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FRAME SEMANTICS METHODOLOGY FOR TEACHING TERMINOLOGY OF SPECIALISED DOMAINS

Oksana Smirnova, Sigita Rackevičienė, Liudmila Mockienė

Institute of Humanities, Mykolas Romeris University, Vilnius, Lithuania

Abstract. *The article attempts to show how the theory of Frame Semantics and the resources of the lexical database FrameNet can be used for teaching/learning terminology of specialised domains. The article discusses the principles of Frame Semantics and presents a use case of application of the frame-based methodology for developing classification of terminology of the selected financial subdomain for learning/teaching purposes. The use case focuses on terms denoting concepts that compose 'CAUSE-RISK' frame which was developed on the basis of several related frames in the FrameNet database. The stages of the use case and its outcomes are described in detail and the benefits of application of the methodology for learning/teaching specialised vocabulary are provided. Hopefully, the provided insights will give ideas to teachers of foreign languages for specific purposes and help to develop effective terminology teaching/learning techniques.*

Key words: *Frame Semantics, FrameNet, terminology, teaching specialised vocabulary*

1. INTRODUCTION

Terminology is an essential component of any specialised language as it represents the knowledge of a specialised domain, its conceptual structure that encompasses domain specific concepts and their interrelations. Thus, acquisition of terminology of a specialised domain is one of the key skills to be developed in studies of languages for specific purposes, both native and foreign.

In study materials, terms are often extracted from the texts and presented as autonomous lexical units in term lists and glossaries, which, along with various vocabulary exercises, become the main tools for teaching/learning terminology. However, such methodology has its limits: it makes it difficult to perceive relations between the terms and the overall terminological framework of a specialised domain that represents the conceptual structure of the domain. The perception of this structure provides for development of a much better understanding of the meanings of the terms, which is essential in developing skills of their accurate usage.

In the last decade, several studies have been performed on application of the Frame Semantics methodology in vocabulary teaching and learning (e.g. Atzler, 2011; Mousavi et al., 2015). Frame Semantics approach is based on the assumption that linguistic knowledge is

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Corresponding author: Liudmila Mockienė. Institute of Humanities, Mykolas Romeris University, Vilnius, Lithuania.

E-mail: liudmila@mruni.eu

inseparable from encyclopaedic knowledge as the language reflects the world the way it is constructed by humans (Cuyckens and Geeraerts, 2007, p. 201). Thus, lexical units become meaningful only when they are understood as denotations of conceptual elements of cognitive structures called frames that are defined as “schematisation of experience (a knowledge structure), which is represented at the conceptual level and held in long-term memory and relates elements and entities associated with a particular culturally-embedded scene, situation, or event from human experience” (Evans and Green, 2006, p. 211).

Frame Semantics opens new possibilities to develop vocabulary teaching/learning techniques enabling to relate lexical units into cognitive structures and thus facilitating their understanding, as well as their retention, recall and accurate usage.

The object of the present paper is the EU financial terms which denote concepts that belong to the frame CAUSE_RISK. The aim of the research is to describe the possibilities and advantages of the application of the Frame Semantics methodology for teaching and learning financial terms related to the concept RISK. In order to achieve the aim the following objectives were set:

- a) to overview issues of vocabulary acquisition in the context of second language learning;
- b) to present the main principles of Frame Semantics;
- c) to discuss the possibilities of applying the Frame Semantics methodology in teaching and learning English financial terms;
- d) to analyse and classify the EU financial terms related to the frame CAUSE_RISK extracted from an ad hoc corpus as a use case of application of the presented methodology.

The present study was carried out based on the analytical-descriptive and corpus analysis methods which enabled the researchers to unveil the advantages of the application of the Frame Semantics methodology for teaching/learning financial terms with the help of visualisation of conceptual relations between the terms under the established frame.

2. THEORETICAL BACKGROUND AND THE METHODOLOGICAL PRINCIPLES OF THE RESEARCH

2.1. Vocabulary acquisition in teaching/learning a second language

Acquisition of vocabulary is one of the main tasks in learning a language as vocabulary acquisition goes along with acquisition of the world knowledge (Cameron, 2001). The perception of the world around us depends on the language/s we grew up with and the experiences we made within this language or languages. Language is an ideal tool for shaping the perception of our surroundings, which enables us to describe them and assign names to the objects (Mousavi et al., 2015).

When we learn a second language, our brain faces challenges as it is ‘programmed’ to acquire world knowledge and express our emotions via a certain linguistic toolkit and has to adapt to a new set of rules and patterns. Bishop (2019, p. 3) states that “every L2 learner’s brain is programmed by a certain idea about how the construction, structure, or pattern of a language must be, and the language is the L1, while no L1 learner’s brain contains any such data or idea whatsoever. The knowledge of L1 subconsciously forces the L2 learners to apply the L1’s construction, structure, or pattern to L2”.

Vocabulary learning plays an essential role in this process. Vocabulary reflects cultural and social reality of another language community and its acquisition enables a better understanding of the world-view of this community. Both the receptive and productive language skills (writing, speaking, reading and listening) are influenced by vocabulary, its acquisition and retention.

Acquisition of vocabulary of a specialised domain (i.e., terminology) has also other important tasks. Terminology represents domain specific knowledge and conceptualisation. Therefore, its acquisition enables construction and usage of this knowledge. Besides, domain conceptualisation might be different in different communities, e.g. national legal concepts are system-bound and do not have absolute equivalents in other national legal systems, they may be similar in their functions, but not identical (Sandrini, 1999; Pommer, 2008). Therefore, terminology acquisition also enables comprehension and juxtaposition of different realia and their conceptualisation in different communities.

The variety of teaching general and specialised vocabulary methods is very large ranging from traditional ones, such as the translation method, the reading method, the natural method (the direct method), the situation method, etc., to more recent ones, e.g., vocabulary games, flashcards, semantic words maps, key word method, content and language integrated learning, computer-assisted vocabulary learning, etc. (Setiawan, 2008).

However, the main approach used is still based on providing language learners with word/term lists (alphabetical, thematically related) with definitions and/or translations which learners try to memorise (Read, 2004, as cited in Atzler, 2011). Such vocabulary acquisition becomes a very long process and demands certain personal features as to be disciplined and well-organised in order to take time every day for repetition in order to be successful in vocabulary learning (Özbal and Strapparava, 2011, p.1-2). Therefore, search for vocabulary learning techniques which would facilitate its retention and recall are still relevant and important. One of them is based on the principles of Frame Semantics presented in the next section.

2.2. Principles of Frame Semantics

Frame Semantics, which is a branch of Cognitive Semantics, was developed by Charles Fillmore, an American linguist, who defined it as the study of how people link linguistic forms with cognitive structures named as frames. Fillmore described frames as “certain schemata or frameworks of concepts or terms which link together as a system, which impose structure or coherence on some aspect of human experience” (Fillmore, 1975, as cited in López and Valenzuela, 1998, p. 3).

Frame Semantics seeks to investigate “how linguistic forms evoke or activate frame knowledge” (Fillmore and Baker, 2009, p. 317). The essential linguistic units that activate frames are verbs and deverbal nouns as they attach other words and together with them embody various situations of human experience.

This theory presents a new way of conception of the word meaning which is understood only “with reference to a structured background of experience, beliefs, practices etc. and these background frames activate the concept encoded by the lexeme” (Fillmore and Atkins, 1992, p.77). Words are linked to frames in such a way that the meaning associated with a particular word cannot be understood out of the frame it belongs to.

Petruck (2003, p. 1) explains that “a frame is a cognitive structuring device, parts of which are indexed by words associated with it and used in the service of understanding”.

Fillmore provides an example of the word *aorta* that denotes a particular concept, the content of which can be perceived only through the frame of the mammalian circulatory system. In the same way, talking about the meanings of the verbs of judgment and verbs of commercial transaction, Fillmore argues that “nobody can really understand the meaning of the words in that domain who does not understand the social institutions or the structures of experience which they presuppose” (Fillmore, 1987, as cited in Cuyckens and Geeraerts, 2007, p. 172). Thus, Frame Semantics seeks to show that a word becomes meaningful only in the context it is used in with other lexical units as only this contextual usage enables to perceive a particular situation of human experience reflected by the lexical units. This shows that Frame Semantics does not make a significant distinction between semantic and pragmatic knowledge and views a lexical unit as a unified entity (Evans and Green, 2006, p. 215).

The semantic research of Fillmore and his colleagues gave birth to the project FrameNet which now functions as an open database constantly updated by new research findings. FrameNet is a lexical resource of modern English based on semantically and syntactically annotated sentences; it is also a lexicographic project (Fillmore and Baker, 2001, p. 1). FrameNet provides cognitive frames, which are based on annotated lexical units extracted from texts. More than 200 000 English sentences were manually annotated in order to establish 1 200 cognitive frames which are currently described in the database. FrameNet is freely available online and easily downloadable. This project has aroused great interest among scholars and inspired many other research projects worldwide. As frames are often similar across languages, principles of FrameNet are applicable to description of lexical units in various languages. Similar projects already exist in French, Chinese, Japanese, Spanish, German, Swedish, and Korean.

The present paper seeks to present possibilities of application of the Frame Semantics methodology in presenting and learning domain-specific vocabulary (terminology) which is believed to have significant benefits with regard to vocabulary acquisition, retention and recall. This approach enables studying terms not as individual words or phrases, but as a part of a cognitive structure – a frame which helps to understand the overall picture of a certain subdomain and gain background knowledge.

3. APPLICATION OF THE FRAME-BASED METHODOLOGY IN ACQUISITION OF ENGLISH FINANCIAL TERMS

Application of the Frame-based methodology will be presented via a use case on developing taxonomy of financial terminology of a chosen subdomain which is proposed for teachers of English for financial purposes; however, a use case of this type may be organised in studies of any specialised domain. The use case was carried out in several stages, each consisting of a set of tasks which are described below. A teacher may decide which tasks will be carried out by the teacher and which tasks can be given to the students and carried out by them under the teacher’s supervision. If the teacher considers the tasks too complicated for the students to perform, only the final outcome of the use case (the taxonomy of the terms) can be used for teaching/learning purposes.

In the first stage of the use case, an ad hoc corpus of financial documents has to be compiled or a ready-made corpus of a financial domain (or any other relevant domain) has to be downloaded from publicly open repositories. In this use case, a corpus compiled by the authors of this article Oksana Smirnova and Sigita Rackevičienė (2020) was used.

The corpus consists of the EU financial documents extracted from EUR-Lex database of the EU legal acts and other documents. The extracted documents are dated 2013-2018, the size of the corpus is 1,006,485 words. The corpus is publicly available in CLARIN-LT repository as a constituent part of a parallel corpus ‘English-French-Lithuanian Parallel Corpus of EU Financial Documents’ (Smirnova and Rackevičienė, 2020) and can be reused by all interested teachers and students.

In the second stage of the use case, the corpus has to be uploaded to a corpus analysis software, such as AntConc (Anthony, 2014), in order to perform the quantitative analysis of lexical units, establish the most frequent terms in the corpus and select the key terms for further analysis. Selection of the terminology is of vital importance since learners do not have time and opportunity to learn all terms of the studied domain. The analysis of term frequency in the corpus helps to select a manageable quantity of the most important terms as it is based on real usage of the terms in the domain. In our use case, we uploaded the corpus to the AntConc software and used its tool “Wordlist” to establish the most frequent single-word terms in the corpus. In our case, they were risk(s) (freq. 4350), credit(s) (freq. 3952), and exposure(s) (freq. 3039). Since the term risk was the most frequent word in the English corpus, we decided to focus on it and multi-word terms with the nominal base risk. We would also recommend to choose one single-word term and focus on it and the multi-word terms that include it.

In the third stage, the sentences that include the selected single-word term (used on its own or as a constituent part of a multi-word term) have to be extracted from the corpus, i.e. copied from the corpus into a separate file. In our use case, we extracted 4314 sentences that include terms with the nominal base risk. Extraction of the data can be carried out by dividing the corpus into subcorpora and analysing each subcorpus separately. This task can be carried out by students working in groups.

In the fourth stage, the sentences have to be analysed and grouped according to the situations they describe. The semantics of the verbs plays the decisive role in this analysis. Therefore, all verbs have to be highlighted and sentences have to be grouped into categories according to the verb meanings: each category has to include sentences with verbs having identical or similar meanings. In our use case, the extracted sentences describe several types of situations:

- situations in which something or somebody causes risk to an entity (sentences with verbs such as pose, entail, create, cause, constitute, generate, involve, lead to, give rise to, expose, arise from, result from);
- situations in which the affected entity experiences risk (sentences with verbs such as bear, face, incur, assume, take on(undertake), have);
- situations in which specialists identify risk and assess its importance (sentences with verbs such as identify, capture, detect, disclose, ascertain, point out, measure, assess, evaluate, report, understand, underestimate, overestimate, calculate);
- situations in which specialists apply various measures to reduce risk and take control on it (sentences with verbs such as mitigate, reduce, minimize, eliminate, absorb, cover, prevent, manage, monitor, address, control, hedge, constrain, limit).

Due to the limited scope of the paper, further we provide the results of the frame-based analysis of the situations of the first type.

In the fifth stage, an appropriate frame has to be selected from the FrameNet database and used in its original form or adapted to the corpus material. In our case, several frames in FrameNet were considered: the frame ‘RISK-scenario’ and the frame ‘Cause_to_start’.

However, neither of them was completely suitable, thus, based on these frames a frame adapted to the selected corpus material was created and named 'Cause_RISK'. It encompasses four main elements (see Figure 1):

- Cause refers to an animate or inanimate entity, a force, or event that produces an Effect (RISK).
- Effect (RISK) indicates the process or state that the Cause initiates.
- Experiencer is an animate or inanimate entity that experiences Effect (RISK).
- Asset is something (abstract or concrete) judged to be desirable or valuable that might be lost or damaged.



Fig. 1. Relationships between the frame elements

In our investigated material, the CAUSE_RISK frame is evoked by the verbs which have the semantic meaning 'to cause something': pose, entail, create, cause, constitute, generate, involve, lead to, give rise to, expose, arise from, result from. The verbs attach terms that denote concepts that refer to various participants of the situation. These participants are represented by the frame elements (Table 1).

Table 1 Definition of the CAUSE_RISK frame and examples expressing the frame

<p>Definition: A CAUSE causes an EFFECT (RISK) on an EXPERIENCER / to an ASSET</p> <p>Examples:</p> <p>1) Access [Cause] would cause systemic risk [Effect]. <Commission Implementing Regulation (EU)2017/394 of 11 November 2016></p> <p>2) A concentration of assets and overreliance on market liquidity [Cause] creates systemic risk [Effect] to the financial sector [Experiencer] and should be avoided. <Regulation (EU) №575/2013 of the European Parliament and of the Council of 26 June 2013></p> <p>3) A default of the obligor/guarantor [Cause] would constitute a huge reputational risk [Effect] to the group [Experiencer], damage its franchise and could threaten its viability. <Commission Delegated Regulation (EU) 2018/179 of 25 September 2017></p> <p>4) < ... > the market risk [Effect] that is generated by the internal hedge [Cause] shall be dynamically managed in the trading book within the authorised limits. <Regulation (EU) №575/2013 of the European Parliament and of the Council of 26 June 2013></p> <p>5) The borrowing and lending operations [Cause] related to the Union's macro-financial assistance shall be carried out in euro < ... > and shall not involve the Union in the transformation of maturities, or expose it (the Union) [Experiencer] to any exchange or interest rate risk [Effect], or to any other commercial risk [Effect] < ... >. <Decision (EU) 2016/1112 of the European Parliament and of the Council of 6 July 2016></p> <p>6) < ... > the changes [Cause] in the intensity of macroprudential or systemic risk are of such nature as to pose risk [Effect] to financial stability [Asset] at national level. <Regulation (EU) №575/2013 of the European Parliament and of the Council of 26 June 2013></p>

In the sixth stage, the terms used in the sentences have to be classified according to the frame elements and types of realia they represent. In our case, we got the following conceptual-terminological taxonomy (see Table 2):

Table 2 Frame elements and the terms of the frame CAUSE_RISK

Cause (50 terms)	<p>a) physical and institutional actors: <i>obligors, connected clients, users, natural or legal persons, guarantor, other participants, CCP, systematic internaliser, people; institution(s), entities, CCP, systems, CSD- banking service provider(s), etc.</i></p> <p>b) a financial tool: <i>business models, number or volume of orders, exposures, credit exposure, short positions, financial instruments (covered bonds, credit derivatives, contracts, investments of a CSD, credit default swap, obligations), bank-type ancillary services, etc.</i></p> <p>c) actions or processes: <i>failure of an institution, malfunction of an institution, changes, deficiencies in information systems, internal processes, personnel's performance, disruptions, borrowing and lending operations, inadequate and failed internal processes, etc.</i></p>
Effect (37 terms)	<p>a) risk related to an Asset: <i>risk of credit loss, credit risk, risk of securitization;</i></p> <p>b) risk related to an Experiencer: <i>counterparty (credit) risk;</i></p> <p>c) risk arising from a certain harmful event: <i>operational risk, settlement risk, default risk;</i></p> <p>d) risk of certain intensity/extension: <i>excessive risks, significant (higher) risk, material liquidity risk, a high risk of disruption, low risk, general risk, potentially high risk of contagion, higher risk of price abuse, material risk of damage, undue risk, unacceptable risk, single risk, huge reputational risk, material liquidity risk, similar risk, specific and general wrong-way risk, systemic risk, etc.</i></p>
Experiencer (27 terms)	<p>physical and institutional actors: <i>third parties, other entities, group, interests of one or more users of the CSD, interests of one or more clients, sponsor, original lender, commercial paper investor, originator; financial institutions, financial system, CSD, financial sector, the Union, CCP, ECA, business model, etc.</i></p>
Asset (5 terms)	<p><i>financial stability, the performance of transactions, the soundness of an institution, the CSD's operations, resilience or smooth operation of markets</i></p>

The provided classification of terms under the frame CAUSE_RISK according to the frame elements provides a visualisation of the conceptual-cognitive structure that represents a particular type of situations of human experience. We believe that such classification facilitates the retention of terms as it enables students to construct a structure in their mind encompassing interrelated conceptual categories, realia they refer to and terms denoting them. Such interlinked structure facilitates understanding of the overall picture of the subdomain and helps to memorize the terms. Learners realize that Cause can be denoted by terms designating physical and institutional actors, financial tools, actions and processes, while Experiencer is only denoted by terms designating physical and institutional actors. The terms that designate an Asset are usually abstract and denote the obstruction of sustainable function of the financial sector. The terms that

denote risk may refer to different aspects of risk: risk related to an asset, risk of certain intension or extension, etc.

If students do not take part in the development of the classification, they should be provided with the corpus material as well. The corpus provides the contexts in which terms are used, and these contexts are important in many aspects: they reveal how terms are used in sentences, which verbs attach them and which phrases they are used in. Contexts also help to understand the meanings of terms; moreover, they often contain direct explanations, e.g.:

< ... >“group of connected clients” means any of the following: two or more natural or legal persons [Cause] who, unless it is shown otherwise, constitute a single risk [Effect] because one of them, directly or indirectly, has control over the other < ... >.

<Regulation (EU) №575/2013 of the European Parliament and of the Council of 26 June 2013>

Thus, students can consult the corpus material whenever they need more information about the terms, i.e. their usage in real context and their meaning.

CAUSE_RISK frame allows students to memorize more than 100 terms. The frame-based method can be combined with other methods, e.g., the ‘brain storm for ideas’ for the vocabulary recall, when students are asked to remember as many terms that denote Cause, Effect, and Experiencer as possible. Students can work with the data from the corpus to organize other terms into other frames and in this way broaden their word and term banks.

4. FINAL REMARKS AND CONCLUSIONS

The results of the presented use case on the application of the frame-based methodology for teaching/learning financial terminology allow drawing the following conclusions:

1. Frame Semantics opens new possibilities to develop vocabulary teaching/ learning techniques enabling to relate lexical units into cognitive structures and thus facilitating their understanding, as well as their retention and recall.

2. The Frame-based methodology is particularly relevant to learning/teaching specialised vocabulary (terminology) as it helps revealing the conceptual structure and substructures of the specialised domain, categorisation of concept and their interrelations. The perception of these interlinked structures enables a much better overall understanding of the domain, minimizes the time used to memorise the terms, reduces the load of retention and, thus, facilitates acquisition of terminology and its accurate usage.

3. The Frame-based methodology is based on corpus analysis; thus, learners have a possibility to work with terminology used in texts drafted by experts of specialised domains and used in specialised communication. Corpus material enables to select the dominant terminology and investigate its frequency and distribution in the domain. It also reveals the real usage of the terms, i.e. their collocations, syntactic structures they are used in, most frequent grammatical forms, etc.).

Thus, frame-based learning provides for development of a wide range of skills necessary for learning/teaching both general and specialised vocabulary, as well as skills necessary to analyse linguistic structures and cognitive frameworks revealed by them. This methodology needs further investigation on its applicability at university studies: research focused on students who speak different native languages and study in different fields would allow to draw conclusions on effectiveness of this approach for different target groups.

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