit, il est difficile de déterminer la relation sémantique exacte entre les deux noms « fire » (feu) et « wall » (mur), c'est-à-dire de savoir exactement si le terme « firewall » est un mur de feu (a wall of fire) ou s'il est un mur contre le feu (a wall against fire). Ce phénomène n'est pas du tout nouveau en anglais ; il constitue un aspect typique de tous les noms composés anglais. D'ailleurs, Jean Tournier souligne qu'il est pratiquement impossible d'étiqueter avec une précision suffisante la relation sémantique entre les noms composés en anglais[7].

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[5] Cusin-Berche (2003), 94.

[6] Cusin-Berche (2003), 100.

[7] Voir Tournier (1991), 4.

Peut-on ainsi adhérer à la conception de Louis Guilbert[8] qui voit que la signification du terme passe nécessairement et uniquement par le volet référentiel, ou bien aller plus loin encore en disant que c'est dans la définition, et à travers elle, que se stabilise, se fixe et s'identifie toute la dimension référentielle, et par la suite le concept deviendra motivé à travers la formulation et l'identification d'un nombre important de traits conceptuels.

3. La définition comme moyen d'identification de nombreux traits conceptuels

Ceci nous amène donc à l'importance de l'expression d'un plus grand nombre de traits conceptuels d'un concept donné, ceci se faisant notamment par le recours aux définitions terminologiques. Par représentation verbale dans les discours de vulgarisation et de semi-vulgarisation, nous entendons le contexte définitoire et/ou la définition qui décrit le concept, le délimite, et le place à l'intérieur du système conceptuel en permettant de le distinguer des autres concepts du même domaine de spécialité. Robert Dubuc et Andy Lauriston soulignent que le contexte définitoire, qui selon eux est plus large que la définition elle-même, contient une quantité suffisante d'informations susceptibles de clarifier le concept :

> « *A defining context contains descriptors in sufficient quantity and quality to convey a very clear image of the concept covered by the term, from which a true definition could be readily inferred*[9] ».

Quant à la définition, elle permet de circonscrire un concept, délimiter son appartenance à un domaine, et montrer ses relations avec d'autres concepts appartenant au même domaine. Elle peut être de deux genres : définition par intension et définition par extension. La définition par intension, appelée aussi définition par compréhension, décrit la compréhension d'un concept, en indiquant le concept superordonné (c'est-à-dire le générique) ainsi que les caractères distinctifs. La définition par extension décrit un concept en énumérant tous les concepts subordonnés (c'est-à-dire les spécifiques) correspondant à un critère de subdivision. Il faudrait à cet égard souligner que la définition par intension est la définition la plus utilisée en terminologie, comme le montrent nos exemples ci-dessous tirés du domaine d'Internet.

[8] Voir Guilbert (1973), 9.

[9] Dubuc & Lauriston (1997), 83.

Selon Henri Béjoint[10], et d'une façon générale, la définition répond à deux fonctions essentielles :

- Une fonction normative : elle fixe le sens du terme de façon autoritaire.
- une fonction cognitive : elle sert à faire comprendre à un utilisateur potentiel un terme qu'il ne connaît pas.

Dans cette lignée cognitive, Marie-Claude L'Homme[11] a, à son tour, fait usage des définitions terminologiques dans les dictionnaires informatiques pour démontrer, qu'à travers elles, des liens conceptuels entre des termes du même domaine peuvent être dégagés, et des familles conceptuelles créées et représentées dans des arborescences, et ce dans une optique de modélisation et d'implantation dans un processus d'extraction automatique et semi-automatique.

Cependant, dans les textes de vulgarisation et de semi-vulgarisation techniques, la fonction de la définition dépasse le cadre cognitif et normatif pour s'insérer plutôt dans un cadre socio-linguistique qui tient compte du lecteur, de ses connaissances, de ses besoins et de ses attentes. Ainsi, elle instaure un dynamisme faisant du lecteur un vrai utilisateur impliqué de plus en plus dans le processus de construction des connaissances et de leur utilisation. Elle revêt différents genres ou formes et se rapprochent beaucoup d'un contexte définitoire au sens expliqué ci-dessus par Robert Dubuc et Andy Lauriston.

Examinons les définitions suivantes en langue arabe – suivies de leur traduction en langue française – tirées de notre corpus qui est un corpus assez large formé de 1575 pages représentant 38 références écrites réparties entre livres, revues, brochures, rapports, cours et glossaires, en provenance de 11 pays arabes[12] :

> « [...] نريد أن نوضح ما المقصود بالحاسب المضيف Host Computer؟ هو الحاسب المركزي الذي يقوم باستقبال وتوزيع البيانات على جميع الوحدات الطرفية (Terminal) أو الحاسبات الشخصية الموصولة على هذا الحاسب، ويستطيع تخزين كميات هائلة من البيانات لاحتوائه على وحدات تخزينية ذات سعة تخزين عالية جدا [...] »[13].

[10] Voir Béjoint (1993), 19.

[11] Voir L'Homme (2003), 25-48.

[12] Voir Affeich (2010), 62-77.

[13] Rayyan (2001), 18.

« المستعرضات هي برامج تُتيح لك استعراض الإنترنت بأكثر من طريقة، وتمكّنك من الحصول على أكبر فائدة ممكنة من الويب [...] وأشهر مستعرِضين هما مايكروسوفت إنترنت إكسبلورر Microsoft Internet Explorer ونيتسكيب نافيغيتر Netscape Navigator »[14].

« لغة النص المترابط هي لغة برمجية تُستَخدَم لبناء صفحات الويب، وتتكوَّن من نصوص (texts)، ورموز (tags) تحيط بعناصر الوثيقة (document elements) وتحدّدها، وتبيِّن هذه اللغة للبرنامج المستعرِض ما ينبغي عمله عند النقر على رابطة معيَّنة وتنشيطها »[15].

« Nous voulons expliquer ce que veut dire un ordinateur hôte. C'est l'ordinateur central qui reçoit et distribue des données à tous les terminaux ou les ordinateurs personnels connectés à cet ordinateur, et peut stocker des mégadonnées puisqu'il contient des unités de stockage caractérisées par une capacité de stockage très élevée. »

« Les navigateurs sont des logiciels qui te permettent de naviguer sur Internet par différents moyens, et te permettent de profiter au maximum du Web […]. Les deux navigateurs les plus connus sont Microsoft Internet Explorer et Netscape Navigator. »

« Le langage HTML est un langage de programmation utilisé pour créer des pages Web. Il contient des textes et des balises qui entourent et marquent tous les éléments d'un document. Ce langage indique au navigateur ce qu'il doit faire quand on clique sur un lien hypertexte afin de l'activer. »

Ces trois définitions relèvent de ce que nous pouvons appeler définition par hyperonymie, où l'hyperonyme représente la classe dans laquelle est inclus le terme défini. Les trois hyperonymes sont respectivement : /ordinateur central/, /logiciels/, et /langage de programmation/. Le trait conceptuel mis en exergue dans ces trois définitions est essentiellement la fonction.

La première définition établit un lien entre le terme défini « host computer » (ordinateur hôte) et « terminal units » (terminaux). Ce dernier terme est à son tour défini

[14] Bachir (2002), 23.

[15] Bachir (2002), 53.

par l'auteur comme étant les ordinateurs personnels reliés à l'ordinateur central. Cet emboîtement de définitions est un procédé caractéristique des discours de vulgarisation technique où l'on tente de définir et d'expliquer tous les concepts sans exception.

Dans la deuxième définition, on voit que l'auteur s'adresse directement au lecteur-utilisateur à travers l'utilisation du pronom qui indique la deuxième personne du masculin singulier (tu en français), indice caractéristique des procédés de rédaction des textes de vulgarisation technique dans lesquels ce lecteur-utilisateur est au cœur de l'opération de transmission du savoir technique et de la mise en application de ce savoir. De plus, tout comme la première définition, nous remarquons un emboîtement de définitions à travers l'utilisation de la définition par l'exemple en citant les deux navigateurs les plus connus : Microsoft Internet Explorer et Netscape Navigator, l'exemple étant un fait réel qui sert à clarifier le concept.

Dans la troisième définition, un lien conceptuel relie le terme défini « langage HTML » au terme « pages Web », par l'intermédiaire de la fonction du langage HTML qui consiste à créer des pages Web.

Examinons le deuxième paquet de définitions en arabe, qui sont suivies de leur traduction en français :

> « كلمة شات Chat تعنى محادثة، وهى من الخدمات المهمة التى توفرها الشبكة، فيمكنك محادثة اى شخص متصل بك على الشبكة كتابة أو بالصوت أو بالصوت والصورة إذا كان لديك كاميرا رقمية ولديه كذلك [...] »[16]

> « يُطلق بعض الناس على عملية الحوار عبر الانترنت اسم الدردشة »[17].

> « لكل موقع من مواقع الويب عنوان فريد يُسمّى العنوان الإلكتروني، وهو عنوان يتكفّل بتحديد مصدر الموقع (أي الجهاز الخادم الذي تمّ تخزين الموقع عليه) والمسار الذي يتمّ تتبّعه للوصول إلى الموقع، [...] ولهذا يُدعى العنوان الإلكتروني بمحدِّد موقع المصدر »[18].

[16] Abdel-Mawla (2001), 42.

[17] Bachir (2002), 44.

[18] Bachir (2002), 21.

> « Le mot Chat signifie conversation. C'est l'un des services importants qu'offre Internet. Tu peux dialoguer avec toute personne connectée à Internet par écrit ou par audio, ou par audio et vidéo si vous possédez tous les deux une webcam. »

> « Certaines personnes appellent le dialogue en ligne chat. »

> « Chaque site Web a une adresse unique appelée adresse électronique. Cette adresse indique l'emplacement du site Web (c'est-à-dire le serveur sur lequel est stocké le site) et le chemin suivi pour accéder au site […] c'est pourquoi elle est appelée localisateur uniforme de ressources. »

Ces trois définitions sont des définitions par synonymie, où le lien entre le terme défini et les autres termes qui figurent dans la définition ou le contexte définitoire sont des liens basés sur la synonymie : /chat/ est le synonyme de /conversation/, /dialogue en ligne/ est le synonyme de /chat/, et /adresse électronique/ est le synonyme de /adresse universelle/. Les auteurs ne se contentent pas d'une définition par synonymie (surtout dans la première et la troisième définition), très souvent qualifiée de définition qui ne permet pas de distinguer le terme défini des autres termes de son genre, menant ainsi à un cercle vicieux ne donnant aucune information sur le concept, mais ils fournissent plus d'explications à travers des suites de contextes définitoires ou explicatifs.

Le quatrième type de définition est la définition par antonymie, où le lien entre le terme défini et les autres termes qui figurent dans la définition ou le contexte définitoire sont des liens basés sur l'antonymie, les antonymes étant des termes qui appartiennent à la même classe mais qui ont des sens opposés. Prenons l'exemple suivant en arabe suivi d'une traduction en français :

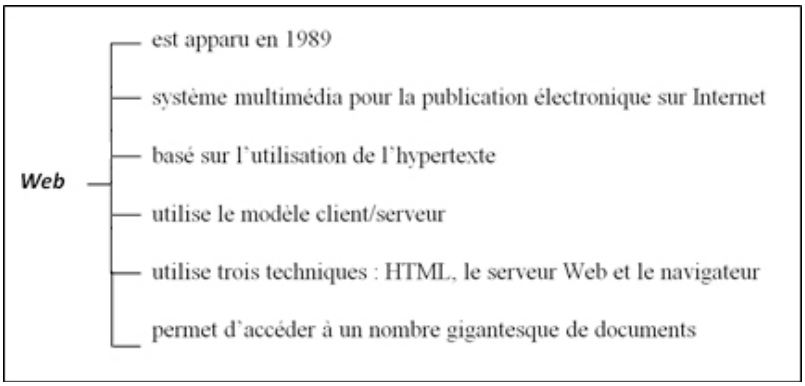
> الصيغتان GIF وJPEG هما الصيغتان الأكثر استخداما في ملفات الصور المنشورة في مواقع الويب، ولكن يُفضَّل استخدام كل منهما في حالات معينة؛ فالصيغة JPEG يُفضَّل استخدامها للصور الفوتوغرافية؛ لأن صيغة JPEG تُتيح نسبة ضغط عالية تخفّض حجم ملف الصورة الفوتوغرافية الذي يكون كبيرا في العادة، أما الصيغة GIF فهي أصلح لرسوم وصور الكمبيوتر المبنية باستخدام تطبيقات معينة؛ لأن هذه الصيغة تعتمد على جدول ألون ذو 256 لوناً؛ مما يجعل ملفاتها أصغر حجما وأسرع تنزيلا[19].

[19] Bachir (2002), 55.

> « GIF et JPEG sont les formats les plus utilisés pour les fichiers d'images publiés sur les sites Web. Cependant, chaque format doit être de préférence utilisé à des fins différentes ; il est préférable d'utiliser le format JPEG pour les images, puisqu'il permet un taux de compression élevé qui réduit la taille, généralement grande, des fichiers. Quant au format GIF, il est plus approprié aux dessins et aux images informatiques qui utilisent certaines applications, puisqu'il s'appuie sur une palette de 256 couleurs, ce qui rend la taille des fichiers plus petite et de ce fait, ce sera plus rapide de les télécharger. »

GIF et JPEG appartiennent tous les deux à la même catégorie : celle des formats utilisés dans la création des images, mais avec des différences rapportées par le contexte définitoire.

Les textes de vulgarisation et de semi-vulgarisation laissent apparaître plusieurs catégories de définitions et des contextes définitoires pluriels qui ne sont pas les mêmes et qui varient selon les auteurs. C'est pourquoi la définition peut porter sur la nature de la chose, sa fonction, son utilité, son origine, son rôle, ses caractéristiques, son mode d'utilisation, etc. Cette pluralité de contextes définitoires qui donnent des informations textuelles sur le(s) concept(s), met en relief des traits de définition qui, une fois regroupés et classés au sein d'un « schéma définitionnel », servent par la suite, dans une approche terminographique, à la rédaction de définitions dictionnairiques. Nous sommes partis à la recherche de traits de définition dans notre corpus, et pour le faire nous avons choisi le terme « Web » que nous avons soigneusement examiné dans plusieurs contextes définitoires. Ainsi, nous avons réussi à dégager et regrouper dans un seul plan les traits suivants :



Les contextes définitoires[20] qui nous ont permis de dégager ce schéma sont les suivants :

ظهر الواب سنة (1989) عندما قام (Tim Bernest-Lee) [كذا] الذي يعمل بالمركز الاروبى للبحث الذرّى (CERN) الموجود بمدينة "جنيف" بسويسرا بوضع البروتوكول (HTTP)[...][21].

(Le Web est apparu en (1989) quand (Tim Bernest-Lee) [sic], qui travaille au laboratoire européen pour la physique des particules (CERN) à « Genève », a mis au point le protocole (HTTP) […]).

إنّ خدمة الوب [...] هو نظام للمعلومات الفائقة Hypermedia على شبكة الإنترنت وهو نظام مبنيّ على تقنيّة النصوص الفائقة hypertext [...][22].

(Le Web […] est un système d'information hypermédia (Hypermedia) sur Internet ; c'est aussi un système basé sur l'utilisation de l'hypertexte (hypertext) […].

[20] Ces contextes sont suivis de leur traduction en langue française.

[21] Ben Abdallah Zayed (2005), 55.

[22] Abed (2003), 9.

تعمل خدمة الوب بالنموذج زبون/مخدم (Client/Serveur)، أي أن برنامجا زبونا يعمل عادة على حاسوب المُستثمِر (المُستعرِض) يرسل طلباً بالبيانات المرغوبة إلى البرنامج المُخدِّم الذي يعمل على حاسوب أخر [كذا] في مكان ما على شبكة الإنترنت. عندما يتلقّى المُخدِّم الطلب فإنه يرسل البيانات إلى برنامج المّستعرِض عبر الشبكة[1].

(Le Web fonctionne grâce au modèle Client/Serveur, c'est-à-dire qu'un logiciel client se trouvant dans l'ordinateur de l'utilisateur (le navigateur) envoie une demande de ressources souhaitées à un logiciel serveur situé dans un autre ordinateur relié à Internet. Lorsque le serveur reçoit la demande, il envoie alors les données voulues au logiciel client).

4. Les illustrations comme moyen d'expression non-verbale complémentaire du moyen d'expression verbale

Maria Teresa Cabré souligne que « l'illustration est une unité iconique qui reproduit l'idée que les individus ont d'une classe donnée d'objets de la réalité[23] ». Elle affirme que dans un dictionnaire, la représentation d'un concept pourrait se faire à l'aide d'une définition ou d'une illustration[24]. Partant de là, l'illustration est comme la définition, un moyen permettant de décrire un concept représenté par une dénomination.

De leur côté, Christian Galinski et Heribert Picht soulignent que ce moyen de communication ne cesse de prendre de l'ampleur et qu'il constitue un supplément aux définitions, capable de réorienter la terminologie et la diffusion du savoir auprès d'un grand nombre d'utilisateurs :

> « *Thus we can imagine the expansion of the writing systems and representational forms of expression found in traditional texts toward the use of visual and other nonverbal forms of representation designed to provide more complete, multifaceted communication to a broader range of user groups. Forms that today are mainly static in nature will in the future be increasingly expressed using dynamic, multidimensional forms of representation*[25]. »

[23] Cabré (1998), 181.

[24] Voir Cabré (1998), 181.

[25] Galinski & Picht (1997), 58.

Ces représentations n'ont pas une valeur ludique ou esthétique, mais peuvent être vues comme une preuve de l'importance du non-verbal dans la représentation des connaissances et leur mise en application. Par association de l'écrit et du visuel dans les discours de vulgarisation et de semi-vulgarisation technique, on pourrait exprimer suffisamment de traits conceptuels, et le grand public ou le public apprenti se trouve rassuré par des explications qui répondent à ses besoins.

La représentation non-verbale dans les discours d'Internet se fait essentiellement par le recours aux copies d'écran qui suivent ou précèdent l'explication verbale, facilitant beaucoup la tâche de l'utilisateur et confirmant le passage facile et aisé de ce qui est information au niveau théorique à la pratique. Les exemples dans notre corpus sont nombreux, nous en retenons que : pour définir toutes les fonctions sur la page de recherche Google, les auteurs[26] donnent tout d'abord à leur lecteur un exemple de recherche effectué à l'aide de Google, puis procèdent ensuite dans le tableau qui suit la définition de chaque fonction à part. Les fonctions définies, numérotées aussi sur la copie d'écran de 1 à 13, sont les suivantes : le bouton « Web » (1), la case de recherche (2), le bouton « Rechercher » (3), la fonction « Recherche avancée » (4), la fonction « Préférences » (5), la « barre des statistiques » (6), « l'adresse de la page » (7), « la taille du texte » (8), la fonction « En cache » (9), la fonction « Pages similaires » (10), « le texte sous le titre » (la description) (11), « les fichiers PDF » (12) et « la version HTML » (13).

Dans un deuxième passage, l'auteur[27] définit dans le texte arabe la fonction « Favorites » qui figure dans le navigateur « Internet Explorer », puis explique ensuite, à l'aide d'une représentation non-verbale comprenant deux copies d'écran, la démarche à faire pour y accéder et sauvegarder les sites favoris. Dans ce but, le lecteur est aussi guidé, dans le texte comme dans les deux copies d'écran, par des indices verbaux qui marquent les étapes à suivre : des verbes à la deuxième personne du mode indicatif : /clique sur…/, puis /choisis/, une nouvelle fenêtre apparaît, /identifie le fichier/.

5. Conclusion

Certains chercheurs ont montré dans leurs travaux les avantages, mais aussi les limites de la représentation non-verbale des concepts. Dans la terminologie du textile à titre d'exemple, et dans un article paru dans la *Revue des Lettres et de Traduction* de l'Université Saint-Esprit de Kaslik (USEK), Susanne Lervad affirme d'une part que

[26]Al-Saghir *et al.* (2005), 106-107.

[27]Bachir (2002), 26-27.

« les illustrations fonctionnent comme un élément unifiant désignation et définition[28] », et va jusqu'à constater que les définitions peuvent dans certains cas disparaître au profit de l'intégration des éléments graphiques. D'autre part, elle montre comment il est difficile parfois de représenter tous les traits caractéristiques d'un concept à l'aide d'une représentation non-verbale. « Il est difficile par exemple de montrer la matière ou la souplesse d'un tissu à l'aide de moyens non-verbaux[29] », dit-elle. Il en est de même pour Christian Galinski et Heribert Picht qui trouvent que certains concepts ne peuvent pas être représentés visuellement :

> « *There are obvious limits to the use of nonverbal representation in cases where concepts cannot be represented visually, e.g., the taste of wine, the "hand" of a fabric, or abstract concepts such as a "court judgment" or a (legal) "right"*[30]. »

Or, dans le domaine d'Internet qui, pouvons-nous dire, est devenu un domaine vulgarisé, la représentation non-verbale s'avère nécessaire et impérative, comme il s'agit d'un domaine où les concepts représentent essentiellement des outils et des fonctions conçus pour être maniés. De façon générale, et comme le note Michel Marcoccia « en réintégrant la dimension pictographique dans l'écrit, [on] opère un étonnant retour aux sources de l'écriture[31] », puisqu'il ne faudrait pas oublier que le premier homme des cavernes faisait appel aux dessins et aux gravures sur pierre pour écrire des récits et des histoires. Dans l'Égypte antique, les Pharaons ont également utilisé le hiéroglyphe, écriture pictographique, pour communiquer entre eux.

De retour à la définition, représentation verbale des concepts, nous pouvons conclure, d'après notre corpus, qu'elle n'est point rationnelle, elle est, au contraire, ancrée dans les pratiques sociales, et liée aux connaissances de l'utilisateur. En matière d'acquisition des connaissances, elle est faite pour répondre aux besoins souhaités par chaque lecteur-utilisateur, besoins certes différents d'un utilisateur à un autre et d'un contexte à un autre.

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[28]Lervad (2013), 48.

[29]Lervad (2013), 48.

[30] Galinski & Picht (1997), 44.

[31]Marcoccia (2000), 5.

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Abstract

Our study starts by stating the differences between technical and scientific discourse in order to show the role of verbal and nonverbal representation in the transmission of knowledge, called know-how when it comes to the technical discourse, as opposed to "hypothetical" knowledge when it comes to the scientific one. The texts we have studied belong to the field of the Internet and are written in Arabic. We investigate the role of the verbal context surrounding the terms. What are its special features? What are the verbal mechanisms used to master concepts and acquire technical knowledge in popularized and semi-popularized technical discourses? Do we only use verbal representation to transmit technical knowledge? Or does the use of nonverbal representation aim at assisting those who spread this knowledge and at strengthening the purpose of the technical discourse? What are the forms of nonverbal representation?

La formalisation psychanalytique : réflexions terminologiques et traductologiques

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Résumé. L'édifice terminologique de la psychanalyse est nourri de nombreux emprunts interdisciplinaires : d'une part, les sciences naturelles et pures de la fin du XIXe siècle, telles que la physique, la chimie, la thermodynamique, qui aident à élaborer la topique freudienne; d'autre part, les disciplines structuralistes des années 50 et les sciences exactes, dont l'algèbre, la topologie et la théorie des graphes, utilisées par Jacques Lacan pour formaliser l'inconscient à partir de 1955. Ce travail présente les raisons de la tentative de formalisation de la psychanalyse, décrit ensuite celle-ci et réfléchit finalement sur le statut des représentations non-verbales lacaniennes quant à leur rapport à la terminologie et à la traduction, celle-ci répondant, contrairement à la formalisation mathématique, à un curieux souci plutôt verbal.

1. Introduction

La naissance, l´évolution et la diffusion d´une discipline invite à des analyses épistémologiques qui vont rendre compte de son statut, de ses méthodes et de ses objets. Or, qu´en est-il pour ses mots ? En dehors de la littérature et de la langue d'usage, l'édifice terminologique de la psychanalyse est nourri de nombreux emprunts interdisciplinaires : d'une part, les sciences naturelles et pures de la fin du XIXe siècle, telles que la physique, la chimie, la thermodynamique, qui aident à élaborer la topique freudienne ; d'autre part, les disciplines structuralistes des années 50 et les sciences exactes, dont l'algèbre, la topologie et la théorie des graphes, utilisées par Jacques Lacan pour formaliser l'inconscient à partir de 1955. Lecteur, traducteur, enseignant et exégète de l´œuvre freudienne, Lacan s'approprie un discours qui dominera la scène psychanalytique et culturelle française de la deuxième moitié du XXe siècle.

2. La psychanalyse lacanienne : de nouveaux transferts, reflets d´une nouvelle époque

A la différence de Freud, chez qui il existe des concepts métapsychologiques fondamentaux, il y a chez Lacan ce qu´on pourrait appeler des « signifiants théoriques[1] » dont l´usage varie. Pour Lacan, la psychanalyse a aussi à voir avec le discours scientifique : « La psychanalyse n´est pas une religion. Elle opère à partir des mêmes conditions que la science » affirme-t-il dans son Séminaire 11 de 1964, bien que des années plus tard, en 1977, il changera d´avis. Ce souci de rigueur scientifique le conduit à radicaliser sa théorie psychanalytique en termes linguistiques et mathématiques, disciplines sur lesquelles se base sa formalisation.

Il est important de voir chez Lacan l´évolution de son enseignement du point de vue diachronique. Pour ce faire, il est possible de marquer des périodes de sa démarche sur un chemin qui part des écrits plutôt psychiatriques et médicaux pour s´étendre aux questions linguistiques et plus tard mathématiques et topologiques. Sa terminologie sera donc de plus en plus hermétique et ses théorisations seront aux limites de la traduction. Assoun rappelle que « Freud invitait avec insistance à ses lecteurs à enregistrer la date de chacun de ses écrits pour le situer selon sa pensée de l´époque » et que chez Lacan « il est essentiel également de prendre note du moment auquel correspond l´énoncé respectif [2] ».

Toute l´œuvre de Lacan doit être comprise dans le cadre de la lecture qu´il entreprend de la production de Freud. C´est lors de ses séminaires à l´hôpital Sainte-Anne dès 1953 qu´il se consacre à cette tâche, ayant pour auditoire des écrivains, des philosophes, des médecins et des psychanalystes. Sa démarche est la suivante : il emprunte les concepts cliniques de Freud que, d´après lui, les autres analystes avaient trahis, et se réfère à la philosophie pour mettre en place l'armature théorique de son approche. Celle-ci, loin de se limiter à paraphraser son maître, s´avère extrêmement innovante.

2.1 Les transferts de la linguistique

C´est la lecture de l´œuvre anthropologique de Claude Lévi-Strauss qui rapproche Lacan de la linguistique. A la suite de ses lectures il énonce sa phrase célèbre:

« l´inconscient est structuré comme un langage[3] ».

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[1] Assoun (2004), 26. Pour ce travail, nous avons consulté la version en espagnol. Désormais, les traductions des citations sont de nous.

[2] Assoun (2004), 40.

[3] Phrase prononcée le 15 mars 1967, lors de la séance n° 14 de son *Séminaire* 14 sur *La logique du fantasme*.

Les méthodes et les modèles de la linguistique moderne inscrite dans le courant structuraliste depuis Saussure l'aident à construire sa théorie du signifiant. Sans vouloir nous appesantir sur la théorie lacanienne, nous rappelons la rupture qu´instaure Ferdinand de Saussure par rapport à la philosophie du langage, discipline qui était tombée dans l´impasse de la « mentalisation » de la réalité. La théorie du signe linguistique constitué par la relation arbitraire et indissociable (nous soulignons) entre signifiant et signifié va être adoptée et reformulée par Lacan : la relation indissociable avancée par Saussure devient dissociable pour Lacan, le signifiant (formalisé comme S) l´emportant sur le signifié (s) dans l´expérience psychotique. Le signifiant devient donc autonome et se différencie des autres signifiants, auxquels il renvoie dans sa *chaîne signifiante*. Ce signifiant est pour Lacan le désir inconscient, désir ayant une logique qu´il faut déchiffrer selon la logique du langage.

C´est de son recours à la linguistique qu'est issue la première tentative de formalisation de cette relation entre signifiant et signifié, connue sous le nom d'*algorithme saussurien*. Il y a dans ce transfert, non seulement l´adoption de termes et leur reformulation (tel le cas de *métonymie*, *métaphore*, *lettre* et bien d'autres), mais aussi la conception d´une théorie étayée par les découvertes du structuralisme linguistique, à laquelle s'ajoutent plus tard des préoccupations relevant des mathématiques et de la topologie.

2.2 Les transferts des mathématiques et de la topologie

En effet, le transfert des termes issus des mathématiques et de la topologie constituent chez Lacan sa dernière théorisation sur l´inconscient, le désir, les pulsions et le fantasme. Dans les années 70, Lacan formalise de plus en plus le discours de la psychanalyse en créant la notion de *mathème* et en précisant sa lecture topologique. La production théorique de la psychanalyse passe en effet de la métapsychologie à la « mathématisation ».

Le néologisme *mathème* provient du mot *mathématiques*, probablement par analogie avec le mot *mythème* utilisé par Claude Lévi-Strauss pour désigner les composants de base des systèmes mythologiques. Le suffixe « structuraliste » *-ème* inscrit le néologisme dans la lignée incontestable de ce courant des années 50[4]. Le mot sert à désigner l´ensemble des symboles algébriques qui, n'étant « ni individualisés ni personnalisés[5] » sont susceptibles de plusieurs significations et servent donc à éviter toute tentative d´interprétation intuitive ou univoque. Cette formalisation constitue un idéal à atteindre pour formaliser la psychanalyse et engendrer de multiples effets de sens.

Les termes reformulés par la théorie lacanienne qui évoquent le domaine des ma-

[4] Alphonse Daudet avait curieusement utilisé le mot *mathemata*, d´après ce qu´atteste Assoun (2004), 164.

[5] Cléro (2002), 46.

thématiques et de la topologie des nœuds sont *graphe* (notamment le *graphe du désir), nœud borroméen, tore* et *cross-cap.* La présence de termes mathématiques dans la terminologie lacanienne a fait l´objet d´études, mais aussi de critiques de la part de certains auteurs. Alain Cochet consacre deux travaux à cet aspect du discours lacanien[6]. C´est ce même transfert qui sert de critique aiguë aux scientifiques Jean Bricmont et Alan Sokal dans leur texte *Impostures Intellectuelles* et qui a soulevé tant de polémiques dans le milieu des sciences sociales[7].

3. Les représentations non-verbales lacaniennes

Les raisons pour lesquelles Lacan décide de formaliser sa théorie sont claires : tout d'abord, pour donner à la psychanalyse un statut scientifique. À l'instar de Claude Lévi-Strauss, Lacan remarque dans son Séminaire 20 son but et son idéal d'arriver à une formalisation mathématique, car c'est cette formalisation qui est l'empreinte de la science moderne ; ensuite, contrairement à ce que l'on pourrait en croire, cette scientificité n'est pas synonyme d'univocité mais d'éclatement des sens, car il cherche à éviter la connaissance intuitive de la psychanalyse en se servant de formules algébriques qui, en tant que symboles, pourront être lues de manières diverses, ce qui facilite l'entrée des notions dans le domaine du symbolique ; finalement il prône pour un corps de connaissances formalisées qui pourront être comprises même par ceux qui n'ont jamais suivi un traitement psychanalytique.

La formalisation lacanienne adopte, selon Assoun[8] trois formes typiques d'expression : tout d'abord les schémas et les graphes des années 1955-1960, ensuite les emprunts topologiques des années 1962-1972 et finalement les *mathèmes* (néologisme lacanien né en 1971), la théorie des discours et les formules de la sexuation des années 1972-1973, autant de formalisations déployées pour rendre compte des notions du sujet, du désir, de la sexuation, des discours, de l'inconscient et des dimensions du symbolique, de l'imaginaire et du réel. Or, au-delà des analyses psychanalytiques, nous nous arrêtons sur les implications terminologiques et traductologiques de ces formalisations[9].

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[6] Cochet (1998 et 2002).

[7] Bricmont & Sokal (1997). A propos de « l´affaire Sokal », voir une approche linguistique qui nous intéresse directement comme linguiste : Gaudin (2000).

[8] Assoun (2004), 156.

[9] Les figures topologiques ne sont pas inclues dans notre analyse car elles n'impliquent pas de questions terminologiques. Il s'agit de figures qui conservent leurs propriétés géométriques malgré leur déformation continue. Lacan s'en sert pour mettre en évidence la logique du discours en tant qu'élément élastique, changeant, dans l'espace inconscient. Pour ce faire, il fait appel à plusieurs figures, dont : *i*. la bande (ou ruban) de Möbius qui, en se tordant sur elle-même, montre le passage de l'intérieur vers l'extérieur sur une même surface ; *ii*. le nœud borroméen, figure constituée de trois anneaux dont la section d'un seul libère les deux autres (c'est d'ailleurs le symbole des Jeux olympiques) qui représente l'indissociabilité des dimensions du réel, du symbolique et de l'imaginaire; *iii*. et

3.1 Schémas et graphes

Les schémas et les graphes servent à mettre en relation de nombreux concepts, en particulier l'opposition clé en psychanalyse entre l'imaginaire et le symbolique. Notons par exemple la manière dont se présentent ces relations sur deux schémas de cette première étape :

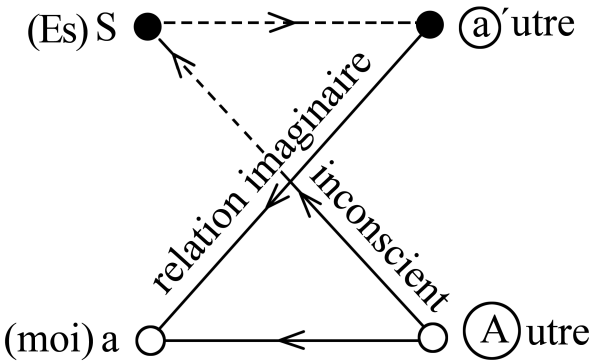

FIG. 1 – *Le schéma L (source : Lacan (1966), 47).*

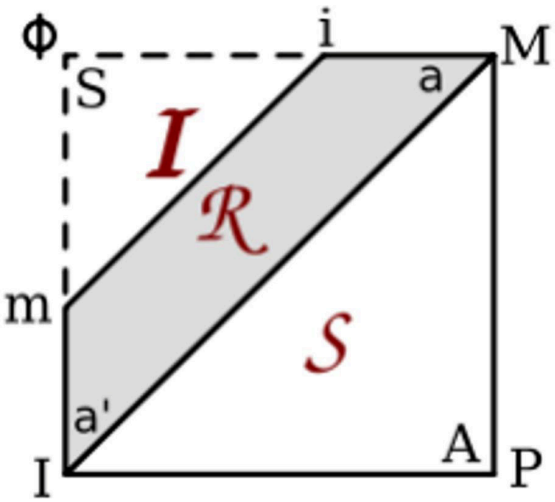

FIG. 2 – *Le schéma R (source : Lacan (1966), 534).*

le tore, anneau tridimensionnel sous forme de bouée, qui représente certains traits de la structure du sujet.

Comme on peut l'observer, ces deux schémas sont constitués de lettres, de lignes, de flèches et de mots. Aussi bien la typographie que la place des éléments jouent un rôle fondamental dans ce qui est appelé « l'algèbre lacanienne ». Ainsi, les lettres en bas représentent la dimension imaginaire, tandis que celles en haut renvoient au symbolique. Les différences entre italiques, apostrophes, lettres grecques et majuscules ou minuscules aident à installer l'analyse des éléments de base, par exemple le sujet (S), le moi (a), le petit autre (a') et le grand Autre (A). Ces schémas deviennent plus complexes lorsque Lacan creuse son analyse et introduit ces célèbres *mathèmes*.

3. 2 Les *mathèmes*

Ce sont les formules mathématiques qui deviennent pour Lacan les meilleurs outils d'énonciation de l'inconscient et de nombreuses notions psychanalytiques. L'algèbre lacanienne est élaborée à partir de S/A/a, qui sont lus comme Sujet/grand Autre et petit autre. Ces lettres sont donc à la base de la mathématisation du fonctionnement du fantasme et de la pulsion, pour n'en citer que deux notions, comme suit :

mathème du fantasme : $◇ a (lu comme « S barré poinçon petit a »)

mathème de la pulsion : **$** ◇ D (lu comme « S barré poinçon demande »)

Les différences typographiques sont essentielles et servent à construire différentes notions, dont les suivantes : D (demande) ; d (désir) ; M (mère symbolique) ; m (moi) ; P (père symbolique) ; **$** : Sujet barré.

Or, cette notation se heurte à des écueils au moment d'essayer de construire une terminologie précise ou de traduire la théorie lacanienne à d'autres langues, en l'occurrence vers l'anglais ou vers l'espagnol, ce sur quoi nous présenterons nos dernières réflexions.

4. La terminologie et les questions de traduction

La terminologie lacanienne présente de nombreux défis aussi bien aux terminologues qu'aux traducteurs. D'une part, les symboles algébriques, loin d'être univoques et atemporels, ont subi des changements et ne réfèrent pas au même concept au long de l'enseignement de Lacan. Ainsi, Evans[10] prévient sur la prudence avec laquelle il faut lire les mathèmes et remarque le cas du symbole *s,* qui désigne d'abord le *signifiant* mais est utilisé ensuite pour désigner le *sujet-supposé-savoir.*

[10] Evans (1997), 33. Pour ce travail, nous avons consulté la version en espagnol.

D'autre part, les théorisations lacaniennes sont aux limites de la traduction. En font preuve les multiples notes de bas de page que les traducteurs sont tenus de rédiger lorsqu'ils se consacrent à la tâche de transposer les mathèmes, les calembours, les mots-valises et les néologismes caractéristiques des *Séminaires*[11]. Ainsi, dans la version anglaise des *Écrits*, Alan Sheridan (1977) rend le symbole A (qui représente la notion de l'Autre) pour O (Other, « Autre » en anglais), pratique à laquelle Lacan lui-même s'opposait, d'après ce qu'Evans expose dans son dictionnaire. Pour sa part, la traductrice argentine Irene Agoff consacre une note de bas de page au problème de la traduction de « grand A » et de « petit a », et sa décision de rendre ces concepts soit comme « gran Otro » ou « pequeño otro » respectivement, soit comme « gran A » ou « pequeño a », ceci pour des raisons d'économie textuelle[12] .

La lecture des mathèmes en tant que formules mathématiques pose également le problème de l'énonciation, tel le cas de la lecture du mathème du fantasme en anglais, rendu comme « the diamond-shaped lozenge » ou les calques et les emprunts en espagnol « Sujeto barrado losange pequeño a ». Cette quête du calque et de l'emprunt au détriment de la traduction d'un équivalent plus naturel de la langue espagnole sont souvent à l'origine des faux-sens dans les traductions, source fréquente du manque de compréhension du discours lacanien. Le souci verbal de transposer au langage courant les formalisations répond à une nécessité inévitable que Lacan lui-même reconnaît, ne serait-ce que « pour bien expliquer ce qu'on va faire[13] ».

5. En guise de conclusion

Le caractère fortement initiatique de l'enseignement de Lacan semble protéger l'objet freudien de la banalité et de la vulgarisation. Pour ce faire, il faut « parler en lacanien[14] », ce qui entraîne souvent, non seulement dans les traductions mais aussi dans les interprétations des spécialistes, un certain pastiche et plagiat. En tout cas, pour nous, comme traductrice et chercheure, la terminologie et le discours lacanien sont une source inépuisable d'investigations qui invitent toujours à des réflexions sur les dimensions du langage et de l'inconscient à la surface de l'énonciation et de la traduction interlinguistique.

[11] Pour une lecture de ses aspects, voir Gentile (2004, 2006, 2008 et 2012).

[12] Dans Assoun (2004), 63.

[13] Lacan (1975), cité par Cléro (2002), 46.

[14] Assoun (2004), 21.

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Abstract

The terminological structure of psychoanalysis draws on numerous interdisciplinary borrowings: on the one hand from the natural and fundamental sciences at the end of the 19th century – such as physics, chemistry, and thermodynamics that contributed to the development of the Freudian discipline; on the other hand, the structuralist disciplines of the 1950s and the exact sciences, including algebra, topology, and graph theory, which were used by Jacques Lacan from 1955 to formalise the unconscious. This contribution presents the reasons for the attempt to formalise psychoanalysis, then describes this process, and, finally, reflects on the status of Lacanian nonverbal representations in relation to terminology and translating. This latter, in contrast to typical mathematical formalizations, generally rather deals with curious, more verbal, concerns.

A New Danish Project in Textile Terminology: *textilnet.dk*

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Abstract: *textilnet.dk* is a digital dictionary of historical and contemporary textile terminology containing entries for materials, techniques, fabrics, and clothing mainly from the 1700s and 1800s. The first phase of the project is now completed and *textilnet.dk* is available on the internet. The overall aim of the dictionary is to preserve and disseminate knowledge of the intangible cultural heritage that this terminology represents. Fundamentally, the scope is Danish, but many of the terms are of foreign origin, for example French, English and Indian terms.

1. Introduction

The website *textilnet.dk* is a digital dictionary of historical and contemporary concepts and terms relating to textiles and clothing as well as the manufacturing techniques associated with these crafts.[1]

The idea for the dictionary emerged in a professional network of Danish textile researchers: Dragtpuljen. Behind the project is a working group of a number of textile researchers including staff from the National Museum of Denmark, Designmuseum Danmark, the Centre for Textile Research at the University of Copenhagen and Den Gamle By (the National Open Air Museum of Urban History and Culture). The daily work on the dictionary takes place in Den Gamle By.

2. Aims and background

Many of the terms found in *textilnet.dk* are no longer used in contemporary language, often because the production of a certain fabric or the use of a certain

[1] The database is available at www.textilnet.dk and comments may be sent to textilnet@dengamleby.dk. The project *textilnet.dk* was generously funded by: HM Queen Margrethe's and HRH Prince Henrik's Foundation, HM King Frederik and HRH Queen Ingrid's Foundation, The Augustinus Foundation, The Farumgaard Foundation, The Danish Ministry of Culture, Termplus ApS, and the National Open Air Museum of Urban History and Culture, to whom we wish to express our grateful thanks.

costume ended many years ago and, therefore, the meaning of the terms for these items has now been forgotten. Moreover, in some cases, the meaning of a specific term also changes over time, and both issues are problematic when interpreting literature and other written sources from an earlier time.

The overall aim of the dictionary is to preserve and disseminate knowledge of the intangible cultural heritage that these terms represent. Therefore, a detailed explanation has been provided for each term, including citations from a number of sources. Fundamentally, the scope is concepts and terms used in Denmark, but many of the terms are of foreign origin, which means that, for example, French, English and Indian terms are also included.

The concepts and terms that we have dealt with in the first phase of the project come from typed and handwritten files compiled by two Danish textile researchers: Erna Lorenzen and Ellen Andersen.[2] Furthermore, many of the explanations of the terms are supplemented with citations collected by Else Østergård, another textile researcher who has been working as a textile conservator at The National Museum of Denmark since 1958. These files mainly contain information about materials, techniques, fabrics, and clothing, dating from the 1700s and 1800s.

The intention is that the dictionary can later be expanded with terminology from other subject areas and different time periods: for example, newer terms for suits, terms for uniforms and terms for furnishing textiles. The *textilnet.dk* project can therefore be seen as a dynamic knowledge bank, to which one can continuously add new knowledge.

Many of the terms are supplemented by illustrations, and a large proportion of the dictionary's photos is taken from textile researcher Ingeborg Cock–Clausen's large photo collection, which has been digitalized as part of the project. The original photos now belong to the library of Designmuseum Danmark.

The dictionary is designed to be searchable in two ways: either via the search box, where one enters the requested term, or via a menu, where one can choose between various categories: materials, textiles, manufacturing techniques, clothing and items of clothing, decorations, as well as colours and dyes. By selecting one of these categories, a list of terms within that category is provided, from there one can proceed to the requested explanation.

The dictionary is aimed at a very broad audience, and it is our hope that it will be used by researchers, students and the general public who have an interest in dress and textiles.

[2] See Lervad & Engelhardt Mathiassen (forthcoming).

3. Two examples from textilnet.dk

The entries include the following data categories where possible: term, variant(s), languages, definition, explanation, citation and bibliographical reference. In order to illustrate the methods and construction of textilnet.dk, the concepts *bellacosa*[3] and *gueras*[4] will be presented.

The first category, variants, is highly important from a linguistic and historical point of view. *Bellacosa* has no variants at the present stage of the project, but *gueras* has the following: *gerras, gorras, and garas.* This means that if the users conduct an open search, they will find the concept through any of these term variants. Sometimes variants share similarities and this approach affords clarity to the user regarding terms and concepts.

The next data category is language, here the etymology of the term is explained and translations to other languages are also provided, but only if the information is available in our current sources.[5] The category for language is empty in both of these examples. As for *bellacosa* it might be of Italian origin, *gueras* might be either Indian or Spanish. In this way, *textilnet.dk* offers great potential for future research and collaboration with researchers from around the world, as the compilation and comparison of research concerning concepts and terms would help us to answer such unsolved questions.

The third and most important data category is the definition, which provides a condensed analysis of the concept in question. *Bellacosa* is defined as:

> "Fabric woven of silk with gold and silver embroidery. Produced at the Greek island Chios".[6]

Gueras is defined as:

> "Fabric woven of cotton in tabby, with large variation in the fineness of the fabric. Imported from '*Bengalen'* (a region in Southern Asia, modern-day Bangladesh and the Indian state West Bengal) and from Surat (an Indian port). Had different bynames after place of production, *i.e. gueras Midling* and *gorras Birbom.* Some of the fabrics had patterns printed on them in Europe, while some stayed white. Used for table linen and towels among other things."

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[3] http://www.textilnet.dk/index.php?title=Bellacosa (Accessed February 17, 2015).

[4] http://www.textilnet.dk/index.php?title=Gueras (Accessed February 17, 2015).

[5] The sources are available at http://www.textilnet.dk/index.php?title=Kilder (Accessed February 17, 2015).

[6] All translations from *textilnet.dk* are by the authors.

These definitions provide delimiting characteristics: textile fibres (for the first example, silk with gold and silver, for the second, cotton) and manufacturing techniques (embroidery for the first, for the second tabby); geographical information (Greece and *Bengalen*); and for *gueras*, the possibility of textile printing, and the most common use of the fabric (table linen and towels). We do not know the use of *bellacosa* at this stage of *textilnet.dk*, but it might be fine clothing.

Language can change over time. Thus, the next important data category is the aspect of date whenever it is mentioned in the sources. *Bellacosa* is attested in our sources over more than a century, *i.e.* 1807-1924. The term *gueras* was probably in use over a much shorter period as, apart from Lorenzen's files, it is mentioned in only two Danish encyclopaedias for merchandise, namely those of Juul and Rawert.[7] We are informed that, in 1831, *gorras* "is a coarse cotton fabric which earlier was imported in large quantities from *Bengalen* to Europe...". We do not know if the same fabric was produced and exported and designated by different terms at a later or earlier date. Further research could possibly resolve an issue like this, especially if the *textilnet.dk* group could collaborate with Indian researchers.

The fifth data category is the explanation. This category is usually somewhat longer than the definition, the latter being, as already stated, a condensed analysis of the concept. As for *bellacosa*, the explanation also contains a discussion of the obsolete Danish term 'at indvirke' which is a polysemous term that not only denotes "to embroider", but also "to weave". The explanation of *gueras* includes the chronological information of the term mentioned above, and also explains how the white variants of the fabrics were used for table linen and towels while the printed ones were used for other purposes.

The next and equally essential category is the citation, which is an excellent way to help us place terms for fabrics and clothing in their original social setting. *Bellacosa* has no useful citation in the present sources, but *gueras* has a citation from Juul (1807), which states that the variants were common knowledge at the time. Juul also explains how the bynames were connected to the different places of production, that the rolls of fabric had different widths and lengths, and that they were divided into three qualities marked A, B and C. The citation informs us that Juul is the source of the information that the printed *gueras* were used for purposes other than furnishing textiles. We thereby get an excellent impression today of a very varied past product, woven in India, imported into Europe and used for different purposes. The printed products might have been used for clothing since printed cottons revolutionized fashion in the latter part of the 18th and the early 19th centuries. Unfortunately, neither the term *gueras* nor its variants nor *bellacosa* are mentioned in Cock-Clausen's photos, or in the registrations of the textile and dress collections of Den Gamle By. Thus, for the time being, we have no illustration of these concepts.

[7] Juul (1807-12) and Rawert (1831-34).

The last of the data categories is the bibliographic reference, and, as an additional facility for the user groups of *textilnet.dk*, we have chosen also to note in which of our sources the term is *not* mentioned. About these two concepts we learn that they are not mentioned in the sources consulted, which date from before 1807.

4. Conclusion

The website *textilnet.dk* is a substantial glossary of concepts and terms for textiles, clothing and manufacturing techniques. The first phase of the project is now complete and *textilnet.dk* is available on the internet at www.textilnet.dk. As of February 2015, the glossary contains more than 1000 entries. There are, however, still a number of concepts and terms in the fields of textiles, clothing and techniques that are not yet included in the glossary. The project group therefore aims to apply for more funding and collaborate with further researchers in order to continue the project.

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Résumé

Le site *textilnet.dk* est un dictionnaire numérique qui regroupe des termes historiques et contemporains désignant les tissus, les matériaux, les techniques et l'habillement, surtout des années 1700 et 1800. La première phase de ce projet est désormais achevée et *textilnet.dk* est accessible sur Internet. L'objectif global de ce dictionnaire est de préserver et de disséminer la connaissance de l'héritage culturel intangible que représentent ces termes. La langue de base est le danois, mais de nombreux termes sont d'origine étrangère, notamment française, anglaise et indienne.

Professional Nonverbal Communication in the Field of Textiles

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1. Introduction

Verbal and nonverbal representations in terminology are different ways of representing knowledge in a specialized field. The nonverbal means are highly important in the field of textiles on account of its highly visual nature. Nonverbal representation forms a continuum from figurative to abstract forms, and these configurations can represent a broad array of synonyms. This is often problematic in verbal representation, where variations and synonyms may cause a lack of transparency over time.

In the field of textile terminology, classifications, concept systems and term bases usually contain information on the fibres and yarns, on structures such as weaves, as well as the final fabric itself. The use of nonverbal representation is not an obvious means of transmitting knowledge concerning the touch and source of the material, but characteristics such as form, colour and weave can be represented efficiently with drawings, photographs, and visual multimodal representations such as videos, audios and films.

The introduction and application of graphical means of nonverbal representation implies the existence of a pictorial representation of the concept in the mind of a human being. Textiles are represented by nonverbal expressions common to all and may be divided into three superordinate types:

1. Objects/concepts based on highly figurative, non-symbolic mental pictures, for instance a sheep for wool.
2. Objects/concepts based on figurative, but symbolic, mental pictures or metaphors such as “world wide web”.
3. An abstract representation of an object or a concept with merely symbolic value, such as the basic weave “twill” (*cf.* below).

2. Limits of nonverbal representation

Despite the obvious expressive potential of nonverbal representations, there are concepts and characteristics that are not suited to nonverbal representation. Concepts and characteristics based on material objects which cannot be perceived by the eye or imagined as a mental picture, such as smell, sound, softness, etc.

The perception of these characteristics and concepts generally depends on the senses of hearing, touch, taste and smell. However, nonverbal means can be combined with verbal means which enhance the level of expression. In the representation of a weave – apart from the visual aspects and characteristics of the conceptualized material object – various concepts in the field of textiles, such as fibre composition, yarn twist and structure are perceivable through diagrams and drawings, which have a high level of expression, such as "s-" versus "z-spun" yarn, indicating the twist of the fibre:

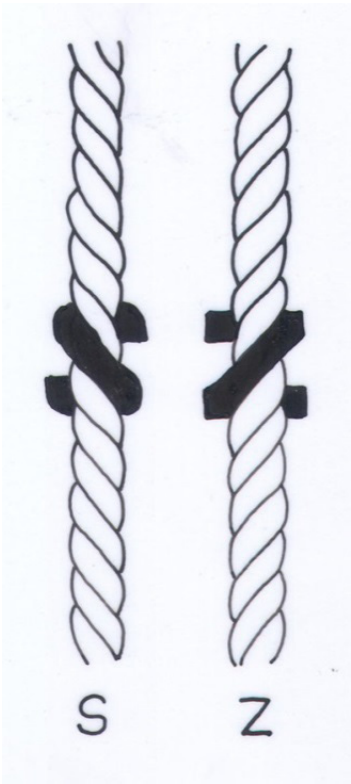

FIG. 1 – *Drawing of S and Z spun thread, from Bender Jørgensen 1992, 15, fig. 2.*

These combined forms of codes and diagrams can even replace the definition of a fibre or a long term/name for a weave such as the example in figure 2:

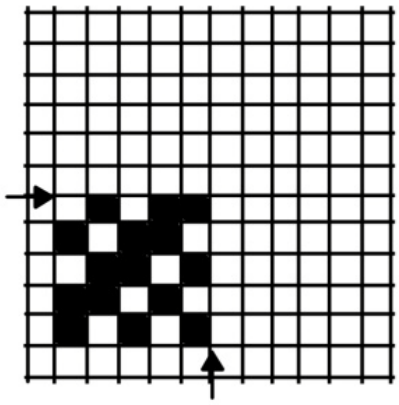

FIG. 2 – *5-end stitched twill, "Z" direction, code 20-02 01 01 01-01-01 (from ISO 9354:1989).*

Nonverbal representations afford the opportunity of selective and nonlinear reading and thus provide a greater degree of precision. They also tend to occupy less space.

3. Concluding remarks

The following example of a configuration of the verbal and the nonverbal representations indicates how the combination of numeric codes with diagrams as a step-by-step guide to the production of a fabric and with designations/terms is an efficient means of communication in the field of textiles.

It limits ambiguity in the communication of professionals in a specific domain field and serves to clarify the concepts used experts or users of the field. This configuration engenders a more universal language which is able to cross borders without translation, thus avoiding misunderstanding. The limits of nonverbal signs are obvious but there are many kinds of complementary texts that clarify different illustrations. In the case of weaves, such as twill, the number of weaves derived from the basic weave twill is almost infinite. The following concept system shows the relations between these concepts in order to transmit contextual knowledge and identifies the various characteristics of the concepts.

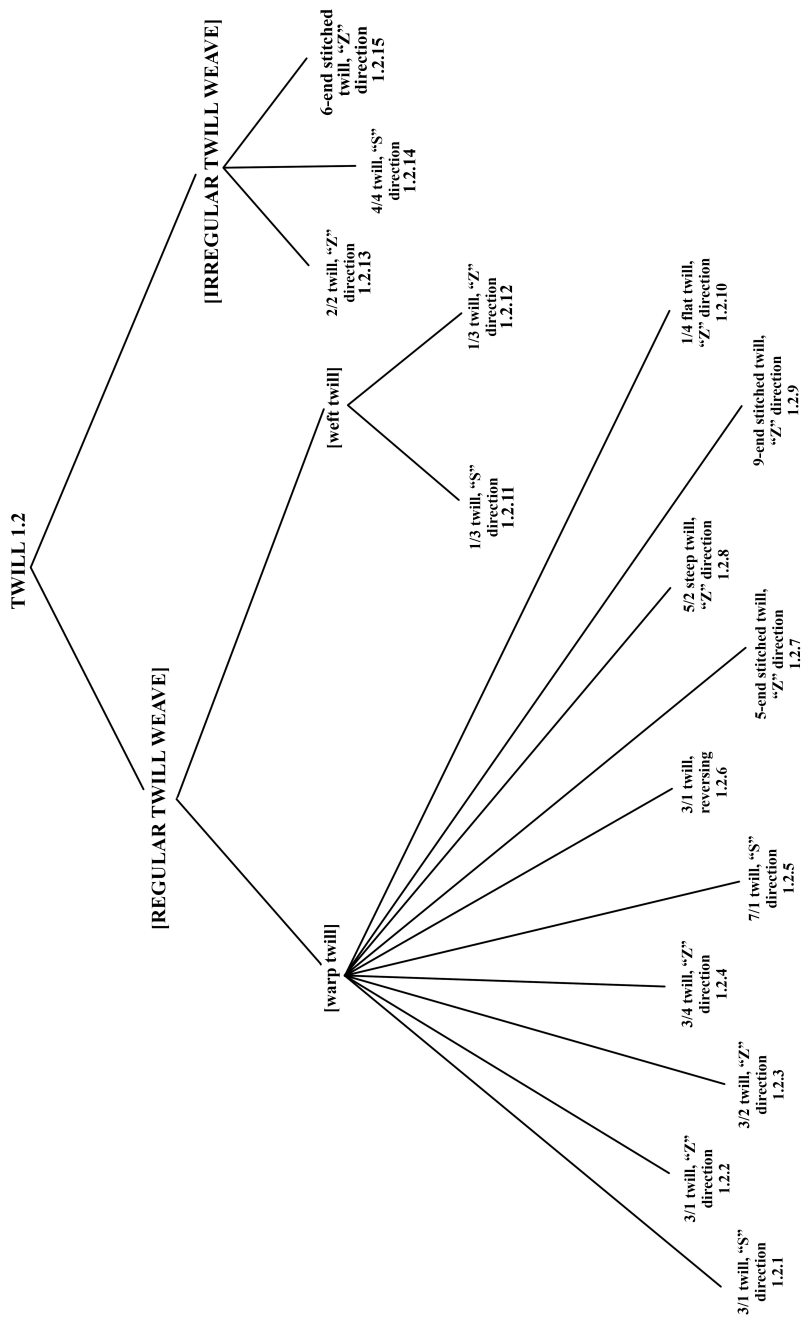

FIG. 3 – *Extract of the concept system for twill, adapted from Lervad 1991, figure 4A.*

The numeric notation system listed in text form below is a variation of the concept system in figure 3, including the criteria in brackets and followed by long terms / designations: The three basic weaves – tabby, twill and satin – are subdivided into a selection of their possible derivations. Twill is, for instance, either "Z" direction or "S" direction; 5-end stitched or 7-end stitched twills are other possible derivations, as shown in both figures.

Weave derivatives

1.1. plain

[...]

1.2. twill

1.2.1. 3/1 twill "S" direction
1.2.2. 3/1 twill "Z" direction
1.2.3. 3/2 twill "Z" direction
1.2.4. ¾ twill "Z" direction
1.2.5. 7/1 twill "S" direction
1.2.6. 3/1 twill, reversing
1.2.7. 5-end stitched twill, "Z" direction
1.2.8. 5/2 steep twill, "Z" direction
1.2.9. 9-end stitched twill, "Z" direction
1.2.10. ¼ flat twill, "Z" direction
1.2.11. 1/3 twill, "S" direction
1.2.12. 1/3 twill, "Z" direction
1.2.13. 2/2 twill, "Z" direction
1.2.14. 4/4 twill, "S" direction
1.2.15. 6-end stitched twill, "Z" direction

1.3. satin

[...]

FIG. 4 – *Notation system corresponding to figure 3, adapted from Lervad 1991, figure 4A.*

Only our imagination sets the limits of the various forms of representation and I hope the proceedings of this first TOTh workshop with a predominant focus on the field of textile terminology may inspire future research and further discussion of diachronic views on verbal and nonverbal configurations.

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