METHODOLOGICAL CONSIDERATIONS IN CONSTRUCTING A THEORETICAL FRAMEWORK OF TERMINOLOGICAL AWARENESS IN HEALTHCARE COMMUNICATION

Bakó Alexandra Vivien

Semmelweis University, Budapest,
alexandrabako@gmail.com

Abstract: When constructing a theoretical framework, one necessarily raises the question how it can be ensured that the theory emerging will be internally valid and robust. While there are meticulous ways of validating an empirical research instrument, theoretical validation is less elaborated in language pedagogy research. Therefore, this paper attempts to explore systematic ways of building a theoretical framework and to set certain criteria for evaluating it. The thus established analytical framework is then applied to a theoretical framework of terminological awareness in healthcare communication. Since this framework is still under construction, the systematic evaluation is used to suggest ways of improvement.

Keywords: theoretical framework, validating a theory, complex dynamic systems, terminological awareness, healthcare communication

1 Introduction

> A science, much like a bird, must have two strong wings if it is to fly. Empirical facts are understood in the light of a specific theory. And, theory is built from the careful consideration of the facts. Indeed, theory and research are so intertwined that neither can exist without the other – and both are needed for a strong science. Theory and research are differentiable, but they are also inseparable – existing in a generative yin-yang relationship. (Wallis, 2010, p. 74)

As the quotation above suggests, in order to have balance in scientific inquiries, it is inevitable to build the empirical and the theoretical part of a study equally. While there are profound and meticulous ways to validate an empirical research instrument (cf. Dörnyei, 2007), the methods of theoretical validation have gained less focus over the years. It is necessary to stop here and clarify what is meant by theoretical validation. The construction of a theory can be carried out either with the help of empirical data, or solely building on scientific literature. In both cases some level of theorizing occurs, but while in an empirically grounded theory the main aim is to make sense of the data collected, and try to build as a complete model of the issue as possible based on the empirical data, a theoretical framework that is arbitrary i.e., it is not supported by carefully collected and analysed empirical data, sets out to describe the complexity of the issue on a larger spectrum by grasping a more overarching issue, than any empirical study. In the field of sociology, empirically based theories have been named middle-range theories by Merton (1968), who stated that a theory emerging from the empirical investigation of a phenomenon cannot be overarching, and that in the social sciences – as opposed to the natural sciences – it is impossible to come to universal understandings of phenomena with the help of one highly abstract theory. Accordingly, he suggested that social

researchers should aim for middle-range theories, and from these it will be possible to build a *grand* theory, a system of the laws proven by the empirical investigations of these middle-range theories. In the social sciences, such as in language pedagogy research, when these middle-range theories are evaluated, the methodological justifications of the empirical investigation receive very meticulous analysis, as there are clear methods that are to be followed and the validation of both qualitative and quantitative instruments is clear-cut. However, when theoretical frameworks are evaluated, the procedure mainly relies on the reader's impression of the framework, and what makes sense and seems to be logical is considered a "good" theoretical framework. Since the theoretical frameworks of middle-range theories should aim at being able to serve as a constituting part of a grand theory – as referred to by Merton (1968), these theoretical frameworks should aim at showing us the characteristics of higher-range theories to the extent they are capable of doing so. The virtues of a theory are usually testability, falsification, prediction, explanation, parsimony, internal consistency, uniqueness, generalizability, conservation, empirical riskiness, fecundity, and abstraction – as Gay and Weaver (2011) establish based on the works of Dubin (1978), Popper (1989), Quine and Ullian (1980), and Wacker (2008). Still, the question remaining is *how* to achieve these characteristics while constructing a theoretical framework. If there are clear methods for its evaluation, they can be followed as criteria in validating a theoretical framework.

Therefore, the aim of this study is to address the issue of validating a theoretical framework by looking at various methods that can be applied to ensure that any framework emerging is valid, well-structured and robust. In order to explore the possible aspects of theoretical validation, this paper is to show the methodological considerations in the process of constructing a theoretical framework of terminological awareness in healthcare communication. The functioning of terminological awareness is based on a problem-solving activity while making terminological choices, i.e., choosing medical terms based on the contextual features of the communicative situation. A theoretical framework capturing this phenomenon will be analysed with the help of the criteria set for theoretical validation.

2 The characteristics of a robust theory

In order to be able to set criteria for evaluating a theoretical framework, first it will be explained what constitutes a theory, and how it is constructed. This will be followed by an investigation on the characteristic features of "good" theories, which can serve as a basis for both constructing and evaluating a theory, and accordingly a theoretical framework.

2.1 What is a theory?

The term theory does not seem to possess a universal definition. Fundamentally, it is "the mental image or conceptual framework that is brought to bear on the research problem." (Van de Ven, 2007, p. 19), or as Wallis simplifies it, a theory is "a system of thought" (2012b, p. 2). As for the structure of this conceptual framework we find definitions such as Heinen's, who explains theory as "a group of logically organised laws or relationships that constitutes explanation in a discipline" (1985, p. 414). Kerlinger gives a more detailed definition: "theory is a set of interrelated constructs (concepts), definitions and propositions that present a systematic view of the phenomenon by specifying relations among variables, with the purpose of explaining and predicting phenomena" (1986, p. 45). The importance of a systemic

explanation of interrelated concepts is emphasised by Babbie (2001) and Gelso (2006) as well. Sutton and Staw (1995) conclude that a theory must be able to answer the question *why*.

If we examine what the word *theory* denotes at its core, it is found that it has its root in the Greek verb *theorein* meaning to look at, observe, examine. Interestingly, if the verb is further analysed, we realise that it is built up of the roots of two words: *thea-* a view and *horan* to see (cf. Harper, 2001-2014). Thus, it can be concluded that theorizing is looking in an active way so that we actually see something. Accordingly, if one examines an issue, it can only be called theorizing if it is an activity leading towards seeing and making people see that phenomenon. Seeing here implies being able to explain the interrelationships of the concepts within the phenomenon being investigated, in other words the *how* and *why* of the relations between the concepts of the phenomenon. Since the subject of the examination is a system, building a theory must be a systematic engagement. This involves that exploring the relationships of the concepts must result in forming statements about their relationship in the form of propositions, which can serve as a basis for empirically testable hypotheses. These propositions draw the skeleton of a theory that is formulated and visualized in the theoretical framework. Wallis (2008) calls this skeleton the *logos* of the theory i.e., "the structure of the logical arrangements that support the theory" (p. 73). Elsewhere he describes these structures of logic having five main forms: atomistic, circular, linear, branching and concatenated (Wallis, 2012b, p. 19). He claims that the most useful form of logical arrangement is the last one i.e., concatenated logic, when changes in two or more concepts cause changes in another concept. Basically, the idea he supports is that "whenever two perspectives are combined, a new (and better) understanding emerges" (Wallis, 2012b, p. 20). Consequently, a more robust theory results if it is constructed of concatenated concepts.

Furthermore, since this system of logically interrelated concepts is designed to mimic a phenomenon taking place in the real world, it can be assumed that the structure of a theoretical framework must show the characteristic features of a complex system. This is especially true in the field of social sciences, such as language pedagogy, due to the individual variations of humans influencing a complex phenomenon. According to Larsen-Freeman (2012), complex systems are characterized by the following features:

(1) Complex systems are open and dynamic.
(2) They operate under conditions that are not in equilibrium.
(3) Complex systems are systems because they comprise many elements or agents, which interact.
(4) Change/dynamism is central. The systems adapt both through interaction with the environment and through internal organisation/self-organisation.
(5) The strength of interaction changes over time. Therefore, multiple routes are often possible between components, mediated in different ways.
(6) The complexity of complex systems is emergent. It is not built into any one element or agent, but rather arises from their interaction.
(7) Because the systems are open, what arises may be in nonlinear relation to its cause. In other words, an unexpected occurrence may take place at any time.
(8) The structure of a complex system is maintained even though its components may change.
(9) The environment in which they operate is part of a complex system.
(10) Complex systems display behaviour over a range of timescales and at different levels of complexity – the latter are nested, one within another.
(11) Complex systems sometimes display chaotic variation.

(12) Complex systems iterate – they revisit the same territory again and again, which means that the present level of development is critically dependent on what preceded it. (pp. 205-206).

Complex systems therefore consist of highly interrelated concepts, where changes in any of the concepts induce dynamism in the system. How the structure of these constantly moving systems is maintained lies in the quality of their networks. Scholars in the field of network science (cf. Barabási, 2012) have proven that the stability of complex dynamic systems is founded on nodes in their network that are of higher degree due to the larger number of links they have. These higher-degree nodes are called the *hubs*, which act as the pillars of the system. Conferring this idea with the preference for concatenated concepts, it can be concluded that a theory is robust if it displays a complex dynamic system, where key concepts are highly connected, and change in each linked concept leads to change in the key concept, but these changes do not destroy the system. Furthermore, Wallis (2014) – referring to Dubin (1978) and Friedman (2003) – draws attention to the fact that there is a general consensus that more systemic theories are more useful in understanding our world.

Henceforward, the aim of a theory is to explore these connections, especially those that link the key concepts with each other and with other elements of the system. The reason why the mapping of these connections is necessary is because these connections are capable of explaining the phenomenon under investigation. This leads us to defining theory as a systematic observation and explanation of the laws of logic that govern the dynamic interrelationships of concepts taking part in the construction of a phenomenon. If one is to explain the logos of any phenomenon, the starting point must be to construct a theoretical framework that can be evaluated among the characteristics of a "good" theory. In the next section it will be investigated how such a theoretical evaluation can be carried out. The questions for theoretical evaluation are raised in line with the definition of theory:

(1) How can the relevant concepts be chosen for explaining a phenomenon?
(2) What makes the laws governing the interrelationships of concepts logical?
(3) How can it be ensured that the explanation of the theoretical framework of a phenomenon is systematic?

By answering these questions, we can get insight to both the methods of constructing a theoretical framework and evaluating existing ones. Accordingly, first we attempt to set the criteria of theoretical construction and evaluation, and based on the findings a developing theoretical framework of terminological awareness in healthcare communication will be evaluated with the criteria set with the aim to further improve the robustness of the framework.

2.2 Criteria for evaluating a theory

"Theory building involves the creation, elaboration, and justification of a body of knowledge that is relevant to the research problem." (Van de Ven, 2007, p. 19) How can it be decided what the relevant concepts are in a certain phenomenon? The answer might lay in the methodology of Grounded Theory (Strauss & Corbin, 1998), as Charmaz (2005, cited in Dörnyei, 2007, p. 258) remarks "[e]ssentially, grounded theory methods are a set of flexible analytic guidelines that enable researchers to focus their data collection and to build inductive middle-range theories through successive levels of data analysis and conceptual development' (p. 507)". In the case of theoretical investigation, concepts of a phenomenon can be seen as

data, and a systematic coding framework can ensure that the core concepts are structured in a logical way. While analysing the concepts of the issue, following the steps of open, axial and selective coding, i.e., first categories are dimensionalized, then central categories are selected, and their causal conditions are drawn in the form of propositions, a well-constructed paradigm can be developed. During such a development, anomalies can be detected, which call for a revision of the paradigm. As Carlile and Christiansen (2004, p. 9) state, "anomalies are valuable in theory building because the discovery of an anomaly is the enabling step to identifying and improving the categorization scheme in a body of theory". Therefore, a research problem is fully investigated within the borders of the phenomenon if all the anomalies found are collated with the already existing structure of concepts, and based on these comparisons the constructor of the theory is capable of stating what belongs to the core of the theory, and what does not. Wallis adds an additional level of rigor to the methodology of Grounded Theory in his Reflexive Dimensional Analysis (Wallis, 2006), where he emphasises the identification of causal relationships at the sub-category level, which then should be applied to the category level (Wallis, 2012b). This form of analysis includes the steps: "1. define the body of a theory; 2. investigate the literature to identify the concepts that define it; 3. code the concepts to identify relevant components; 4. clump the components into mutually exclusive categories; 5. define each category as a dimension; 6. investigate those dimensions through the literature, looking for robust relationships" (Wallis, 2006, p. 7). As it can be seen, mutual exclusiveness of concepts is a separate point in this analysis, which can directly lead to defining what is and what is not a constituting part of a theory.

At this point we can conclude that a "good" theory is a complex system in itself, where the concepts must be interrelated in the most logical and economical way. In a theoretical framework a concept is an abstracted idea of some component of a phenomenon, which needs to be defined in relation to the other concepts of the framework. In order to ensure that the concepts are capable of building a robust theoretical framework, it must be continuously checked whether the network of the concepts is kept stable. This involves that any definition must be in harmony with the definition of other concepts so that they can organically construct a complex dynamic framework. Therefore, it is essential to meticulously define concepts and to constantly cross-check them with the concepts of other definitions. This way, the logos of the theory can be supported, as the arrangement of the concepts displays a logical structure. Furthermore, the interrelatedness presupposes concatenatedness as well, which increases the possibility of developing a robust framework as "any part of the system can only be fully understood in terms of its relationships with the other parts of the whole system" (Wallis, 2012a, p. 27). On the other hand, Barabási (2012) claims that complex dynamic systems are always economical, as connection of two or more nodes always happens in the shortest possible way. This results in the presence of *small worlds*, which add to the robustness of a network. The shortest way of connection is reached with the help of the highly linked nodes, the hubs, and consequently, the more hubs there are in a network, the more economic and stable that system is. In the case of concepts and their definitions it means that those concepts must be found to build a theoretical framework that have a high number of links to other concepts in the phenomenon under investigation, and that are interrelated with each other as well. Wallis (2012a) also emphasises that concatenated concepts should be closer to the core of the theoretical framework, which is the skeleton of the relations between key concepts. Thus, the logos of a theory is based on laws that require propositions between concepts that are economically connected, based on high-degree linked concepts, the accuracy of which ensures a stable complex theoretical framework.

Both Barabási (2012) and Wallis (2008) suggest a precise and quantifiable form of checking the robustness of a theoretical framework, by measuring the complexity of the theory. Wallis (2008) proposes the application of Propositional Analysis, which "involves identifying the total number of aspects (or concepts) within a theory and, within that number, identifying those aspects that are concatenated" (p. 85). This way a ratio is gained resulting in a number between zero and one, which indicates the robustness of the theory. Similarly, Barabási (2012) measures the degree of distribution of relationships in a complex dynamic system network, and concludes that a degree distribution characterizes small worlds, implying that the more hubs there are in a system, the more robust that system is. It is advised to handle these quantifications with caution in the social sciences, even if they can serve as a powerful additional aspect in validating theories. For example, there can easily be a mismatch among the levels of abstraction of the various concepts – a feature of theoretical frameworks that may well influence the validity of the propositional analysis because collating the concepts in a theoretical framework is a critical point. As Wallis (2014) puts it, "concepts and conceptual systems may be understood as existing in a conceptual world that is related to, but distinct from the real world of physical objects." Accordingly, if we are to systematically examine the logos of a theoretical framework, a distinction must be made between the evaluation of concept-to-concept and concept-to-object relationships. Comparison and cross-analysis of concepts can only be effective if they are on the same or at least similar levels of abstraction. The effectiveness of abstraction lies in drawing attention to more nuanced differences between similar concepts – hence in resulting in a more accurate definition of a concept. Furthermore, since the definitions are worked out with the help of creating links between the concepts, interrelatedness will be of a higher level. This interrelatedness on the same level of abstraction, as Wallis (2014) concludes, is the prerequisite of having an internally valid and well-constructed theory. Additionally, by systematically identifying the hubs in the theory, the theory becomes less complex (i.e., more to the point) and more accurate.

For validating a theory, Wallis (2008) proposes a model (Table 1) based on the reframing of Popper's (1978; 1996) idea of the "three worlds" that constitutes of three various facets of theoretical validation: W1, the physical world (i.e., the facts and data); W2, the world of emotions and conceptions; and W3, the purely theoretical one. Such a model of theoretical validation can serve as a useful tool including multiple perspectives, and checking the level of validity on various levels. Although Wallis himself admits that this proposed model has certain limitations, it is worth considering the aspects of validation it suggests. Furthermore, it calls attention to a very important issue that is the logos interpreted by readers of the theory. It implies that a theory gains validity not only by drawing on empirically valid data sources, or highly constructed theoretical frameworks, but through the acceptance of the constructed framework by the expert community. This points to another aspect of dynamism of theoretical frameworks, as it suggests that "no theory is ever complete: there is always opportunity for improvement" (Wallis, 2008, p. 79). In fact, this is one reason supporting the widespread use of middle-range theories, as it is very rare that a theory reaches level three in W2. On the other hand, level-two validation adds triangulation of the conceptual framework of the theory. When one is creating and structuring a theory, there is a high risk of not being able to spot the flaws of the framework, and an outside observer may see problems simply by looking at the theory from farther or from a different angle. It must be remembered that reality is the response of the observer, and in order to minimise or exclude the observer effect, multiple perspectives must be involved in the process of validation.

	Level 1	**Level 2**	**Level 3**
World One (Facts or data) – i.e., empirical data	Uses objective data.	Uses objective data from multiple sources.	Future facts are predicted.
World Two (Meaning, emotions) - i.e., how the findings are evaluated	Makes sense to author.	Makes sense to editor, reviewers, and readers.	Consensus of expert opinion (this theory is preferred over other theoretical options).
World Three (Theory) – i.e., acceptability on an abstract level	Includes logical arguments.	Theory is constructed of specific propositions.	Theory is constructed of co-causal propositions.

Table 1. Dimensions of validity (based on Wallis, 2008, p. 83)

This model therefore proposes an integrated and systematic view of theoretical validation, but it shows only the dimensions of the various validating aspects, thus it must be complemented with explanations on how to achieve the levels of validation in each world. As this paper deals with the conceptual validation of a theoretical framework, the use of the model in Table 1 can take place in a limited version only. Although within these limits we can focus our investigation along the criteria set above: checking whether the concepts in the current form of our theoretical framework are mutually exclusive and relevant to our research problem; exploring whether the concepts connected are on the same level of abstraction, and the logical propositions on the relationships of the concepts in the theoretical framework are economical (i.e., degree-distributed) and accordingly support a stable and robust system. Additionally, it must also be suggested that the author reflects on the plausibility of the framework. Further steps of validation are out of the scope of this present paper.

3 Analysing the robustness of a developing theoretical framework

The reason why it is important to examine the robustness of a theoretical framework is phrased this way by Wallis (2008) when talking about the robustness of theories: "Theories of greater internal validity are more 'robust' and more robust theories stand much stronger chances of enabling – and eventually predicting – W1 changes." (p. 82). In line with this, a theoretical framework of terminological awareness – that is to show the characteristics of a "good" theory to the largest extent possible – is analysed along the criteria set in the previous section. This framework is still in development, and it is hoped that with the help of a systematic evaluation further improvements can be carried out.

3.1 The framework of analysis

According to the investigation in section 2, the following criteria have been found important in evaluating and validating a theoretical framework:

- the relevance of concepts in a theoretical framework must be ensured if they are mutually exclusive, and clearly define the phenomenon under investigation;
- logical propositions must be drawn between concepts of similar level of abstraction;
- high level of systematicity in a theoretical framework must follow from the logical and economical structure of concepts, which involves that the propositions show

a degree distribution, i.e., the key concepts of the theoretical framework share a high number of links with other concepts of the system.

3.2 The complex dynamic theoretical framework of terminological awareness

First of all, the phenomenon under investigation will be presented as a complex dynamic system built up of three sub-systems. Afterwards, each sub-system will be explained in its present form, and at the end of each section there will be a separate analysis subsection, where – based on the criteria for theoretical validation – the sub-systems will be evaluated. As this process of evaluation creates an emerging revised version of the present framework, the results of the analysis will be discussed in section 4 of this paper.

3.2.1 The research problem

English for Healthcare Purposes (EHP) is a branch of English for Specific Purposes (ESP), focussing on teaching and learning English for the purpose of communicating as a member of a professional discourse community. While the scope of ESP mostly involves professions where the specialized communication takes place mainly within the borders of a limited discourse community i.e., experts of the same specialized field communicating with each other, like scientists, businessmen, lawyers, and engineers (cf. Kurtán, 2003), EHP communication involves interacting with laypeople to a much greater extent. This implies that healthcare professionals must be able to use the language effectively in any context, be it highly specialized or characterized by interaction with non-professionals. Therefore, the central focus of teaching and learning EHP must be to explore the pragmatic aspects of the language use in any possible specialized communicative situation in the field of health care. This is in consonance with Widdowson's (1998) point of view, who emphasises that professionals must be aware of their responsibility in specialized communication, where they must adapt their language use according to their interlocutors' context, background knowledge, and communicative purpose. Accordingly, they need to engage in a co-operation with their interlocutors to ensure effective communication. Furthermore, this picture gets even more complex when English is used as a lingua franca. Seidlhofer (2011) describes this co-operation the following way: "the participants gauge a level of language at which they can operate, and settle on ad hoc, pro tem norms that are adequate to the task and commensurate to the command of the linguistic resources they have in common" (p. 18). Therefore, healthcare providers "have to be prepared to cope with varying interpretations of what constitutes appropriateness and develop a capacity which enables them to respond to some of the challenges, novelties and difficulties ELF communication presents" (Illés, 2011, p. 6). The question is what it is exactly that healthcare professionals must take into consideration when they are engaging in specialized communicative situations.

Faber (2012) points out that texts in specialized discourse are terminology-rich because of the large number of specialized language units in them, and as a result, "understanding terminology-rich texts requires knowledge of the domain, the concepts within it, the propositional relations within the text, as well as the conceptual relations between concepts within the domain" (p. 23). This involves that language users engaging in specialized communication must pay attention to use language that is plausible for the interlocutors i.e., that it activates conceptual schemata required for successful interpretation of the message. Since terminological units are the key carriers of information, as they are "access points to more

complex knowledge structures" (Faber, 2012, p. 9), it is vital to choose them with care in specialized texts so that the interlocutors can connect them to their own schemata. In order to aid these attempts of conceptual linking, the healthcare provider must ensure that the terms chosen are well-formed linguistically and appropriate in the given communicative situation. According to Hymes's work (1972), one must know what to say in what manner to the interlocutors under the circumstances of the communicative situation. The complexity of specialized communication was captured in Cabré's (2003) Communicative Theory of Terminology, which describes terminological units in relation to three dimensions: a cognitive, a linguistic, and a communicative one. This is of course true for every language unit, however, Cabré (2003) also argues that terminological units are special in the sense that they have "explicitly fixed" meaning, and "are fixed, recognised and disseminated with the help of the expert community" (p. 184). On the other hand, she adds that their communicative component entails that although they are denotative, connotations are not excluded (Cabré, 2003, p. 85). And this is a feature which cannot be overlooked in specialized communication with non-experts as most of the time their limited access to the conceptual framework of terminological units allows for connotations that may be different from the intended meaning of the sender of the information. Fóris (2013) suggests that the three dimensions of terminological units defined by Cabré (2003) are three *scale-free networks* (cf. Barabási, 2012), and joining them results in the modelling of the process of communication, which she calls the "model of terminological network" (Fóris, 2012, 2013). She claims that in the case of a terminological network, the unity of the three dimensions or sub-networks (i.e., cognitive, linguistic and communicative-pragmatic) "determines the communicative value of a term" (Fóris, 2013, p. 428). She argues that the meaning of a term is determined by the term's designation of a concept in the cognitive network of a domain, and "the relations of the communicational network allow the terms to create the links necessary for the articulation and transfer of information appropriate to the given communicative situation" (Fóris, 2013, p. 428). Therefore, the meaning of a term is emerging from the cognitive, linguistic and communicative values it points at in the three-dimensional system of communication (Fóris, 2009).

Let us explore these networks of the terminological model in relation to healthcare communication from the point of view of the three-layered structure of terminological units (Cabré, 2003; Faber, 2012; Fóris, 2009, 2010, 2012, 2013), forming the skeleton of healthcare communication (Figure 1). In what follows, each network – cognitive, linguistic and communicative-pragmatic – will be closely observed with the assumption that these three networks are, in fact, sub-networks in the system of healthcare communication, in continuous interaction with each other, each serving as an informational variable for the other two, shaping the state of the others, and consequently the state of the whole system. However, it must be noted that the theoretical framework presented here works only in the W3 dimension of Wallis's model (Table 1) – i.e., it can be accepted only at an abstract level. Accordingly, it serves only as a preliminary phase in the construction of a framework to rely on both empirical and theoretical data. It is assumed that based on theories in terminology and communication, a robust theoretical framework can be constructed, which will be later triangulated with the framework emerging from empirical data. In section 4 the three sub-systems will be presented and then carefully analysed following the criteria set earlier in this paper, and suggestions will be made for improvement of the theoretical framework.
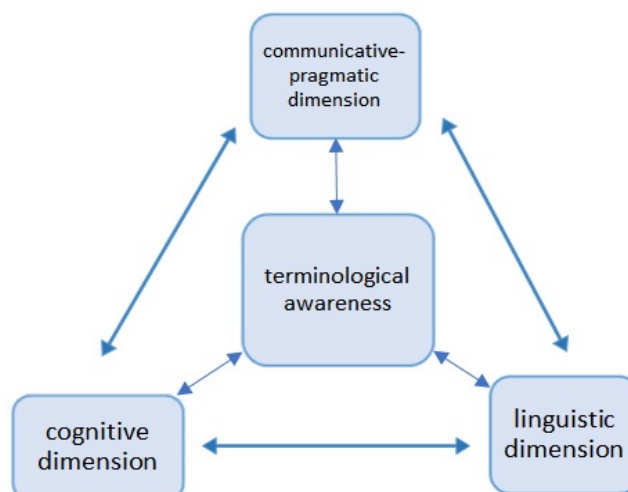
Figure 1. The complex dynamic framework of terminological awareness in healthcare communication

3.2.1 The cognitive sub-system

In the Communicative Theory of Terminology proposed by Cabré (2003), the dimensions of terminological units are described "as sets of conditions which distinguish them from other similar but different units" (p. 184). As for the cognitive component, the main distinguishing conditions are the dependence on a thematic context and the precise place in a conceptual structure. However, the construction of such conceptual structures is not described explicitly, as it has been criticized by Faber (2012), who based her cognitive theory of terminology on the principles of Frame Semantics in order "to structure specialized domains and create non-language-specific representations" (p. 23). It is built on the proposition that lexical items provide access to non-linguistic i.e., encyclopaedic knowledge by activating *frames* of the cognitive structure of a domain. She uses Evans's (2007) broad definition of a frame i.e., "the schematization of experience (a knowledge structure), which is represented at the conceptual level and held in long-term memory and which relates elements and entities associated with a particularly embedded scene, situation or event from human experience. Frames include different sorts of knowledge including attributes, and relations between attributes." (p. 85) How these frames are activated is described by Langacker (1991), who understands conceptual domains as dynamic structures, the frames of which are foregrounded by a concept. Accordingly, the meaning of a term gains semantic value from the relation of the concept and the frame activated by it.

Although Cabré (2003) claims that the cognitive component of a terminological unit is fixed, the frames a term gives access to rely on the human individual's background knowledge in the specific domain. Furthermore, the linguistic and non-linguistic elements of the context largely influence the extent of any frame a term foregrounds. As a consequence, healthcare professionals must be sensitive to any information regarding the interpretation of the message sent by them, as the interlocutors' own conceptual framework might be not just limited but differently structured, which can lead to misinterpretations of the information provided. Furthermore, it is very likely that during the communicative event between the healthcare professional and the layperson, a great deal of conceptual restructuring is taking place on behalf of the non-professional party, as he or she is continuously processing the information provided by the healthcare professional. Parallel to this, healthcare providers must carry out a continuous

modulation, periodic adjustment, or discrete resetting (cf. Warren, 2006) of their own conceptual framework for the time of the conversation, while they are simulating the predicted framework of their interlocutors.

During these procedures the interpersonal cognitive schemata of the interlocutors is established, laying ground for effective communication. However, in order to achieve this state, the healthcare provider must collect information about the background knowledge of the interlocutor by monitoring informational variables affecting the stability of the system. In this subsystem of the cognitive dimension of healthcare communication, the control variables are the nodes of the conceptual framework activated by the salient concepts in the communicative event. Although they are more or less fixed structures, individual re-structuring characterises them, and still they seem to be stable. If a complex system maintains its robustness, it is due to the fact that its hubs are not affected to a large extent by the modulations, adjustments and resettings imposed by the informational variables. Why this can happen in a professional-layperson communication is because the hubs in a conceptual structure are most likely those concepts that are widely known. For example, in the discussion about *high blood pressure* the layperson most probably has assumptions that it is a medical condition, which involves the blood, therefore the blood vessels and the heart, and the pressure in this system is higher than it should be, otherwise it would not be handled as a medical condition. These assumptions are based on encyclopaedic knowledge, most of which can be expected to be known by the lay interlocutors. This knowledge was further categorized by Langacker (1987) as *conventional, generic, intrinsic,* and *characteristic*. These imply how widely known one concept is in a particular linguistic community, how generic i.e., basic the knowledge of the concept is, what the concept entails, and how characteristic the current concept is of the class of entities it belongs to. Furthermore, it must be remembered that all these categories are further shaped by the individual's experience and the contextual factors in the given communicative situation.

Analysis: Right here in the analysis of this sub-system, an apparent problem emerges. Finding the concepts relevant in this system is not an easy task, as the cognitive procedures in formulating information plausible for the interlocutors are informed by various components of the communicative situation. The activation of the necessary frames does not lie only on the evaluation of communicative purpose and the lexical items i.e., terms to be chosen, but rather on the interlocutor's knowledge as assumed by the healthcare provider. Moreover, there are numerous contextual features taking part in the procedure. Therefore, it is necessary to focus our investigation on the initial research problem. Fundamentally, healthcare providers' terminological choices are to be investigated. The question is how they shape their terminological language use in order to achieve their communicative purpose. Obviously, this cannot be completely separated from the contextual features, but in order to explore the context, empirical data are necessary. However, we need to keep our focus in the world of theory (W3) at this point. On the other hand, even if we provide a clear theoretical framework of the cognitive sub-system of terminological awareness, later it will have to be faced that supporting these ideas empirically is going to be a very difficult if not impossible task, as cognitive processes happen mainly automatically. Still, in order to have a robust system, we need this sub-system as well, as there is an obvious interrelatedness observable with the other two sub-systems.

If we examine the conceptual propositions of the concepts of this sub-system, we find that a minimum of two complex dynamic systems take part in its formation because in order to establish interpersonal schemata, i.e., the shared domain knowledge of the interlocutors, connections must be made between the interlocutor's dynamic conceptual schemata to one

another. However, it must be realised that at this level of investigation, what we need to find is a simplified yet complex framework that contains concepts of the same abstraction level as the key concepts of the other two sub-systems. We will turn back to the definition of the key concept of this sub-system later, as it must be related to the linguistic and communicative-pragmatic key concepts.

3.2.2 The linguistic sub-system

In Faber's Frame-based Theory of Terminology (2012) the language code of a terminological unit is described as the *construal* which already implies the speaker's perspective and intent, as they are expressed when one term is chosen instead of another. As Faber (2012) puts it "[i]n the case of specialized communication, the existence of a nomenclature […] is indicative of the assumption of shared knowledge" (p. 200). Accordingly, depending on the predicted lexical knowledge of the interlocutors, healthcare professionals can make terminological choices.

As Fóris (2012) points out, terminological units are at the same time lexical units, and are therefore parts of speech. This implies that they both have and are parts of linguistic structures, such as syntactic, lexical, morphological, and phonological. These features of terminological units can greatly contribute to the successful interpretation of specialized texts, as the linguistic characteristics must be adjusted to the level of the interlocutors, just like the conceptual frameworks.

The scale-free network of terms is centred around denominations that are most widely known – for example popular terms, and their alternative denominations, like Latin counterparts of the same term are smaller nodes connected to them. Furthermore, these networks change from language to language even if they contain a large number of shared terms, like Latin medical terms, which must be taken into consideration when making a terminological choice in ELF communication. This is relevant most probably when the interlocutor's L1 is a Romance language. For example when in English the language user can choose from the popular term 'womb' and the Latin 'uterus', the popular would be a better choice when talking to non-professional native speakers of English, however, for a layperson with a Romance L1, uterus would activate the necessary conceptual framework with a higher probability, e.g., 'utérus' in French, 'utero' in Italian, and 'útero' in Spanish. Although, in these languages there is sometimes another neo-Latin denomination as well, but they use it almost interchangeably with the medical Latinate one. As Rosendo (2008) explains, most of the time Spanish lacks "term-coupling" (p. 242) that is common in English medical language. She lists a few examples, like the English doublet 'coagulation'-'clotting', which is used in Spanish only as 'coagulación'.

Furthermore, as these lexical elements can form part of larger language units, they can connect to other lexical units in concordance with the frames they activate. For example, in the case of the following terminological unit four different linguistic manifestations, or construals, can be observed: *the head of the upper arm bone, the head of the humerus, humeral head, or caput humeri*. Each of these is the denomination of the same concept, in which a semantic frame is activated based on a possessive relation of two concepts *x of y*. However, according to the intent of the speaker, or to textual or contextual constraints, syntactic or morphological changes must be carried out in order to keep the optimal level of communication.

Analysis: Similarly to the cognitive sub-system, language is in itself a complex dynamic system, showing individual variation. If we focus our investigation on terminological nomenclature, it can be claimed that it has the same characteristic features as the conceptual schemata of the domain in question. In both cases we need to formulate concepts that are abstractions of human phenomena. If we say that a term used by an individual is at the same level as the concept denominated by that term, connection can be made between them. Furthermore, change in either of them has an effect on the other one.

So far, we can see that the former two sub-systems are fundamentally connected, but at a level that does not seem to be directly related to the phenomenon under investigation. Since we are to explore terminological awareness, our main interest is in the ability to explore the three dimensions of terminological units. Let us presume at this point that in order to construct an economical framework we need to add the more abstract concepts of exploring the dynamic sub-systems to our framework, so that the key concepts get closer to the core of the theory. Still, to justify this proposition we need to explore the third sub-system.

3.2.3 The communicative-pragmatic subsystem

This sub-system carries the communicative purpose, which shapes the choices made at conceptual and linguistic levels. Such as the two other sub-systems, this one also works as a complex dynamic system as the communicative purpose is continuously fine-tuned in the course of communication. Along with this constant modification, the basis for choosing terms and sharing information is modified in order to achieve the perlocution intended by the speaker. All the while, the main purpose remains that the interlocutors wish to understand each other, and therefore engage in the co-construction of meaning. In other words, they follow the tacit conventions of communication that are naturally present in any sort of community. Grice (1975) described this phenomenon as the Cooperative Principle (CP), which controls the procedures of human communication by providing relative norms, the maxims, the adherence to which results in effective co-construction of meaning. These are the maxims of quantity, quality, relation, and manner. The maxim of quantity suggests the interlocutors that they should "be as informative as is required (for the purposes of the exchange)" (Grice, 1975, p. 45). The maxim of quality requires from the participants of communication to make contributions that are true, which entails two things: 1. not saying what is false, and 2. not saying "that for which one lacks adequate evidence" (Grice, 1975, p. 46). The third maxim, relation asks the participants to be relevant, and the last one, manner makes suggestions about how to say what is to be said. This includes "1. Avoid obscurity of expression; 2. Avoid ambiguity; 3. Be brief (avoid unnecessary prolixity); 4. Be orderly." As Grice (1975) concludes it "Be perspicuous." (p. 46). Furthermore, based on the communicative purpose, these maxims can also be flouted in order to sustain effective communication.

Analysis: By defining the third dimension as the communicative purpose, it can be claimed that this concept is at the same level as assumed shared knowledge or terminological choices, as they are similar concepts. Their alikeness lies in their feature of being an individual's exploitation of the communicative and linguistic sources at hand. Furthermore, in all three cases there is a complex dynamic system accessed by the individual, and all three dimensions can equally be embedded in the dynamic schematic construct of the context, as the manner of these exploitations are influenced by contextual features. If we re-examine the research problem under investigation i.e., what choices healthcare providers make, we can conclude that we have found more relevant key concepts of the phenomenon of terminological awareness.

Consequently, these concepts can be more easily collated with empirical data, as by exploring healthcare providers' exploitation of the three dimensions we can draw conclusions on their problem-solving capacity, which can serve as a basis for raising healthcare providers' awareness in their language use.

4 The revised framework of terminological awareness in healthcare communication

With the help of a systematic approach to developing a theoretical framework, the flaws and mismatches in the preliminary framework could be detected and they aided the improvement of a revised framework (Figure 2), which may still be subject to further analysis and modification in the future steps of theoretical validation. As our framework of analysis suggested, the relevance of the key concepts was examined by looking at their mutual exclusiveness and concatenatedness. It was found that while the sub-networks of the terminological unit were concatenated per se, they could not display the complexity of healthcare communication, as the individual choices of terms were not included in the framework. In other words, by directly linking terminological awareness to the sub-systems of terminological units, two different fields – i.e., terminology and healthcare communication – were connected without the exploration of their relationship (cf. Figure 1). This observation had led to the greatest modification on the preliminary framework due to the realisation that the key concepts building up the core of the framework were not at the same level of abstraction as the phenomenon under investigation, and therefore more steps were needed to be made in the network to connect the relevant nodes with each other. It has been concluded that in order to explore a problem-solving capacity, such as terminological awareness, it is necessary to approach the dimensions of terminological units from the aspect of exploitation of the sources in these dimensions. This way a more logical and systematic analytical tool has been developed, which makes it possible to explore the phenomenon empirically as well.
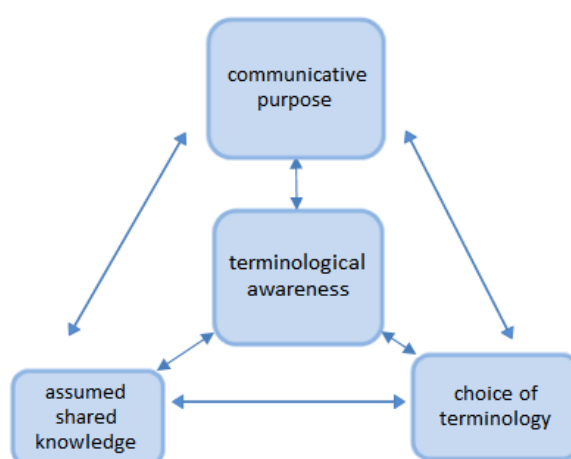

Figure 2. The revised framework of terminological awareness

It is anticipated that during the empirical phase of the research these key concepts will be found to be hubs in the network of terminological awareness as contextual features will most probably induce changes in the sub-systems of all of the components. So far, this simplified construct of the theoretical framework seems robust, as the concepts are mutually concatenated, as the chosen communicative purpose influences the decision of healthcare providers on how

much information they share and which terms they use. On the other hand, by deciding on the amount of information to be shared based on the exploration of the interpersonal cognitive schemata, the healthcare provider can shape the communicative purpose, and select terms accordingly. Similarly, by evaluating the shared terminological nomenclature, both the communicative purpose can be adjusted to the lexical level of the interlocutors and the amount of shared information can be assumed. Therefore, it can be concluded that the revised framework (Figure 2) serves as an intermediary tool connecting the psychological constructs i.e., cognitive, linguistic and communicative schemata of the interlocutors. In the case of healthcare communication where English is used as a lingua franca, healthcare providers must continuously explore the interlocutors' linguistic resources, which may include not only their use of English, but their mother tongue as well which influences their actual English language use to a large extent. Similarly, parallel to this exploration, they also have to monitor their own multilingual linguistic resources and constantly compare them to their interlocutors'. In line with this, the same procedures happen while adjusting their interpersonal cognitive schemata, along with their ad hoc communicative purposes. The function of terminological awareness is similar to the role of the translating system in the scale-free network model of translation (Fóris, 2009, 2010), which mediates between the two three-dimensional systems of the source and target languages. The reason why the emerging framework of this paper is different is that its final aim is to explore the choices and adjustments made by the responsible party i.e., the healthcare provider in communication, and accordingly, the mediation takes place between the interlocutors, resulting in their dynamic interpersonal schemata laying the foundation for healthcare communication.

5 Conclusion

At the onset of this paper it was proposed that a more systematic approach would be needed in constructing and developing theories in language pedagogy. In order to address this issue, the criteria for a "good" theory have been proposed, which can serve as a basis for building and evaluating a theoretical framework. It has been found that a robust theory contains mutually exclusive concepts at the same abstraction level that are relevant to the research problem and are logically connected in an economical way. In order to be able to choose the relevant concepts explaining a phenomenon, the mutual exclusiveness of the concepts must be ensured, and to create a logical theoretical framework, the same level of abstraction must be reached for concepts that take part in a proposition together. Furthermore, the key concepts of the framework must have a high number of links to other components of the network to create an economically functioning complex system. Accordingly, an emerging framework of terminological awareness has been analysed by examining the relevance of the key concepts and their relationships with each other. The analysis of this developing theoretical framework with these criteria has proven to be successful, as it resulted in its improvement by adding intermediary key concepts to the framework that could ensure its logos and robustness. However, further analysis is needed both in order to fine-tune our procedures of validation and to make sure that the developing theoretical framework stays robust.

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References

Babbie, E. (2001). *The practice of social research* (9th ed.). Belmont, CA: Wadsworth.

Barabási, A. L. (2012). *Network science book.* Retrieved January 1, 2014, from
    http://barabasilab.neu.edu/networksciencebook/.

Cabré, M. T. (2003). Theories of terminology: Their description, prescription and explanation.
    Terminology, 9(2), 163-199. https://doi.org/10.1075/term.9.2.03cab

Carlile, P. R., & Christiansen, C. M. (2004). The cycles of theory building in management
    research. Working paper, version 5.0. [Online] Retrieved March 29, 2014, from
    http://www.hbs.edu/faculty/publication%20files/05-057.pdf

Charmaz, K. (2005). Grounded theory in the 21st century: Applications for advancing social
    justice studies. In N. K. Denzin, & Y. S. Lincoln (Eds.), *The Sage handbook of
    qualitative research,* 3rd Edition (pp. 507-565). Thousand Oaks, CA: Sage
    Publications.

Dörnyei, Z. (2007). *Research methods in applied linguistics – Quantitative, qualitative and
    mixed methodologies.* Oxford: Oxford University Press.

Dubin, R. (1978). *Theory building.* New York: The Free Press.

Evans, V. (2007). *A glossary of cognitive linguistics.* Salt Lake City: University of Utah
    Press.

Friedman, K. (2003). Theory construction in design research: Criteria: Approaches, and
    methods. *Design Studies*, *24*(6), 507–522. https://doi.org/10.1016/s0142-
    694x(03)00039-5

Faber, P. (Ed.). (2012). *A cognitive linguistics view of terminology and specialized language.*
    Berlin, Boston: De Gruyter Mouton.

Fóris, Á. (2009). A terminus háromdimenziós vektormodellje [The three-dimensional vector
    model of a term.] *Magyar Terminológia, 2*(1), 31–45.

Fóris, Á. (2010). A fordítás skálafüggetlen hálómodellje [The scale-free network model of
    translation]. In M. Balaskó, G. Balázs, & L. Kovács (Eds.), *Hálózatkutatás –
    Hálozatok a társadalomban és a nyelvben (Segédkönyvek a nyelvészet
    tanulmányozásához 103.)* [Network research – Networks in the society and in
    language (Handbooks to linguistic inquiries 103.)]. (pp. 122-141). Budapest: Tinta
    Könyvkiadó.

Fóris, Á. (2012). Terminology and the theory of scale-free networks. *Magyar Terminológia,
    5*(1), 58–71. https://doi.org/10.1556/materm.5.2012.1.5

Fóris, Á. (2013). Network theory and terminology. *Knowledge Organization, 40*(6), 422-429.
    https://doi.org/10.5771/0943-7444-2013-6-422

Gay, B., & Weaver, S. (2011). Theory building and paradigms: A primer on the nuances of
    theory construction. *American International Journal of Contemporary Research, 1*(2),
    24-32.

Gelso, C. (2006). Applying theories to research: The interplay of theory and research in
    science. In F. T. Leong, & J. T. Austin (Eds.), *The psychology research handbook* (pp.
    455-465). Thousand Oaks, CA: Sage Publications. Retrieved February 28, 2014, from
    http://www.sage-ereference.com/hdbk_psychrsch/Article_n32

Grice, P. H. (1975). Logic and conversation. In P. Cole, & J. L. Morgan (Eds.), *Syntax and
    semantics 3: Speech acts* (pp. 41-58). New York: Academic Press.

Harper, D. (2001-2014). Online etymology dictionary. Retrieved January 16, 2014, from
    www.etymonline.com

Heinen, J. (1985). A primer on psychological theory. *The Journal of Psychology*, *119*(5), 413-
    421. https://doi.org/10.1080/00223980.1985.10542912

Hymes, D. (1972). On communicative competence. In J. B. Pride, & J. Holmes (Eds.), *Sociolinguistics* (pp. 269-293). Harmondsworth: Penguin Books.

Illés, É. (2011). Communicative language teaching and English as a lingua franca. *Vienna English Working Papers, 20*(1), 3-16.

Kerlinger, R. (1986). *Foundations of behavioral research*. New York: Holt, Rinehart, & Winston.

Kurtán, Zs. (2003). *Szakmai nyelvhasználat* [Professional language use.] Budapest: Nemzeti Tankönyvkiadó.

Langacker, R. (1987). *Foundations of cognitive grammar* (Vol. 1). Stanford CA: Stanford University Press.

Langacker, R. (1991). *Concept, image and symbol: The cognitive basis of grammar.* Berlin: Mouton.

Larsen-Freeman, D. (2012). Complex, dynamic systems: A new transdisciplinary theme for applied linguistics? *Language Teaching, 45*(2), 202-214. https://doi.org/10.1017/s0261444811000061

Merton, R. K. (1968). *Social theory and social structure* (3rd ed.). New York: The Free Press.

Popper, K. (1978). *Three worlds.* Paper presented at the Tanner Lecture on Human Values, University of Michigan, April 7, 1978.

Popper, K. (1989). *Conjectures and refutations: The growth of scientific knowledge* (5th ed.). London: Routledge.

Popper, K. (1996). *Knowledge and the body-mind problem: In defence of interaction*. New York: Routledge.

Quine, W., & Ullian, J. (1980). Hypothesis. In E. Klempe, R. Hollinger, & A. Kline (Eds.), *Introductory readings in the philosophy of science* (pp. 404-414). Buffalo, NY: Prometheus Books.

Rosendo, L. R. (2008). English and Spanish medical languages: A comparative study from a translation point of view. *Trans: Revista de Traductologia,* (12), 231-246. https://doi.org/10.24310/trans.2008.v0i12.3137

Seidlhofer, B. (2011). *Understanding English as a lingua franca*. Oxford: Oxford University Press.

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage Publications.

Sutton, R., & Staw, B. (1995). What theory is not. *Administrative Science Quarterly*, *40*(3), 371-384. https://doi.org/10.2307/2393788

Van de Ven, A. H. (2007). *Engaged scholarship: A guide for organizational and social research*. New York: Oxford University Press.

Wacker, J. (2008). A conceptual understanding of requirements for theory-building research: Guidelines for scientific theory building. *Journal of Supply Chain Management*, *44*(3), 5-15. https://doi.org/10.1111/j.1745-493x.2008.00062.x

Wallis, S. E. (2006). *A sideways look at systems: Identifying sub-systemic dimensions as a technique for avoiding an hierarchical perspective*. Paper presented at the International Society for the Systems Sciences, Rohnert Park, California.

Wallis, S. E. (2008). Validation of theory: Exploring and reframing Popper's worlds. *Integral Review*, *4*(2), 71–91.

Wallis, S. E. (2010). Toward a science of metatheory. *Integral Review*, *6*(3), 73-120.

Wallis, S. E. (2012a). A systems approach to understanding theory: Finding the core, identifying opportunities for improvement, and integrating fragmented fields. *Systems Research and Behavioral Science*, *31*(1), 23-31. https://doi.org/10.1002/sres.2159

Wallis, S. E. (2012b). *Existing and emerging methods for integrating theories within and between disciplines*. Proceedings of the 56th Annual Meeting of the ISSS - 2012, San

Jose, CA, USA. Retrieved March 25, 2014, from
http://journals.isss.org/index.php/proceedings56th/article/view/1943

Wallis, S. E. (2014). Abstraction and insight: Building better conceptual systems to support more effective social change. *Foundations of Science, 19*(4), 353-362.
https://doi.org/10.1007/s10699-014-9344-4

Warren, W. H. (2006). The dynamics of perception and action. *Psychological Review*, *113*(2), 358-389. https://doi.org/10.1037/0033-295x.113.2.358

Widdowson, H. G. (1998). Communication and community: The pragmatics of ESP. *English for Specific Purposes, 17*(1), 3-14. https://doi.org/10.1016/s0889-4906(97)00028-8