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# Concept Maps as a Conceptual Modelling Device in L2 Abstract Vocabulary Acquisition

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## ABSTRACT

The goal of this paper is to demonstrate the role of conceptual metaphor and concept maps in SLL by exploring the employment of conceptual metaphor theory in the design of concept maps as an instrument enhancing the effectiveness of abstract vocabulary acquisition in L2. It claims that the ubiquity of audio—and visual stimuli in contemporary society, which often renders students 'insensitive' to linguistically coded information, requires more stimulating tools for teaching vocabulary. Concept maps—a blend of visual and textual information that introduces concepts and their connections—can serve as a suitable tool for the introduction, revision, and systematic presentation of abstract vocabulary. What brings this opportunity to the fore in the second language classroom is the fact that abstract concepts and abstract vocabulary are commonly rooted in concrete conceptual domains through metaphor—a pattern of thought and a mechanism of experiential grounding of abstractions. Therefore, the methodology of the present research is the intersection between cognitive semantics, metaphor theory, and the constructivist approach to learning. To prove the effectiveness of concept maps transposing conceptual into conventional metaphors in vocabulary acquisition, an inquiry is made into their symbolic isomorphism with conceptual mapping viewed as the process aspect of metaphorical conceptualization. Using the method of structural and functional modelling, an invariant model is created for the design of such concept maps and their transformation into a didactic tool for abstract vocabulary acquisition. The educational adequacy of the resulting didactic Cmaps is yet to be validated experimentally.

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# 1. Introduction

The structural simplicity of the English language and the sound logic underlying its grammatical system favour its role as an almost universal lingua franca. Yet, the step from working knowledge of the language to mastery in using it is rather difficult to make. One reason for this is its rigid collocational restrictions and the complexity of its vocabulary, which stems from this characteristic. The requirements of semantic compatibility and the intricate variety of phrasal verbs, phraseological unities and idioms, whose motivation is difficult to retrieve, at least synchronically, are a serious barrier to the acquisition of native-like knowledge of English.

The rationale behind this study is therefore to suggest an approach to vocabulary teaching that can enhance learning and retention, while at the same time revealing the picture of the world that English constructs linguistically. The approach includes three mutually defining elements: 1) the concept of the internal metaphoricity of language[1–3]; 2) the principle of visualization in education[4]; 3) the idea that in the foreign/second language classroom, Cmaps can function both as a means of visualization and an instrument of cognition.

In addition, the study poses the issue of stimulating students' ability to recognize, learn and predict metaphorical uses of lexical expressions since true fluency in using vocabulary implies not only knowledge of lexemes and phraseological expressions, but also the capacity to generate them aptly in the right communicative context.

The concept of the internal metaphoricity of language is crucial to converting conceptual metaphor, as an inherent language property, into a tool that aids abstract vocabulary acquisition through simulated knowledge promoted by the construction of concept maps. More specifically, being a mental construct and a mechanism of cognition, metaphor establishes a foundation for the formation of abstract concepts through concrete ones by: 1) isolation of distinctive properties of objects, processes and phenomena from material reality (source domain object); 2) projection of these properties and their relations onto an object from ideal reality (target-domain object); 3. reiteration of the perceptions of the target-domain object through those related to the source domain one. This process of conceptual reframing through perception of the unfamiliar object, its properties, its mental representation, and its relation with other objects from the same structure of knowledge (conceptual domain) is in essence an act of simulated knowledge or learning[5]. It is formed in the course of the identification of correlational interactions between the objective and the subjective reality. In the process, the experience of the cognizing subject functions as a point of departure for metaphoric conceptualization and initiates the transposition of knowledge from one situation to another by simulating relations based on analogy or similarity elicited from bodily experience or sensory-motor stimuli.

Since the cognitive revolution in linguistics, which is rooted in conceptual metaphor theory, and the resultant conclusion that language is a cognitive faculty, researchers have also been exploring ways to apply conceptual metaphor to foreign/second language education. Evidence has been piling up as to its role in vocabulary retention, raising intercultural awareness, the teaching of tense and aspect, the teaching of prepositions, the acquisition of oral/written fluency, especially with respect to establishing, maintaining, and terminating conversations and to structuring the argument within cohesive units of text[6–12]. The results of these experimental studies facilitated the validation of metaphorical competence as a constitutive part of speakers' communicative competence[13]. So far, however, metaphor awareness raising activities focus on the chain INTRODUCE-IDENTIFY-CLASSIFY-DISCUSS-RETAIN with little reference to metaphorical language generation. Only a few longitudinal studies exploring the long-term effects of these activities on vocabulary acquisition have been conducted[14]. Few attempts have been made so far to design a coherent, comprehensive and learner-oriented didactic technology for systematic teaching of metaphorical language either.

The present study is a small step along this path in that it explores the design of conceptual maps (Cmaps) in such a manner as to explicate conceptual re-categorization

through metaphor and use this as an effective tool for abstract vocabulary acquisition in L2.

Two facts of equal importance, though disparate in essence, underly the choice of Cmap cards as a learning tool for abstract vocabulary acquisition in the foreign/second language classroom. First, as will be demonstrated in part 3, Cmaps and conceptual metaphor are structurally isomorphic. Second, contemporary culture is visually oriented and young people, both as consumers and as creators of culture are immersed in a milieu of images that inform rather than illustrate. Fully aware of this development, course book designers offer a large amount of instructional content in the form of pictures, drawings, tables, graphs, figures, etc, which are provided as a source of specific additional data rather than as visual support to the textual information. Against this background of students' in-creased reliance on visual sources of information in both learning and exploring, concept maps can successfully be used as a foundation for a technology of teaching English that synergizes the metaphorical nature of language, on the one hand, and the schematic nature of knowledge structures, on the other, to help students reach optimal results in the acquisition of L2 skills as a whole.

Next, my own observations and those of many of my co-workers raise some concerns about the changing habits of second language learners as to the practice of learning vocabulary. Being continually exposed to English in surroundings other than the classroom, students tend to develop a feeling of 'knowing' lexical items that they actually only recognize in familiar contexts. Unfortunately, the phenomenon is not a matter of active and passive vocabulary knowledge because learners are not only unable to use these words in written or oral communication, but they also find it difficult to come up with suitable translation equivalents and are helpless if the word occurs in an unfamiliar context. Their knowledge of concrete lexical items, however, is rather stable as compared to that of abstract lexis for two main reasons. One way to account for this observation from practice is the design of school course books, which are by definition structured to meet the educational requirements through continuity in learners' familiarization with thematic units related to their immediate surroundings (family, home, school, hobbies, etc.). This continuity stems from the steady expansion of the vocabulary necessary to handle these topics descriptively, pragmatically and with respect to reading and listening comprehension. Thus, to achieve maximum effect with 'minimum raw material available', the process of vocabulary acquisition can be streamlined by using this stable core of concrete vocabulary more effectively as a basis and a starting point for the familiarization, learning, and ultimately pragmatic activation of words and expressions signifying abstract concepts through lexical items designating concrete conceptual content.

The design and application of a didactic technology that uses visualization tools (concept maps) which employ students' knowledge of concrete vocabulary units to teach (and elicit) knowledge of abstract conceptual content designated by these units is therefore a shortcut from sheer memorization to a conceptual approach to vocabulary teaching.

To demonstrate the role of concept maps as instruments raising metaphorical competence in foreign/second language education by facilitating abstract vocabulary acquisition, I have chosen to present the conceptual content of the functional semantic field WATER/LIQUIDS in English, which is formed as a result of the bilateral interaction between the concrete source domain WATER/LIQUIDS and the abstract domains, conceptualized in terms of that concrete knowledge structure (MIND, TIME, COMMUNICATION, INTERPERSONAL RELATIONS, MORALITY, EMOTIONS)[15]. The source domain WATER has been subject to structural and functional modelling in order to construct the sample map, which can be used as an invariant that can be reshaped to match the instructional content. The reason for this choice is grounded in the fact that the semantic domain WATER/LIQUIDS contains a large number of core vocabulary items. All these items have conceptual extensions to abstract domains. Hence the domain WATER/LIQUIDS provides a comprehensive and extensive coverage of a large number of linguistic metaphors expressing abstract meaning. This meaning, however, is articulated through familiar core vocabulary lexical units.

In addition, earlier studies substantiate the claim that conceptual metaphor, being a model and a construct manifested by conventional metaphors, as its variants, can be successfully used as a tool for acquiring new instructional content[16,17]. Concept maps have also been shown to facilitate this process by visualizing the relations between experiential (situative) and conceptual (simulated) knowledge[5].

The present study builds on this research by substan-

tiating the uses of Cmaps as didactic tools facilitating the acquisition of abstract vocabulary in foreign/second language education not only as a result of their visualization properties, but also due to their isomorphic relation to conceptual metaphor as a construct of thought (and language) instantiated linguistically through conventional metaphors.

## 2. Model Design: Theoretical Rationale

An approach to abstract vocabulary learning, in which concept maps are tools for abstract vocabulary acquisition which streamline the process engaging students' own language knowledge and experience of the world, requires the definition and explication of the connection between linguistic metaphoricity, visualization and concept maps, on the one hand, and vocabulary study on the other.

The intricate system of conceptual metaphors in a language contains, at the schematic level, a particular picture of the world[18]. Linguistic pictures of the world are language-specific; they are entrenched in the formal and lexical levels of the respective language[19]. Metaphors, or the building blocks of these pictures of the world, also vary—in terms of their nuances or with respect to the source and target domain elements and relations established in the process of reframing abstract content through concrete lexical items[20,21].

An important task of a foreign/second language teacher is thus to use these disparities and help students devise a strategy that will allow them to consciously shape the L2 picture of the world by gradually putting together its separate parts. Visualization and analogy are instrumental in this process. It is one thing to explain to a learner that L1 and L2 construe abstract concepts differently, but to demonstrate this difference is quite a strenuous task. Differences and similarities in the linguistic construal of metaphorically encoded concepts across languages can be explicated by demonstrating the choice of a source domain, whose content serves to reframe a concrete concept by mapping semantic elements and relations onto the target domain forming our knowledge of an abstract concept. These differences are also reflected in the specific choice of the semantic elements (features and relations) of the source domain term(s) highlighted in the metaphorical mapping.

For example, it is argued that the conceptualization of quantity in English reflects the fact that we think of quantity as of number or amount. A variety of terms from the concrete conceptual domain WATER/LIQUIDS are used to conceptualize *abundance* or *scarcity* metaphorically (*oceans of, seas of, a river of, a flood of, a flow of, flood the market, a stream of, a tidal wave of, a spray of, a drop/dash/splash of*)[22]. These lexical items are mostly terms denoting basic level category members. These terms form the core of the respective semantic field, which is a system of interrelated linguistic elements that articulate conceptual content. The reason for this linguistic choice is the relative ease with which it is empirically observable if something is large or small, a lot or a little, enough or not enough. While in English both number and amount are represented through terms from the conceptual domain WATER/LIQUIDS, other languages employ this domain mostly in the conceptualization of amount. Number, in turn, is metaphorically rooted in the concrete domain of entities. Therefore, the respective abstract vocabulary comes from the domain ENTITIES/OBJECTS rather than WATER/LIQUIDS. How can a concept map visually demonstrate these linguistic phenomena?

The answer to this question requires a critical look at the tenets of schema theory in linguistics, psychology and computer science, which postulates that all knowledge is organized in units (schemata) in which information is stored. A schema in memory and cognition can thus represent knowledge at all levels, from ideology and cultural awareness to the meaning of a particular word or morpheme. We have schemata to represent all levels of our experience, at all levels of abstraction. That is, all of our knowledge is embedded in schemata which can be described as generalized conceptual systems for understanding how knowledge is used[23]. According to this theory, schemata not only represent knowledge about concepts, but function as theories about reality as well. They influence the interpretation of information in our consciousness, affecting comprehension, and they continue to change as new information is acquired.

The concept of meaningful learning frames these findings into an approach to education that puts at its centre the learner with their own experience and knowledge and uses this as a starting point for the introduction of new instructional content in a scaffolded, step-wise, and motivating manner. As part of the inventory of the constructivist approach in science and in education, Cmaps have been subject

to rigorous exploration in view of their application to knowledge management, knowledge representation, deep knowledge analysis, knowledge and information visualization, and meaningful learning for quite some time [24–27]. Their grounding in the tenets of Piagetian age psychology, schema theory of cognition and processing and the theory of meaningful learning turns Cmaps into an effective instrument for learning and retention [23]. The theoretical rationale for their successful application as learning tools, however, still remains out of the spotlight of language education theory and practice.

Indeed, the employment of Cmaps as structures of knowledge containing concepts and propositions and the relations among them makes them highly applicable as both visualization and presentation tools. However, what seems of much greater use as far as language learning goes, is their potential to encompass new concepts, propositions and relations as learners' knowledge expands in time [28]. By definition, a concept map is "a top-down diagram showing the relationships between concepts, including cross connections among concepts, and their manifestations (examples)" [29]. It can be a tool in clarifying "the elements and examples of an abstract concept" [29]. To put it more clearly, Cmaps, such as the ones proposed in this study, are a viable instrument in streamlining abstract vocabulary acquisition because they explicate the metaphorical mappings (relations) that entrench abstract concepts in concrete conceptual domains through analogy based on experience. Viewed in a top-to-bottom manner, these relations, incorporate: (i) the abstract (target) domain conceptualized through a concrete one; (ii) the concrete (source) domain; (iii) its key sub-categories defining the target domain (the aspects of the metaphorically encoded concept); (iv) examples of the linguistic construal (words, phrases, expressions) of these sub-categories (actual abstract vocabulary items that exemplify the concrete-abstract concept relation).

Besides the clarity with which they represent such complex processes, Cmaps have another important inherent property—they have a temporal dimension potentially reflecting any change in learners' interlanguage. As a result, they can function both as structures reflecting knowledge representation as is and instantiating knowledge in a temporal manner—at different moments of the learning process and during a variety of learning episodes. In the context of the constructivist approach to learning and knowledge representation, this means that Cmaps allow for a fine-tuned coordination between what teachers want to present as new content and what learners can use as a basis for acquiring this content in the shape of a constructi-con-knowledge of grammatical constructions and lexicon.

Importantly, to consider concept maps a tool of visualization and cognitive stimulation, means to employ, in the learning episode, both the senses and the mental processes. It suggests active rather than passive student engagement. These maps are graphic representations of connections between language and the mind that are otherwise hard to comprehend. They also epitomize meaningful parts of the linguistic picture of the world by showing how the extralinguistic continuum is represented with the discrete means of language. This ranks concept maps next to infographics as "an instrument in the development of a comprehensive system of cognitive tasks in education related to the formation of skills for modeling" [30]. They fine-tune students' awareness of the connections between mind and experience that form the metaphorical nature of abstract concepts and the vocabulary which denotes them, offering learners a glimpse at the way the properties of different languages establish a divergence (or similarity) in their ways of sampling the flow of reality.

It should be noted that the theoretical rationale behind the present research limits the data subject to analysis to: (i) the invariant structure of abstract conceptual domains in English and the functions of their components in that structure; (ii) the topology of these domains and its isomorphic relations with the organization of Cmaps presenting abstract meanings through concrete ones. Classroom setting empirical research to validate the didactic tools designed on the basis of language data analysis is yet to be conducted.

# 3. Discussion

The concurrent visualization and schematization of the presentation of metaphorically construed abstract concepts through Cmaps, such as the ones described above, suggest that there are two critical components to be included in the effective design of concept maps for classroom use. First, a high order of abstractedness should characterize the target concepts and the respective lexical items that denote them—this guarantees a variety of associated vocabulary

items that can illustrate its linguistic construal [1]. Second, these abstract concepts should have the capacity to relate to conceptual domains other than the ones they belong to. This combination offers students an opportunity to establish how such associations may be expressed differently in different languages. It also introduces them to the idea of the interrelatedness of concepts reflected in their linguistic expression. Thus, for example, terms from the conceptual domain WATER/LIQUIDS are used to express both knowledge (*shallow/deep knowledge*) and understanding (*foggy explanation, as clear as wind, clarify the answer, deep understanding*), which demonstrates the interdependence between their experiential association and the linguistic means engaged in their conceptualization.

The high order of abstractedness characterizing the target abstract vocabulary has a crucial corollary. The maps that visualize the interrelatedness among concepts articulated through lexical items with concrete primary meanings have greater cognitive value based on the number of hierarchical levels that lead from the source domain level, through its subcategories, to the target domain with its own, metaphorically conceptualized, subcategories and finally, to the abstract vocabulary items that illustrate this conceptualization. An equally variegated set of relations characterizes and visualizes the interdependence between terms occupying the same level of the concept map.

These links in concept maps have been reconsidered for classroom use as "streams" rather than relations: "[T]he stream is a multi-component relation reflecting, to different degrees and from a variety of perspectives, the interrelation between bases [key concepts] in a certain educational context"[31]. The adoption of this term is instrumental for the purposes of the present research for a very simple yet pressing reason. Cmaps that visualize the abstract vocabulary items through their interrelatedness with concrete ones and with the experiential motivation that underlies these associations, do not contain a genus-species type of hierarchical links. Therefore, the scope and content of the term 'streams' facilitate both the design of these models of concepts and their application in effective language teaching. Such visual representation of lexical expressions at all levels of the lexicon is a challenge to both teachers and students, yet it is extremely useful in ways crucial to language learning.

To start with, Cmaps span a bridge between L1 and L2 culture and the mindset engendered by these languages. Hence, at the level of pedagogical interaction, they can contribute to the formation of students' intercultural competence. The hypothesis of linguistic relativity suggests that our conceptualization is shaped by the structure of our language. Therefore, learning a language means acquiring new modes of conceptualization. The more learners understand these modes, the better their language skills will be as they recognize the differences encoded in a foreign or second language. Cmap models guide students through this realization by turning it into a systemically structured picture of the world intuitively known to native speakers of the target language. Awareness, not internalization, is the key to this process. Our students' language skills will improve significantly as soon as they start paying attention to conceptual differences and avoiding transfer from their native language. They do not have to use the conceptual system of the target language. They just need to develop an understanding of its nature and be aware that it exists.

Next, the structuring of the source and target domains and the collection of the relevant linguistic data require extensive preliminary work. But this work is also an opportunity for students to contribute to the design and completion of the model through diverse and numerous activities. The effectiveness of the process hinges on the capacity to break down complex systems—in this case, semantic fields that articulate conceptual domains—into their constituent elements. These elements are groups of focal and peripheral terms whose interrelations exhaust the representation of the ontologically rooted conceptual domain through the gnoseologically constructed semantic field. Care should be taken to conduct the process in accordance with consistent criteria. Since these fields are gnoseological rather than ontological, the choice of these criteria yields different arrangements of the key components that reflect learners' individual experiences. Thus, the cognitive task of constructing concept maps is suitable for project-based educational activities because each student can contribute based on their experience and knowledge of the world and the foreign language. The capacity of concept maps to serve as cognitive tasks in education encourages active student participation and proves to be an effective way to stimulate interest and motivation and set new paths for conscious language learning.

Finally, Cmaps' design can facilitate the development of

competence for cognitive modeling, an important educational goal, which is defined as "a motivated, transversal (portable) ... personality quality that gives meaning to a wide range of situations conducive to acquiring knowledge"[32]. In other words, concept maps can buttress the development of cognitive modeling skills while simultaneously promoting the acquisition of a large number of abstract vocabulary items. Learning these items without the use of Cmaps or other visual models largely relies on memorization and rote learning.

One of the most difficult stages in foreign/second language learning is the transition to fluency in vocabulary usage, part of which is the ability to collocate lexical items in such a manner as to avoid incompatibility between their semantic components. While with beginner to intermediate level vocabulary this is not so problematic because it mainly comes from the part of the lexicon that designates basic level members of natural categories, with higher levels of foreign/second language fluency the required vocabulary becomes increasingly more sophisticated in terms of paradigmatic relations, such as polysemy, synonymy, oppositeness of meaning, incompatibility, etc. This leads to an increased intricacy with respect to combinatorial restrictions. Although dictionaries of collocations are perfect as reference books, they cannot be of much help when it comes to conventional metaphor, which, as a linguistic manifestation of conceptual metaphor, is at the heart of most linguistic expressions that refer to abstract concepts.

Conceptual metaphors, as demonstrated by Lakoff and Johnson and subsequent researchers are mechanisms of thought (and language) for the formation, cognition, and, ultimately, processing knowledge of systems of related abstract concepts (target domains) in terms of analogous systems of related concrete ones (source domains)[1,33–36]. The ubiquitous operation of conceptual recategorization through metaphor in language and speech is manifested in conventional metaphors, which are linguistic expressions on the word, phrase, and idiom levels. They use concrete vocabulary items to express highly abstract ideas, such as *information leak, ooze with enthusiasm, flow of time*, etc. In all these expressions, terms from the semantic field WATER/LIQUIDS that designate concepts from the concrete domain WATER/LIQUIDS are used to construe linguistic aspects of abstractions like INFORMATION/COMMUNICATION, TIME, and EMOTIONS.

Lakoff and Johnson's theory proves that our conceptual system contains experientially motivated metaphors that convey meaning through mappings of semantically important or salient elements and relations from one domain to another. Their argument is that we acquire concepts that are difficult to understand and/or categorize through concepts we know from experience. The former are said to be metaphorical as they are conceptualized (through mappings) in terms of other, usually concrete, concepts[1]. Thus, states in many languages are construed as containers (*be in a good/bad mood, be in the blues, be in one's right mind,* etc.). The analogy between a container restricting our movement and a state that imposes limits on our emotions and behaviour is rather transparent. Emotions, in turn, are commonly conceptualized as processes taking place inside these containers—anger, for example can be represented as a pressurized liquid trying to escape from a container (*simmer with anger, bottle up one's anger, blow off,* etc.), excitement is sometimes seen as movement in a container (*have butterflies in the stomach*)[37]. This turns conceptual metaphor into an instrument for sampling the flow of ideal (rather than material) reality with the discrete means of language. It is a phenomenon of the mind, a form of knowledge organization through re-categorization of elements and relations of fairly concrete, experientially grounded conceptual domains into more abstract ones, knowledge of which is acquired through "simulated cognition"[5].

The process is similar to learning through assimilation, which, in Piagetian terms, is the incorporation of new information into existing schemata so that it can be processed, used and transformed into knowledge. In the process of first language acquisition, metaphorical conceptualization is among the most powerful mechanisms of acquiring meaning of polysemous lexical items wherein the primary meanings may very well refer to concrete entities and sense perceptions, while the secondary ones, through metaphorical mappings, come to cover a variety of abstract ones[38].

As far as foreign/second language learning goes, however, the process seems far more complicated. While native speakers practically assimilate metaphorically structured concepts in the conceptual network representing the knowledge of their mother tongue, foreign/second language learners are in a position in which they need to change the existing 'labels' (lexical items) designating concrete conceptual content so

as to make them fit into the abstract knowledge structures in which they function with their metaphorical senses. This process, however, is much more reminiscent of accommodating existing language structures to the new information than of assimilating it within their 'boundaries'. This in turn is very likely to interfere with retention and usage. What the present paper proposes as a viable and effective alternative is concept mapping through which students' knowledge of concrete vocabulary items is transposed (rather than accommodated) as a label onto the new abstract content (**Figure 1**).

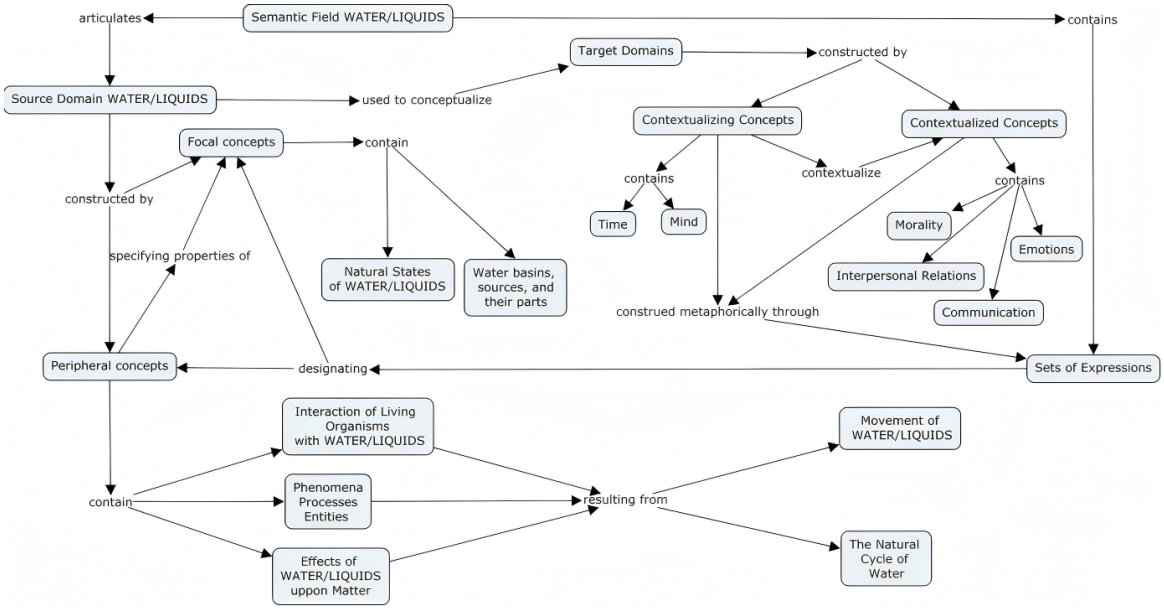


**Figure 1.** Metaphorical conceptualization of abstractions through terms from the conceptual domain WATER/LIQUIDS: Design algorithm applicable to any concrete conceptual domain.

What **Figure 1** demonstrates is an algorithm that can be applied whenever abstract conceptual content (in this case the target domains TIME, MIND, MORALITY, COMMUNICATION, INTERPERSONAL RELATIONS, and EMOTIONS) is metaphorically structured through concrete concepts grounded in experience (here the source domain WATER/LIQUIDS) in order to facilitate the acquisition of abstract meanings of concrete words. It can be used as a template for the metaphorical reframing of any abstract domain through concrete ones.

Since this paper is limited only to the provision of a theoretical rationale for the viability of this procedure as a didactic technology for facilitating abstract vocabulary acquisition, its application for the classroom context is a matter of subsequent, experimentally oriented research. However, what **Figure 1** actually visualizes is the graphic algorithm for the preparatory stage in the procedure for designing pre-made Cmap cards which contain: (i) source and target domain fragments; (ii) scaffolded instantiations (relevant linguistic expressions of concrete to abstract vocabulary transposition), (iii) cloze exercise for classroom use to illustrate how abstract conceptual content is articulated into concrete lexical items (**Figure 2**).

While **Figure 1** systematically presents the preparatory procedure for designing abstract vocabulary Cmaps, **Figure 2** demonstrates how the design-algorithm can actually be applied in class. Thus, the node source domain Focal Concepts in **Figure 1**, containing the sub-nodes Water in Its Natural States and Water Basins, Sources, and their Parts, can be instantiated by the example expressions ice, vapour, water, ocean, river, rain, maelstrom, flood, etc. The same instantiations hold for the target domain nodes INTERPERSONAL RELATIONS (icy welcome), EMOTIONS (a maelstrom of remorse), TIME (water under the bridge, water over the dam), MORALITY (as pure as spring water), INFORMATION/COMMUNICATION, illustrated in **Figure 2**. What such cards may provide, as far as abstract vocabulary is concerned, is a visualized, coherent structure where all newly acquired metaphorical senses of a lexeme can fit in a manner that explicates their experiential

motivation. Cmaps of abstract concepts reframed through concrete conceptual domains other than WATER/LIQUIDS (**Appendix A**) demonstrate that the model is applicable across domains.

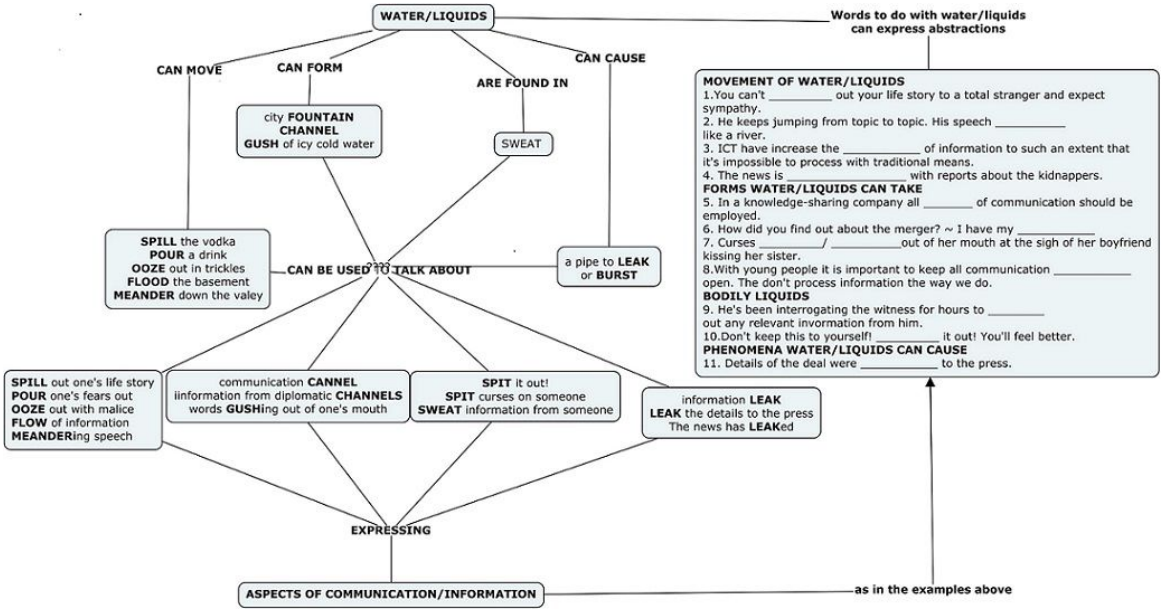


**Figure 2.** Cmap didactic tool for abstract vocabulary—source domain WATER/LIQUIDS, target domain COMMUNICATION.

In summary, our knowledge of reality is stored and processed with the help of highly abstract cognitive schemata that change in line with the changes in the experience and knowledge of the individual. To communicate meaningful conceptual content, language uses sets of symbolic assemblies functioning at different levels of schematization [39]. This inherent property is instantiated depending on our communicative needs. In other words, the linguistic interpretation of reality is a schematic (invariant-type) interpretation realized through its variants (units of grammar and vocabulary represented through symbolic assemblies). Against the backdrop of this conceptual mechanism, conceptual metaphor, one of the most powerful linguistic tools for the interpretation of reality, is itself a schema or mental model. It is a dynamic thought pattern blending knowledge of concrete with knowledge of abstract conceptual content to produce new knowledge. This pattern is realized or manifested through its examples—conventional metaphors expressing abstract concepts.

These conditions provide the requisite foundation for making the claim that concept maps (Cmaps) are isomorphic with the way knowledge is structured, processed, and used. This isomorphism stems from two of their immanent characteristics: (i) Cmaps contain propositions that explain the relationship between linguistic representations of reality and experience; and (ii) they do so by reflecting the connections between cognitive schemata at the level of mental representation and conceptual metaphors grounded in experience, which appear in conventional metaphorical expressions at the linguistic level.

That is, much like conceptual metaphor, Cmaps themselves re-echo the way knowledge is retained and processed in memory. Therefore, the employment of conceptual metaphors in the design of Cmap cards (for abstract vocabulary acquisition) demonstrating the transposition of concrete onto abstract conceptual content has the potential to significantly improve learners' understanding, retention, and knowledge of abstract vocabulary.

Arguably, such Cmap cards can increase the effectiveness of the teaching/learning process in the classroom because this type of knowledge organization produces a synergic effect by mirroring the presentation of new instructional content with the manner in which it is ultimately stored and processed by learners.

Additionally, the educational effectiveness of these cards is increased by the fact that they are actually simplified models of the source and target conceptual domains. This facilitates the employment of the method of educational and

cognitive modelling in the presentation, retention and internalization of abstract vocabulary through Cmaps [40]. The method can be applied to create diverse and numerous Cmap-based activities: (i) after the initial introduction and practice meant to familiarize students with the model, they can be invited to complete missing information at various levels—the concrete phrases can be left out of the Cmap card while the abstract ones can be included for learners to identify the source domain; (ii) alternatively, the source and the target domain can be included in the cards with no reference to specific phrases that illustrate the connection. Students may be included in a longer-term group project to identify lexical items belonging to both domains as suggested by the teacher; (iii) all the lexical information can be included in the Cmap without the connecting propositions. By inviting students to elicit the missing links, the teacher establishes conditions for the development of critical thinking skills within the vocabulary-oriented learning episode.

As visual models of conceptual reframing Cmaps are, by virtue of their definitional properties, close approximations of the schematic organization of knowledge in the mind in that: 1) they contain a key concept(s), whose range and content is further defined by the levels of horizontal and vertical relations through which it is associated with its examples/instantiations; 2) the key concept(s) does not necessarily have one and only one correct interpretation of its instantiations and its characterizing/identifying relations; these depend on the experience and knowledge of the individual constructing or interpreting the map (Being gnoseological rather than ontological in nature, Cmaps imply that the designer/reader provides the criteria for the choice of salient elements in their construction); 3) the relations and instantiations characterizing the key concept can change in time as the experience of the individual accrues. This property of Cmap cards used as didactic tools in foreign/second language learning also renders them highly conducive to creative thinking.

All these characteristics are pertinent to the acquisition and construction of new information by engrafting it onto existing schemata. Therefore, the corresponding properties of concept maps make them especially suited to the context of introducing new, abstract meanings by demonstrating their experiential motivation through metaphor.

# 4. Conclusions

In a society where visual culture reigns and verbal communication gives way to visual information, students learn in ways that are quite different from how their teachers used to learn. Using concept maps to teach a foreign or second language breaks away from the memorization-based learning stereotype that contemporary students find tedious and often refuse to follow, relying instead on picking up words randomly from video or audio input. Although these maps require diligent analysis and modeling in advance, this apparent drawback can actually turn into an additional benefit beyond the acquisition of lexical expressions with some systematic preparation. The intricate design of these maps helps students learn vocabulary creatively and heuristically. It also shows them the real-life motivation behind linguistic expressions. In the long run, this enhances fluency, facilitates communication in English, and reveals fragments of the linguistic picture of the world, constructed through its formal and semantic characteristics. Arguably, the application of concept maps to foreign/second language education can cover all levels of metaphorical encoding of experience in language. It starts from vocabulary and lexicon, goes through effective message exchange and communication and, leads to cohesive text composition (oral or written), following the rules of both grammar and semantics [39].

Posing the question whether conceptual metaphor can be used in the design of concept maps to enhance the effective acquisition of abstract vocabulary in second/foreign language education, the present research demonstrates that a Cmap which explicates the transposition of concrete onto abstract conceptual content meets the needs of contemporary culture as a visual, multi-modal culture. As an added value, it functions as a profile, a static representation of otherwise dynamically related concepts of entities, processes, phenomena and their instantiations. This inherent property makes concept maps especially suited to the needs of contemporary foreign and second language education because they can demonstrate and explicate, in a scaffolded manner, the ways in which language uses its discrete structures to pattern the non-discrete flow of reality making communication possible. Importantly, this map or profile, however static it may look, has a dynamic dimension in that it can

change to accommodate learners' new knowledge of abstract vocabulary content. Based on all these inherent properties, concept maps can be used to expose concept and category associations via best examples, important properties, etc., and are easily supplemented by string or phrase learning, which is especially useful within functionally oriented approaches to teaching. Last, but not least, concept maps are, by definition, organized along the principle from-the-general-to-the-specific, where the general, or the key concept(s), is subsumed under the specific, or its aspects and examples, through succinct but meaningful propositions. The design of maps that transpose concrete vocabulary labels onto abstract conceptual content is therefore a way to synergize instructional content and the forms of its didactic presentation to the effect of raising metaphorical awareness while at the same time facilitating abstract vocabulary acquisition.


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## Institutional Review Board Statement

The study did not require ethical approval.

## Informed Consent Statement

Not applicable.

## Data Availability Statement

Data is accessible upon request.


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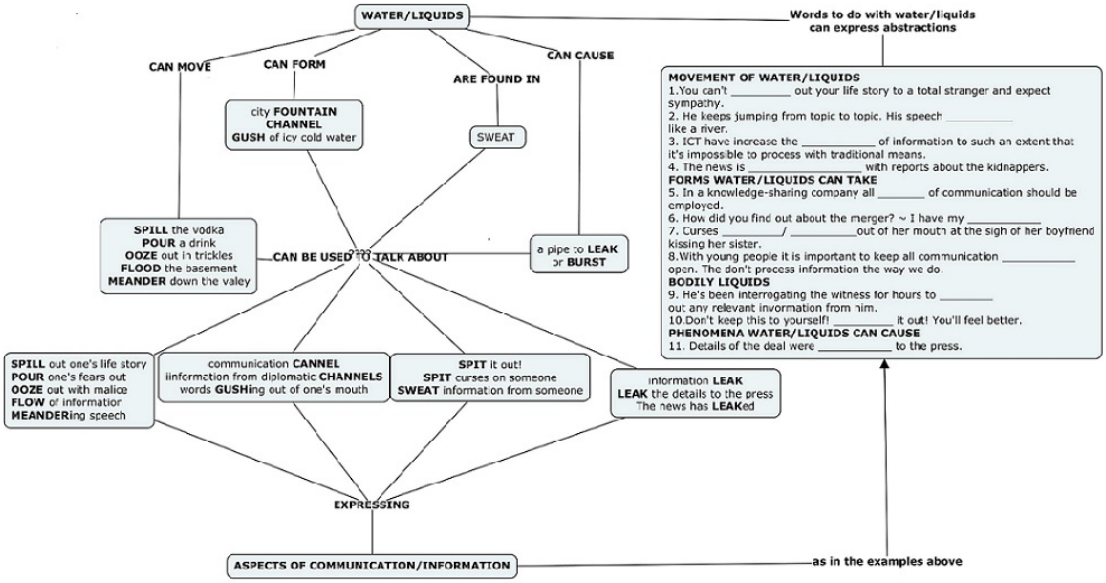
## Conflicts of Interest

The author declares no conflict of interest.

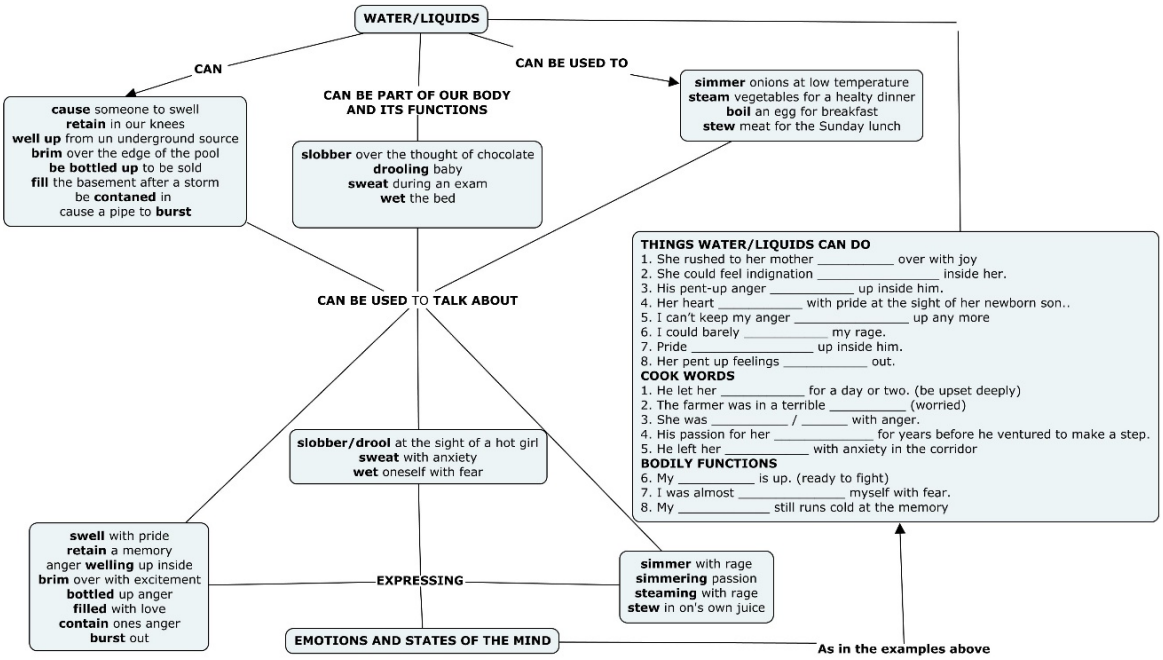
## Appendix A

Didactic tools—variants of the invariant conceptual modelling algorithm for the metaphorical construal of abstractions in l2 vocabulary acquisition (model Cmaps based on the domains WATER/LIQUIDS, AIR/GASES, TREES/WOOD)

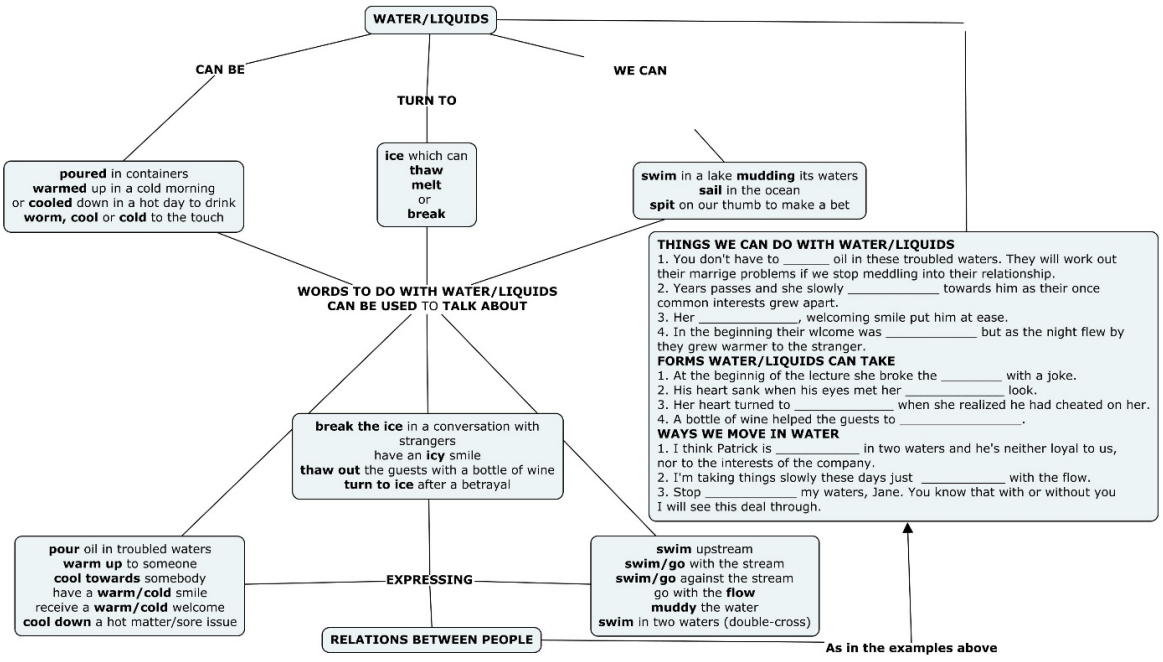
**Cmap didactic tool** 1—instantiation of the design algorithm demonstrating fragments of the linguistic construal of the target domain COMMUNICATION through metaphorical mappings from the source domain WATER and LIQUIDS



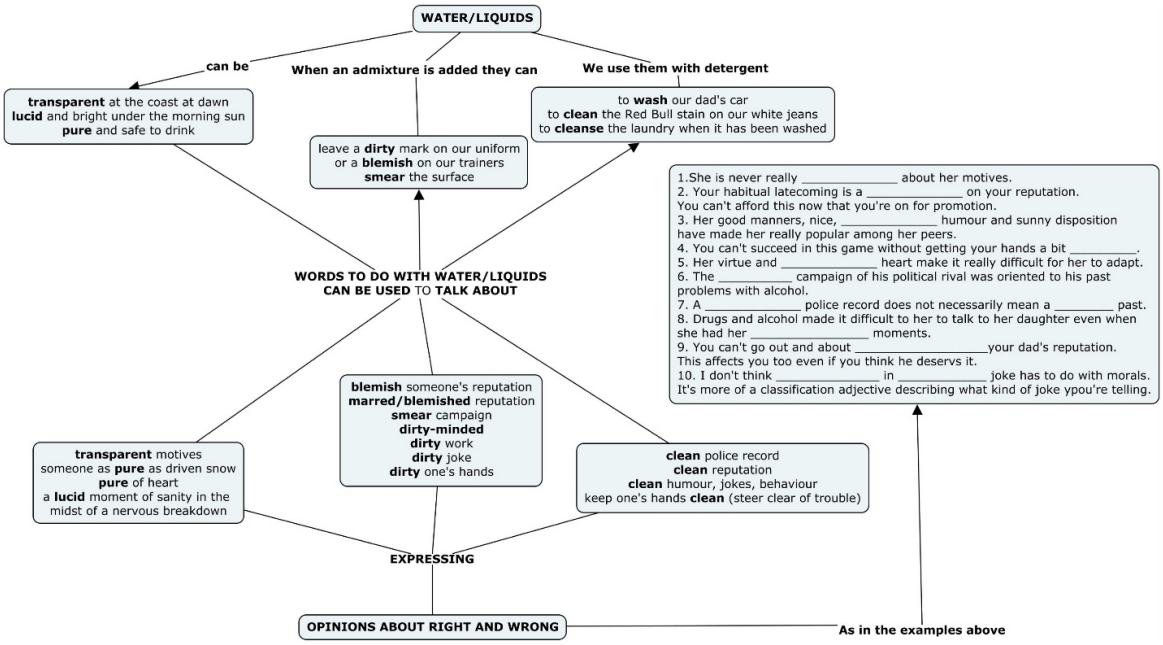
**Cmap didactic tool 2**—instantiation of the design algorithm — source domain WATER and LIQUIDS, target domain EMOTIONS.



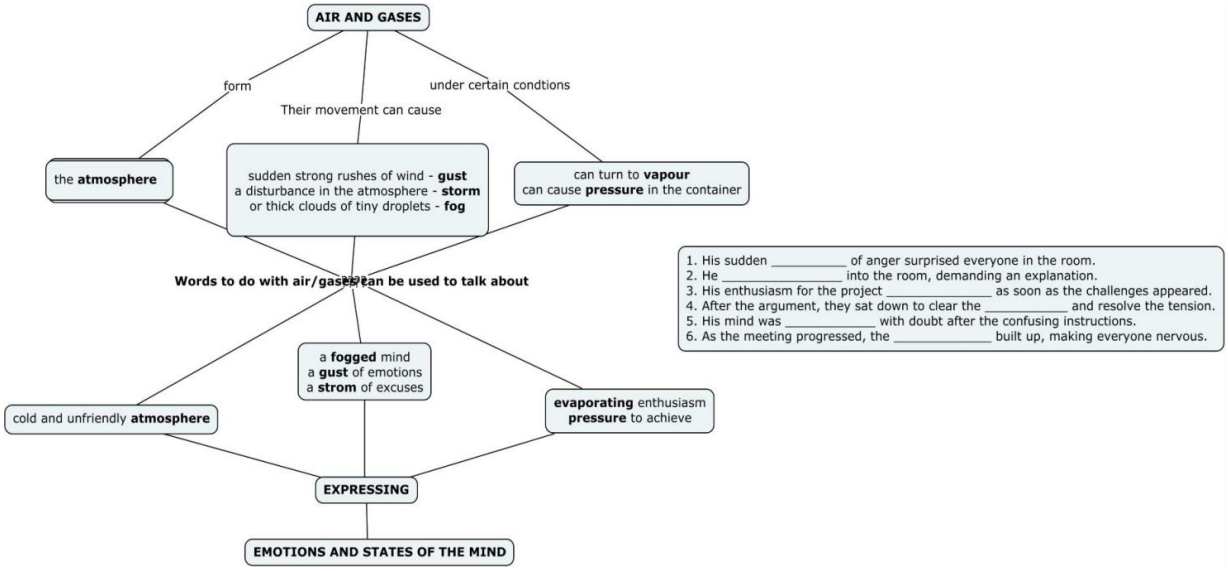

**Cmap didactic tool 3—**instantiation of the design algorithm — source domain WATER/LIQUIDS, target domain INTERPERSONAL RELATIONS



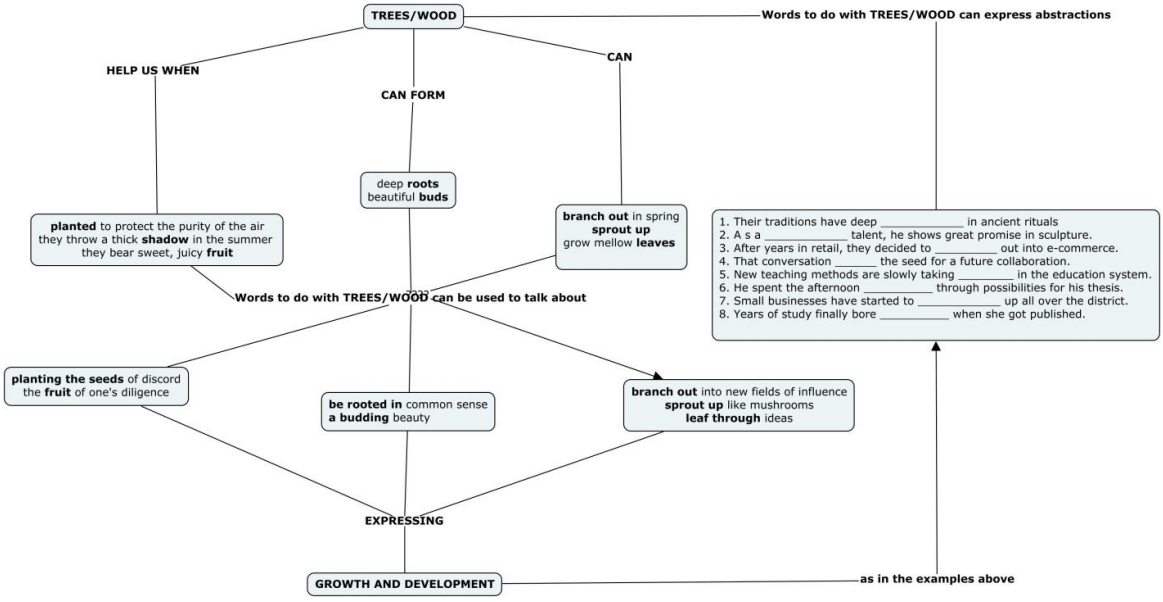
**Cmap didactic tool** 4—instantiation of the design algorithm — source domain WATER/LIQUIDS, target domain MORALITY




**Cmap didactic tool 5**—instantiation of the design algorithm — source domain AIR and GASES, target domain EMOTIONS AND STATES OF THE MIND.




**Cmap didactic tool 6**—instantiation of the design algorithm — source domain TREES and WOOD, target domain GROWTH AND DEVELOPMENT.

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