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LEXICAL AND LEXICO-SYNTACTIC INNOVATIONS: A RESEARCH INTO CREATIVITY IN SPOKEN ENGLISH DISCOURSE

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LEXICAL INNOVATIONS: A RESEARCH INTO LEXICAL CREATIVITY IN SPOKEN ENGLISH DISCOURSE

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Abstract

The purpose of the present study, which is mainly of a qualitative nature, is to give a cognitively-oriented account of lexical and lexico-syntactic creativity in the English language grounded in some influential descriptions made within the domain of cognitive linguistics. Our interest is focused on the underlying conceptual mechanisms of meaning construction, specifically on the cognitive operations accounting for the processes of word formation and semantic extension. The descriptive and analytical tasks of this study will be based, primarily, on three cognitive mechanisms actively involved in linguistic innovation: mental spaces, radiality, and frames. The main assumption made at the beginning of this proposal is that lexical and lexico-syntactic creativity, as a dynamic communicative process, is not only a function of language use (as many studies in the field ascertain) but also a powerful mechanism of cognitive processing.

1.0. INTRODUCTION

Particularly since the 70's of last century, meaning has been at the heart of several disciplines in the realm of linguistics, being one of the most widely explored aspects of human language within the field. It has constituted the basis for such micro-linguistic studies in the domain of semantics and grammar as well as macro-linguistic studies pertaining to pragmatics, discourse analysis and cognitive linguistics.

With the arrival of modern linguistics, some influential theories of language, proposed by such prominent scholars as Saussure, Firth, and Chomsky, among others, have elucidated the somehow elusive notion of linguistic meaning by providing a logical, objective explanation of the manner in which lexical and grammatical constructions and formal structures jointly operate. Largely inspired by the contributions of structuralism, emphasis was placed on the study of formal aspects of language, namely phonology, morphology, and syntax. Conversely, semantics was given a secondary role; with meaning being restricted to form and substance rather than other equally important dimensions of the phenomenon of language such as functional meaning, the role of situatedness, speaker meaning and hearer meaning. By the same token, the Chomskian tradition put on the spotlight the interaction of linguistic units through the study of sentence structure, approaching meaning under the rigid compositional rules of syntax. This overt opposition

to externalism, or the acknowledgement of external reality is proclaimed in Chomsky's overly quoted example in favor of the autonomy of syntax from semantics (Piattelli-Palmariny and Cecchetto 1997).

Within the same generative tradition, in the early 1960s a branch of formal linguistics, lexical semantics, re-directed its attention towards the study of lexical meaning through the semantic structure of languages. One of such proposals was the theory of semantic markers elaborated by Katz and Fodor (1963). According to its central tenet, lexical meaning represents a decomposable unit which can be broken down into semantic markers, i.e. a limited set of inherent features or *primitives* (*bachelor* being their classic example with essential features [+MALE, +ADULT, + –MARRIED]). Despite its insightful contribution to the study of lexical meaning, the theory proved insufficient to account for the domain of comprehension, especially in that semantic markers could not fully encompass the whole range of phenomena encoded by words. In a similar strand of research but highlighting the role of syntax is Theta Theory. A significant though indirect contribution of these hypotheses to the study of semantics was the set of thematic roles or semantic specifications assigned to sentence constituents. Syntactic roles were replaced by semantic functions which identified the relationships embedded in the configuration of sentences (AGENT, GOAL, THEME, PATIENT, EXPERIENCER, SOURCE, BENEFACTIVE, among others) .

In the Montagovian tradition, formal semantics similarly addressed the significance of meaning in terms of its parallelism with syntax. Meaning was understood as a matter of truth condition determined by the correspondence between the reality described in a given sentence and a real or hypothetical state of affairs in the world. In accord with its central idea, the *Principle of Compositionality*, meaning was determined by the syntactic arrangement or interaction of sentence constituents. In other words, semantic roles were assigned by the syntactic roles which words occupy in a given sentence. Treatment of linguistic meaning per se resided in an objectivist, specialised system of reality rather than an embodied experience of the world (Piatelli-Palmarini and Cecchetto 1997; Evans and Green 2006).

In spite of their descriptive validity, all the aforementioned approaches to meaning, fail to adequately account for the complexity of linguistic coding, particularly in that their treatment of meaning is mostly addressed on purely linguistic grounds. The evident limitations can be in fact attested by many of the scholars who reaped the long-acclaimed benefits of the generative tradition. As Coulthard (1994: 2) observes, "[…] the timebomb

meaning was ticking away: in the late 1960s Ross, Mc Cawley and G. Lakoff began arguing that one cannot in fact describe grammar in isolation from meaning, that powerful syntactic generalizations can be achieved by making lexical insertions at an early stage in the generation of a sentence." All in all, it became clear that the interaction of linguistic units, be words, clauses, and sentences, could not be devoid of context and experience. Meaning called for a redefinition, one that would encompass, as its main participants, the role of speakers and hearers along with their implicit assessments, descriptions and inferences of the world around them.

A much deeper, fundamental problem of the aforementioned 'meaning-free' approaches seems to lie in their inability to perspectivise the study of meaning from a standpoint that may draw on the complex cognitive operations and sociocultural associations underlying language use as far as the conceptual structuring of reality is concerned. In other words, such treatments have failed to address language from a cognitive standpoint. In an attempt to bridge this descriptive and explanatory breach, cognitive linguistics has strengthened its approach to language by concentrating on the semantic structure of linguistic coding in its interaction with experience and the conceptual system (Evans et al. 2006; Lee, 2001; Fauconnier, 2006). Special focus has been placed on the study of *conceptual structure* (knowledge representation) and *conceptualisation* (meaning construction). With the inclusion of the notion of *construal* (proper reference to this term will be resumed in Section 4.1.) on a par with principles of Gestalt psychology and sophisticated cognitive linguistic theories, the view of meaning has departed from its traditional foundation. Under the cognitive lens, meaning is understood as an intricate system that reflects the merging of thought, language, and the world, and within this latter dimension, the bodily and sociocultural that conceptualisers retrieve from their experience with reality.

A specific dimension of the meaning-making process stemming directly from the interest of the cognitive approach pertains to creativity in language as reflected in semantic extension and coining of new words. In formal linguistics, research has approached this dimension of meaning construction rather discretely, as far as lexical formation is concerned, on the basis of such processes as metaphor, concept formation, and categorisation, mainly. In this paper, we attempt to offer an integrative treatment of creativity in language in a manner which effectively accounts for the basic relationship between form, meaning, and human cognition; in other words, from a standpoint that views creativity not only as a function of language use but also as a powerful mechanism of

cognitive construal enabling us to unfold the 'complex backstage operations of cognition' (Fauconnier 1994).

The main objective of the present study is to account for the role of creativity in the cognitive processes underlying the activation, construction, connection, and transformation of English lexical and lexico-syntactic meaning. Our specific interest, therefore, lies in the role of creativity at the level of parole, which involves taking into consideration the psychological and sociocultural factors that influence the formation of lexicon, lexically composite structures, and related semantic extension. Given that creativity in language can be examined in a variety of oral and written corpora (vernacular speech, political discourse, editorials, etc.), we will focus our attention on the analysis of spoken specialist texts as a manifestation of the ongoing change of language in today's technology-driven world for the purpose of substantiating a significant sample of novel linguistic forms and the cognitive operations underlying their construction.

The motivation underlying the present research paper emerges from an ongoing interest in the English language (long acclaimed as the standard international language), and, most particularly, from the vastness and versatility of its *mental lexicon* (the array of concepts stored in our mind), clearly, the scientific and technological jargons being no exception to this fact. In my view, a cognitive approach to the study of lexicon, including a well-defined set of lexico-syntactic constructions, as proposed here, could only but strengthen the type of descriptions made within formal and structural semantics, many of which present either a decontextualised or discrete-item type of analysis. One can compensate for such limitations by taking into account the use of these constructions and their concrete instantiations in specialist spoken discourse. In line with the endeavour of cognitive linguistics, we hope the present study will offer a unifying treatment of creative meaning as a reflection of our 'wording of the world' and the cognitive moves underlying the process of meaning creation. In short, a proper blend of language, experience, and thought.

2.0. RESEARCH QUESTIONS

The present study is guided by two research questions which can be framed as follows:

2.1. What are the cognitive mechanisms underlying the creative process of lexical constructions, Mexico-syntactic constructions and semantic extension?

2.1. In what ways do these mechanisms reveal that lexical and Mexico-syntactic creativity together with semantic extension are not only a function of language use but also a powerful instantiation of cognitive processing?

3.0. OBJECTIVES

3.1. GENERAL OBJECTIVES

3.1.1. To account for the cognitive mechanisms underlying the process of lexical formation, lexico-syntactic formation, and semantic extension in novel[1] lexical items and lexico-syntactic constructions which are used in specialist spoken discourse on the basis of three main cognitive mechanisms: mental spaces, framing and radiality.

3.2. SPECIFIC OBJECTIVES

3.2.1. To describe the creative mechanisms of cognitive processing at work in the formation of lexical innovations reflecting the influence of cultural and technology-driven changes in English usage.

3.2.2. To describe the creative mechanisms of cognitive processing in operation in the formation of lexico-syntactic innovations reflecting the influence of cultural and technology-driven changes in English usage.

3.2.3. To explain the cognitive mechanisms involved in the process known as *semantic extension*, which is inherent to lexical and lexico-syntactic creativity.

3.2.4. To find and describe other possible interrelated cognitive mechanisms at work in the formation of newly-formed lexical items and lexico-syntactic constructions originated in spoken specialist.

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[1] To avoid terminological ambiguity, the meaning of *novelty*, as employed in the present work, has been redefined in line with the specified research purposes (see Section 5.0)

4. THEORETICAL FRAMEWORK

4.1. The creative construction of meaning

Language is said to be a highly creative process. But in what ways does creativity manifest itself in language? For those anchored in the Chomskian tradition, creativity can be found at the syntactic level in the complexity of innovatively composed sentences resulting from the configuration of both lexical and syntactic constituents. As formerly discussed, morphosyntactic configuration, as embedded within these clusters of language, may not prove to be the adequate path to unfold the meaning-making process. In fact, according to cognitive linguist Lee (2001: 200), "true creativity in language essentially has little to do with syntax and a great deal to do with cognition." The validity of this assertion finds an echo in cognitive linguistics whose core proposals are grounded in the very creative nature of the meaning construction process.

> (1) Language does not represent meaning; it prompts for the construction of meaning in particular contexts with particular cultural models and cognitive resources. Very sparse grammar guides us along the same rich mental paths, by prompting us to perform complex cognitive operations. Thus, a large part of cognitive linguistics centers on the creative on-line construction of meaning as discourse unfolds in context. The dividing line between semantics and pragmatics dissolves and truth-conditional compositionality disappears.
>
> Fauconnier (2003: 1-2)

In this respect, the meaning-making process involves the constant interplay between linguistic expressions and a domain that transcends the language system: human cognition and knowledge of the world.

Following the modern linguistic tradition, lexical and lexico-syntactic meaning has been mainly defined on the basis of denotation, a dictionary view which addresses meaning from a predominantly linguistic standpoint. By providing a metalinguistic definition of word meanings (eminently lexically full words) (Lyons 1995), it encapsulates world referents in a somewhat rigid, invariant view of the linguistic sign, at times reinforced with some descriptive aspects involving our encyclopaedic knowledge. Thus, by relying on factual, objective, literal meaning of linguistic expressions, we are able to identify the set of entities a given lexeme denotes. By contrast, cognitive linguistics highlights the dynamic and experientialist nature of meaning construction at all linguistic levels. This view of meaning can also be equated with our encyclopaedic knowledge, a central notion in the cognitive literature, which is mainly about how ´language hooks on to the world' (Lyons

1995: 79) and proposes that our conceptual system is anchored in perceptual, cultural, and social associations of the reality surrounding us. Once recruited in our knowledge structure, these associations are later encoded by language. This means that unlike dictionary knowledge (denotational meaning), 'encyclopaedic knowledge is external to linguistic knowledge, falling within the domain of "world knowledge"' (Evans and Green 2006: 208), which comprises contextual, connotational and pragmatic factors.

Rather than being viewed as static forms, lexemes and lexico-syntactic constructions are envisaged as flexible units undergoing constant development. The core units of analysis within these constructions are concepts, which, terminologically speaking, correspond to cognitive representations of phenomena pertaining to the external world. Concepts can be equated with the non-technical meaning of *sense*—the way language participants envisage an object, situation, or state of affairs. In specific terms, it could be said that the concepts that we store in our mind are bound up with our embodied experience of the world, i.e. structured by our bodily and neurological configuration. To this respect, Evans et al. (2006: 10) assert,

> (2) The fact our experience is embodied […] has consequences for cognition. In other words, the concepts we have access to and the nature of the 'reality' we think and talk about are a function of our embodiment. We can only talk about what we can perceive and conceive, and the things that we perceive and conceive derive from embodied experience. From this point of view, the human mind must bear the imprint of embodied experience.

This observation implies that behind every concept that we have for a given word lies a knowledge structure which, based on our life experience, would necessarily vary from conceptualiser to conceptualiser. According to Lee (2001), the presence of a knowledge structure underlying concepts challenges the traditional assumption of the term *concept* as a fixed, stable unit, mainly in that it makes room for the notion of *connotation* which has been given a secondary role if the literature of formal linguistics. For the same reason, it would be misleading to think of concepts as purely private mental representations. They can, in fact, be shared within a language community, being conventionally and culturally established (Jaszczolt 2002). Thus, our concept of a trivial entity such as *home* may not always hold true for members of other communities who already possess a pre-determined concept for dwelling.

In view of this perspective, our understanding of meaning can be modified by the nature of human concepts, especially if these, instead of words, are thought of as triggers for our knowledge base (Lee 2001). This is actually the claim made by Langacker (1987)

when pointing out that an intrinsic feature of concepts is their context-dependence, meaning that when we think of them they will always presuppose reference to a related entity. Concepts are, therefore, characterised by they ability to build up 'hierarchies of complexity' which are, in nature, indefinite and open-ended. In view of this claim, lexical concepts are encyclopaedic in nature, serving as 'points of access' to a wider and much larger context which he refers to as *domains* [2]. In his words, '[d]omains are necessarily cognitive entities: mental experiences, representational spaces, concepts, and conceptual complexes' (1987: 147). More precisely, domains encompass a variety of experiences which derive from our sensory capacities (basic domains) or higher-order concepts (abstract domains). This means that a basic domain like VISION would entail our embodied experience whereas abstract domains like LOVE or SERENDIPITY would require a complex array of mental associations, which may not necessarily comprise our sensory-motor perception. The implications of context (with regard to cultural and social factors) in conceptualisation will be resumed in Sections 4.3.3 and 4.3.4 in our discussion of frame knowledge and radiality.

The meaning of words is, therefore, not only a matter of linguistic competence. It is, in essence, construed through the cognitive process of classification known as categorisation, an implicit, innate capacity of the human brain to identify and organise entities found in the world, be these abstract or concrete, real or unreal. It would not then be misleading to conclude that our understanding of how linguistic creativity operates is very much entrenched in categorisation, especially in that its role, as Lakoff (1987: 6) emphasises, "is central to any understanding of how we think and function." Categorisation, therefore, with its countless realisations in language use, should not be understood purely on linguistic grounds proper; any such approach would nothing but obfuscate the conceptual force embedded within the creative acts surrounding human reasoning:

> (2) [H]uman categori[z]ation is essentially a matter of both human experience and imagination—of perception, motor activity, and culture on one hand, and of metaphor, metonym, and mental imagery on the other. To change the very concept of a category is to change not only our concept of the mind, but also our understanding of the world. As a consequence, human reason actually depends on the same factors and therefore cannot be characterised merely in terms of the manipulation of abstract symbols. Of course, certain aspects of human reason can be isolated artificially and modeled by abstract-symbol manipulation, just as some part of human categori[z]ation does fit the classical theory.
> Lakoff (1987: 8)

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[2]   As Langacker (1987) himself acknowledges, in some respects, an abstract domain is equivalent to Fillmore's notion of *frame* and Lakoff's ICM (Idealised Cognitive Model).

The concepts stored in language users' minds, or *cognitive categories* ('the product of categorisation') reflect how the world denoted by words is 'perceived and categori[s]ed by the mind' (Lyons 1995). Cognitive categories are largely determined by prototypes, i.e. ideal realisations of a given entity in the world. Our notion of prototype is, nevertheless, constantly put to the test with abounding 'fuzzy sets' which defy implicit assumptions about world referents (Hurford and Heasly 1983). As arbitrary as it may seem, it is the same conceptualisation of idealised representations that enables us to sort out the difficulties of counterexamples. The cognitive process of categorisation, as Rosch's study "Natural Categories" (1973) and similar research in the field demonstrate, acts as a 'cognitive reference point' in that by dissolving blurred distinctions it establishes permanent links with the words we use (and create) and the perceptual salience of concrete objects, abstract categories, and natural phenomena. Our discussion of categorisation and prototypicality will be taken up in Section 4.3.4.

The creative capacity of meaning construction constantly pushes the boundaries of reality and imaginary world. A point in case is the formation of abstract terms to denote phenomena which are not part of our external experience such as mythical or imaginary beings. Cognitive categories like *mermaid*, *centaur*, or *unicorn* presuppose conceptually prominent features of a physical, tangible entity which lacks a readily identifiable referent in the world.

Such creative capabilities are further reinforced with the notion of *construal*, a newer, fresher concept of meaning intended to highlight the range of conceptualisation processes employed by human beings in the structuring and encoding of bodily and sociocultural experiences into language. The term has come to debunk a long-standing view in formal linguistics. In Lee's words,

> (4) There is a long tradition in linguistics encapsulating the belief that the role of language is to map elements of the external world onto linguistic form. According to this view, situations can be dissected into a number of component parts, each of which corresponds to some element of language, so that mapping from the external world to language is a relatively straightforward operation. Essentially, it involves a one-to-.one encoding of the elements of the situation into linguistic structure, this process being governed by formal rules of grammar. In contrast, cognitive linguists argue that there is no such direct mapping. Instead, they claim, a particular situation can be 'construe' in different ways, and that different ways of encoding a situation constitute different conceptualisations. (2001: 6)

Construals have been referred to under different terms: Langacker (1987) suggests the criteria of 'focal adjustments'; Talmy (1985) puts forward his four-tiered classification of 'imaging systems' (Structural Schematisation, Deployment of Perspective, Distribution of

Attention, and Force Dynamics); Croft and Cruse (2004), on the other hand, view these cognitive processes as 'construal operations' (Attention/salience, Judgment/comparison, Situatedness, and Constitution/Gestalt). Regardless of the different terminology, all these approaches acknowledge the fundamental role of Gestalt perception underlying the process of linguistic meaning construction. Principles of proximity, similarity, closure, foregrounding, backgrounding, and continuation, among others, are "intimately bound up with questions of mental representation and processing, just as the notions of good and bad examples, of attributes, and of prototypicality in general cannot be isolated from their cognitive background" (Ungerer and Schmid 1996: 37).

Lee (2001) equally highlights the strong interrelation existing between creativity and the cognitive operations governing the nature of meaning. In a brief yet insightful treatment of creativity, he refers to the primary cognitive mechanisms involved in linguistic innovation: mental spaces, radiality, and cognitive frames. Our discussion aims to take Lee's proposals a step further by exploring in greater depth the manner in which these mechanisms (along with other cognitively and experientially-grounded factors) operate in language use and their specific implications for lexical and lexico-syntactic creativity and productivity. The following section sketches out the cognitive mechanisms underlying the activation, construction, connection, and transformation of linguistic meaning.

4.2. Creativity and linguistic transformation

Every act of creation presupposes a reason, a flash of insight, or conceptual necessity that prompts language users to 'give birth to' novel or 'renovated' linguistic forms. Creativity may be an individual or collaborative task which orchestrates consensus by building on the work of others or by simply starting anew. Creativity is also a dual endeavor; it comprises speakers as creators of meaning and hearers as interpreters in their attempt to tease out that intended meaning. By the same token, it follows that linguistic innovations are more than just a relationship between a word, or a set of words, and a referent in the world. Creativity calls for the existence of a mutual understanding between language participants on the basis of time, place and context.

Our experientialist knowledge of the world, in defiance to the generative tradition, reveals that creativity, as understood within the context of formal aspects of language, is not solely encapsulated in clauses and sentences but equally embedded within the lexicon and lexico-syntactic forms that we use. Beyond the interaction of creative formations,

instantiated in the coining of novel expressions, non-established words, or metaphorical extensions aid daily communication in that they help speakers in their perception, conceptualisation, and wording of the world. Creative formations should, therefore, not only be explored for their linguistic capacity but also for their cognitive value, i.e. as a way to unfold some of the mental mechanisms herein described in conjunction with such cognitive/experiential processes as selectivity, perspective, attention, and prominence. They are, in fact, powerful resources reflecting how the mind copes with the reality motivating linguistic creation. As firm advocates of this claim, Fauconnier and Turner (2003: 2) point out,

> (5) Meaning potential is the essentially unlimited number of ways in which an expression can prompt dynamic cognitive processes which include conceptual connections, mappings, blends, and simulations. Such processes are inherently creative, and we recognise them as such when they triggered and produced by art and literature. In everyday life the creativity is hidden by the largely unconscious andextremely swift nature of the myriad cognitive operations that enter into the simplest of our meaning constructions. It is also hidden by the necessary folk-theory of our everyday behaviour which is based quite naturally on our conscious experience rather than on the less accessible components of our cognition.

Our concepts and the semantic networks which they are part of are highly relevant to language change as an ongoing, active process which is susceptible to historical, cultural, and technological developments brought about by our increasingly globalised world. Cognitive categories, though traditionally described as ´timeless,' stable mental representations, are flexible units constantly re-inventing themselves and liable to continue shifting as new interactive contexts take place (We will return to this point shortly in Section 4.3.4.).

As technology and cultural perceptions evolve, so do our knowledge frames (Section 4.3.3). Such transformation reflects the human capacity to perceive, construct, and re-construct reality, acting as a compensatory mechanism used to cope with new experiences. This holds true for linguistic innovations intended to fill a void in language use. Take, for example, the case of non-existent words introduced to compensate for the identification of classes of referents whose linguistic representation is otherwise unavailable in the speaker's mother tongue (Mc Carthy 1990; Lee, 2001) .

In view of the arguments advanced, it seems more than appropriate to exploit the creative capacity of meaning in the light of a cognitive perspective. Mental mappings grounded in experience would enable us to enrich the invariable, stable semantic nature of denotation, thus expanding other aspects of conceptualisation that, under the traditional view, remain in the periphery or not fully explored.

4.3. COGNITIVE MECHANISMS AS INSTANCES OF LEXICAL AND LEXICO-
    SYNTACTIC CREATIVITY

4.3.1 Metaphor and metonymy

Metaphor is at the heart of creative linguistic forms. It constitutes a rich conceptual tool whose role, as cognitive research has demonstrated, is more than just an ornamental function of figurative language or a stylistic rhetorical device (Lakoff and Johnson 1980). Underlying metaphorically-constructed expressions lies an array of mental representations, powerful cognitive structures that echo our perception and cognition of the world around us.

From a traditional standpoint, metaphor is conceived of as an analogy based upon the commonalities arising from a given set of world referents. In the cognitive linguistics view, conceptual metaphor is a cognitive process consisting of drawing systematic correspondences, or mappings, between a target domain and a source domain. The transfer of information is usually said to occur from a concrete category to a relatively abstract one. The term *domain*, as used in the *Conceptual Metaphor Theory*, corresponds to a coherent representation of a body of knowledge which captures individuals' ideas, thoughts, and emotions relative to objects and states of affairs in the world.

Mappings are structured on the basis of *image schemas*, a central notion to the understanding of metaphor.[3] Image schemas should not be paralleled with mental images only. Instead, they represent abstract, schematic, internally complex bundles of concepts grounded in sensory-perceptual experience (i.e. embodied experience). An essential feature of image schemas is that they have a tendency for proliferation and since they mirror our ongoing physical, experiential interaction with the world they are subject to undergo further transformations.

Language abounds in metaphorically grounded expressions rich in image schema. Countless situations in everyday life serve as a modelling basis for the construction of analogies that derive from our bodily and perceptual experience. An example of image

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[3] Seminal work on image schemas can be traced to Mark Johnson's book *The Body in the Mind* (1987).

schema is HEIGHT standing for things that are not easy to achieve such as goals and dreams. In expressions like 'to reach the unreachable goal,' 'aim high,' 'have a mountain to climb,'

or 'get to the top,' figurative use of language encodes conceptually schematic structure which in the eye of language speakers usually passes unnoticed.

(a) COMPULSION	→	*Situations*: being moved by external forces like wind, water, physical objects, or other people
(b) CONTAINER	→	*Situations*: being inside a buiding or being trapped in an elevator
(d) CONTACT	→	*Situations*: the rustling of a silk dress, drops on a window pane
(e) NEAR-FAR	→	*Situations*: the foothills of a mountain and its top, the view from a balcony, looking downs the stairs from a top floor

Table 1 Image schemas (adapted from Evans and Green 2006)

In his poetic works, Aristotle was probably the first to capture the ubiquitous nature of metaphor besides its aesthetic function: "In the language of prose besides the regular and proper terms for things, metaphorical terms only can be used with advantage. This we gather from the fact that these two classes of terms, the proper or regular and the metaphorical—these and no others—are used by everybody in conversation" (Roberts 2010: 154).

Using Lakoff and Johnson's organising principle, expressions like the following (retrieved from everyday songs) illustrate the transferring of information from one conceptual domain to the other:

(a) JOURNEY → LIFE (e.g. *The road is long with many a winding turn*)
(b) LOVE → MADNESS (e.g. *I'm out of my head when you're not around)*
(c) LOVE →HEAT (e.g. *You light my morning light with burning love*)
(d) LOVE → WAR (e.g. *Love is a battlefield*)
(e) BODY → MIND (e.g. *They could never tear us apart*)
(f) ARGUMENT → WAR (e.g. *Hit me with with your best shot—Fire away*)

Table 2 Image schemas (adapted from Evans and Green 2006)

The fact that conceptualisation of a domain in terms of another usually occurs from concrete to abstract categories demonstrates the strong attachment of human thought to experience.

Following the provocative contention of the cognitive authors mentioned, this target-source configuration, together with the many linguistic instantiations of figurative language in an ample scope of cognitive domains (e.g, poetry, politics, religion, science), is not only indicative of the manner in which we view and structure human experience but also points to the fact that we are capable of shaping the way we think and act in relation to particular basic domains. In other words, our thinking is endowed with a metaphorical structuring which permeates through our linguistic choices; as they point out,

> (6) The concepts that govern our thought are not just matters of the intellect. They also govern our everyday functioning, down to the most mundane details. Our concepts structure what we perceive, how we get around in the world, and how we relate to other people. Our conceptual system thus plays a central role in defining our everyday realities. If we are right in suggesting that our conceptual system is largely metaphorical, then the way we think, what we experience, and what we do every is very much a matter of metaphor.
>
> Lakoff (1980: 3)

If metaphor equates a way of thinking, or better yer, if "language and thought are inextricably intertwined" (Lee 2001: 7), we can conclude that words and fixed linguistic forms should be regarded as conceptual categories enabling us to discover how the mind operates. Conduit metaphor by Reddy (Ungerer and Schmid 1996: 119) has elegantly captured the applicability of this assertion through a basic analogy of human communication. In very simple terms, the metaphor equates words with parcels or containers of ideas. It also evokes the role of a sender and a receiver; the former is in charge of transferring information; the latter, of 'unpacking' the content (ideas) from the parcel. Although frowned upon by the cognitive view, the metaphor represents a valuable attempt to highlight the conceptual structure of meaning.[4] Stemming directly from the same analogy, an observation with far-reaching implications in the creation of linguistic forms is the common assumption pertaining to fixed expressions also known as conventionalised or 'dead' metaphor. As language users we are oftentimes unaware of the mental imagery or conceptual force beneath metaphorically grounded expressions. This invites the conclusion that after extended usage their meaning, sort to speak, wears out, leaving to oblivion the conceptual associations and mental processes surrounding their creation. This misleading view, however, proves to be actually the opposite. For Lakoff and Turner (1989: 129) the confusion results from "assum[ing] that those things in our cognition that are most alive and

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[4] For cognitive linguistics rather the opposite would be the case; words and linguistic expressions are regarded as empty containers which become meaningful the moment cognitive operations in the mind of language speakers bring out their conceptual force (Lee 2001).

most active are those that are conscious. On the contrary, those that are most alive and most active and most deeply entrenched, efficient, and powerful are those that are so automatic as to be unconscious and effortless." All in all, it is plausible to conclude there is no such thing as 'dead' or 'fossilised' metaphor.

The centrality of metaphor is not restricted to language proper. Its creative and versatile role is embedded in several complementary roles as in the generation of new perspectives to states of affairs and paralinguistic features of non-verbal communication. Metaphor is all-pervasive. As Mc Carthy (1990: 28-29) ascertains,

> (7) Metaphor may also be a way of demonstrating relations and systematicity in the real world, relations that may not be immediately obvious. Metaphor is also useful in expanding existing concepts and creating new ones (e.g. talking about the brain as though it were a computer, or about language acquisition in humans as though it were like computer-processes: 'input'/ 'storage' / 'retrieval' / ' database', etc.). Thus we appreciate the centrality of metaphor to the encoding and decoding of language. Metaphor also seems to be connected with certain interpersonal functions such as euphemism, indirectness, evasion, and face-saving.

Like metaphor, metonymy offers a cognitive perspective to conceptualisation and creativity in language. Although a large bulk of the cognitive literature has concentrated on the study of metaphor, more and more studies have started to drift their attention towards metonymy. As a cognitive instrument, metonymy captures the same defining principles which apply to metaphor; they are both "conceptual in nature, both can be conventionalised (i.e. automatic, unconscious, effortless and generally established as a model of thinking), both are means of extending the resources of a language and both can be explained as mapping processes" (Ungerer and Schmid 1996). So where can we draw the line between these figurative devices? The boundaries at times become blurred by cases of co-occurrence in which metaphors are conceptually structured through metonymic mappings.

Metonymy has been commonly understood on the basis of a substitution (e.g. part for whole, whole for part, container for content, producer for product) a referential relationship which, unlike metaphor, can be represented on the basis of a 'B for A' formula (B stands for the vehicle and A, for the target).

Cognitive linguistics offers a fresher, thought-provoking treatment to the metonymic puzzle. Using Evans and Green's suggested outline (2006), the insights of the cognitive view can be sketched out as follows: (1) For Lakoff and Turner reference problems resulting from metonymic links can be clarified in terms of access and *proximity*. Thus, what enables an entity to have access to another is the fact they are situated in the same domain; (2) in

Langacker's terms, metonymy is a vehicle providing a 'route of access' to a particular target; (3) according to Croft, it is a matter of domain highlighting; our encyclopaedic knowledge has a structuring role in reality assigning particular weight to an aspect domain within the same domain matrix.

It follows that trivial metonymically-grounded sentences like the ones below tell us a great deal about what is going on "behind the scenes."

1 *The town was once inhabited by _rednecks_.*
2 *Joe spilled milk on my _touch_—not again.*

Access to the referring expressions is made possible thanks to such cognitive notions as attention, salience and foregrounding guided by common-sense assumptions of the conceptualiserts' background knowledge (Section 4.3.2 will touch upon this key aspect under the notion of *framing*). In sentence 1, for example, *redneck* stands for farmers. The allusion is motivated by the BODILY FEATURE domain; their red necks parched by the sun. A similar cognitive operation is done in 2 with the highlighting of a FUNCTION domain, the most prominent applicability of touch technology.

How do the aforementioned ideas link to the purpose that guides the present study? The answer is straightforward: If the language we construct is, to a large extent, metaphorically and metonymically grounded, it follows that the search and analysis of a consistent battery of linguistic forms would prove sufficient to test the contention that we can access the human mind via our linguistic choices and that the cognitive instruments of metaphor and metonymy, far from being fossilised, act in tandem with the cognitive mechanisms governing lexical and lexico-syntactic creativity to be described in Sections 4.3.2., 4.3.3., and 4.3.4.

4.3.2. Mental spaces

Fauconnier's Mental Space Theory ([1985] 1994) has shed light not only on key issues of the reference problem in linguistics but has also offered a cognitive approach to meaning and meaning construction. Mental Space Theory (MST) involves the perception and construal of cognitive correspondences between small conceptual arrays. In a broad sense, MST highlights (1) the construction of mental spaces, (2) the activation of mapping

operations across these mental spaces, and (3) the role that context, background knowledge and inferences play in the conceptualiser's mind.

Mental spaces are temporary but complex conceptual domains activated by words and sentences (or utterances, in the pragmatic sense) acting as linguistic prompts. According to Fauconnier (1994), linguistic prompts alone are 'partial' and 'impoverished' instructions whose meaning can only be triggered efficiently once they come into contact with the referents in the real or hypothetical world and the conceptualiser's experience. In Fauconnier's words,

> (8) Language, as we use it, is but the tip of the iceberg of cognitive construction. As discourse unfolds, much is going on behind the scenes: new domains appear, links are forged, abstract mappings operate, internal structure emerges and spreads, viewpoint and focus keep shifting. Everyday talk and commonsense reasoning are supported by invisible, highly abstract, mental creations, which grammar helps to guide, but does not by itself define.
>
> Fauconnier (1994: xxii-xxiii)

In view of this claim, meaning construction represents a dynamic process whereby conceptualisation is heavily rooted in local discourse. This means that the meaning of a given expression or utterance is liable to be exploited differently depending on the situated context. This approach bears significant implications for the analytical tools employed by formal semantics which conceives of meaning as context-independent.

Mapping operations take place in intricate and, oftentimes, unpredictable ways. Conceptual representations, guided by local discourse, proliferate as they recruit, merge, and create networks of conceptual associations. Pre-assembled knowledge structures encompass real, hypothetical, fictive, sensory, or subjective reality largely shaped by experientialist, encyclopaedic knowledge. According to Evans and Green (2006: 369), given the online unfolding of discourse, the best way to think of mental spaces is terms of cartoonists's speech bubbles in that in the interaction of the "inner thoughts of the characters […] you can have many thought bubbles working simultaneously."

The construction of mappings tends to occur on the basis of metaphorical and metonymical links. In either case, conceptual regions are accessed from a base space to an input space via a 'trigger-target' configuration. Activation of mental spaces is mainly guided by the pragmatic function of on-line discourse and the structural properties of image schemas grounded in embodied experience.

Reference to entities, events, or abstract phenomena is accessed through space builders, which are formalised via such constructions as prepositional phrases, connectives, and adverbial constructions, all conveying (parts of) propositions stating beliefs or attitudes.

Although MST accounts for a wide range of cognitive and linguistic phenomena, the interest of our study lies in the 'elements' involved in the spaces which such linguistic constructions set up. Elements in this context refer to entities or processes elaborated on-line or pre-existing in the conceptualiser's mental frame and are linguistically realised as nouns and noun phrases as main nominal processes.

A single sentence like *Serpico blows the whistle on rampant corruption* can be understood as a mental space. In it, constituent linguistic units prompt for the activation of different mental spaces. Background knowledge relative to the subject is fundamental for the exploitation of conceptual regions. Following the argumentative line of Fauconnier, but with the provision of our own real-life examples, by saying something like *In the movie Serpico blows the whistle on rampant corruption* , we activate two mental spaces; one grounded in a 'reality' space and the other, in a 'movie' space. It follows that each base space acts as a point of access to a new domain. If we change the wording slightly into *I don't think in the movie Serpico blows the whistle on rampant corruption,* we now set up a third mental space which encompasses the speaker's judgement of a state of affairs. The diagram below represents the dual projection of counter spaces.

a **Reality space**

b **Movie space**

Fig. 1   *In the movie Serpico blows the whistle on rampant corruption*
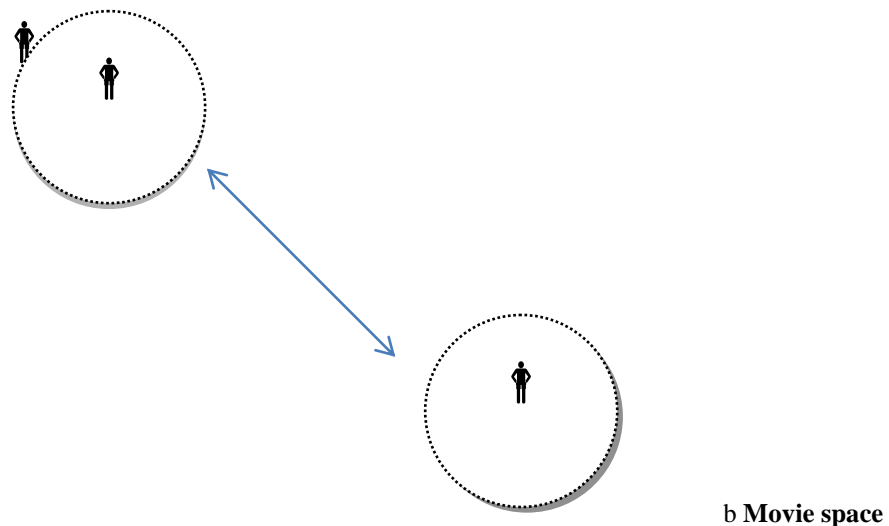
It turns out that a given base space, the one which "remains accessible for the construction of a new mental space" (Evans and Green 2006: 374) may induce a lattice of mental spaces with their corresponding conceptual schemas. Interrelations of this sort and the temporary links established offer countless 'access possibilities' or 'connection paths' leading to

unlimited meanings, especially if regarding constituent linguistic units as single mental spaces activated in unison.
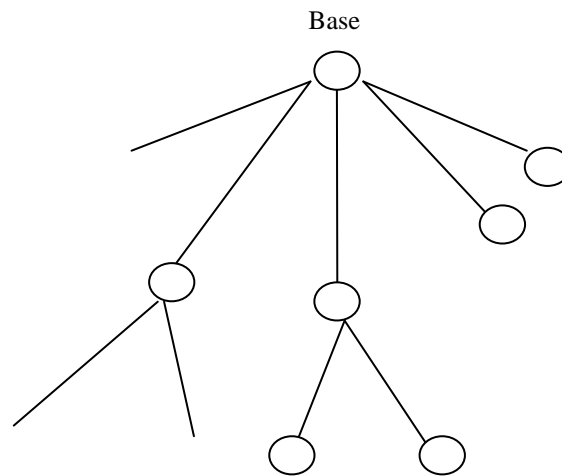
Base

Fig. 2 A lattice of mental spaces (adapted from Evans and Green 2006)

Mental spaces play a significant role in the coreferential and inferential structuring of reality by enabling connections between domain located in the internal sentence structure, wider stretches of discourse or beyond the linguistic boundaries of oral or written communication. Counter spaces set up mappings between counterpart elements located in different reality domains, something Fauconnier describes as the *Access Principle*. The link is usually established on the basis of a pragmatic function. In the sentence *In the movie Al pacino plays Serpico, a New York cop who blows the whistle on rampant corruption*, reference points operate explicitly and implicitly (grounded in prior knowledge) by connecting to the identity of the subject through the activation of three mental spaces: Al Pacino, the actor; Serpico, the character in the movie; and the real-life Frank Serpico. In turn, shifts in attention and focus may accompany the referential interweaving across mental spaces. Notice, for example, the unpredictable shift in reference of the counterspaces in *The interview with Serpico on Serpico.*
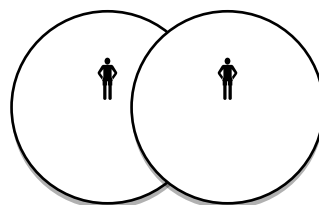

Fig. 3 *The interview with Serpico on Serpico*

The organisation of a mental space as a single package is known as *frame*. Terminologically speaking, a frame corresponds to a cognitive model which has a unifying function; it

assembles the whole set of relations and contexts relative to the cognitive categories evoked by words into a blanket term. To this respect, Fauconnier and Turner (1998: 3) add,

> (9) Frames structure our conceptual and social life. As shown in the work of Fillmore, Langacker, and others, they are also, in their most generic and schematic forms, a basis for grammatical constructions. Words are themselves viewed as constructions and lexical meaning is an intricate web of connected frames. Furthermore, although cognitive framing is reflected and guided by language, it is not inherently linguistic. People manipulate many more frames than they have words and constructions for.

This means that the example given above *In the movie Al pacino plays Serpico, a New York cop who blows the whistle on rampant corruption* can be structured (or 'framed') as a MOVIE frame. In addition, it recruits closely related sub-frames, which can be generic (e.g. seeing a film) or specific (e.g. inner conflict facing the character). In turn, the activation of mappings can be further expanded by a set of indirectly related frames.

Mental spaces constitute one of the primary mechanisms for creativity in language, especially in what Fauconnier and Turner (1998) describe as *blending* or *conceptual integration*, a cognitive operation whereby the conceptual mappings of input spaces are recruited into a new mental space endowed with a dynamic and conceptually divergent structure. Blending is usually preceded by the formation of a generic space which contains the commonalities arising from input spaces. As a dynamic process, the development of conceptually integrated networks may entail multiple mental spaces whose elaboration is often assisted by *simulation*, the ability to recreate experiences "which need not have potential real world reference" (1998:4).

According to Fauconnier and Turner, conceptually integrated networks make manifest a remarkable cognitive capacity, which, although used pervasively, oftentimes passes unnoticed. The creative construction of mental representations is instantiated in many formal constructions, either lexical or lexico-syntactic ones. A case in point is the large number of compound noun phrases, mainly complex nominals whereby the mapping of conceptual structures is metaphorically and metonymically grounded. In fact, the English language capacity for creative elaboration can be traced to the Old English Period in a wide range of Anglo-Saxon kennings such as *bone-house*, *whale-road*, and *joy wood,* or *happy wood* to denote a person's body, the sea, and a harp, respectively (Crystal 1995). One may ask oneself the following question: What motivated language users to draw such a parallel? Underlying these linguistic expressions lies a highly creative process consisting of the elaboration of relevant mental correspondences. Creativity is demonstrated in the moves that induced the conceptual associations between the mental space A—e.g. *bone*, *whale*,

joy, operating as the trigger—and mental space B—*house*, *road*, and *wood,* operating as the target. Conceptual mappings rest on the similarities and evocative attributes—not easily perceived at first—of the trigger and target elements leading to the subsequent blended space.

4.3.3. Frame knowledge

The construction of mental correspondences also depends on 'framing,' the process of establishing conceptual connections across mental spaces (Lee 2001: 203). According to Fillmore (1985: 223), the propounder of *Frame Semantics Theory*, frames are cognitive structures that derive from concepts encoded, predominantly, by lexical elements which are intimately associated with prototypical scenes, i.e. 'coherent schematisations of experience.' Broadly speaking, cognitive frames are evocative of commonly occurring situations reflecting world views and beliefs shared by members of a given community. They may vary from context to context or, more generally, from culture to culture, but are nonetheless representative of the way human beings perspectivise and structure experience through language.

The study of frame knowledge has received extensive attention in the cognitive literature, particularly for its relevance to account for the wide range of phenomena within the scope of the cognitive linguist's interest, i.e. conceptualisation as shaped by individuals' life experience.

A central concept to frame knowledge is the principle of *foregrounding* (already introduced in previous sections) with such key notions as prominence, perspective, and attention. This view presupposes that the salience of a particular cognitive structure within our frame-system is largely determined by what attracts our perceptual attention and the psychological standpoint from which a situation is viewed. Prominence is reflected in the language we use, which, acting as a 'window of the mind,' unfolds our differing 'ways of seeing.' Fillmore would later redefine these notions under the Gestalt terms of *figure* and *ground*; the former, in reference to individual words and the latter, with regards to their context of usage.

Frames are context-bound; a single word may perspectivise varying dimensions of reality and behave differently depending on the context of use. The importance of context, therefore, cannot be underestimated. It plays a crucial role in the viewing arrangement of reality, and, clearly, it is not exclusively related to the immediacy of the situation; in the

cognitive view, context is also a mental phenomenon which encompasses a wide range of affairs directly or indirectly connected to the cognitive categories which we, conceptualisers, recruit from reality and the stimuli around us. The situation, in its literal sense, is just a prompt for the activation of our frame-system and its complex range of conceptual associations. Using a trivial example of *weekdays*, Fillmore (1985: 223-224) exemplifies this assertion as follows:

> (10) If we wish to articulate our understanding of the weekday names and other related words, we can appeal to a single interpretive frame made up of an understanding of (1) the natural cycle created by the daily apparent travels of the sun, (2) the standard means of reckoning when one day cycle ends and the next one begins, (3) the larger calendric cycle of seven days, and (4) the practice in our culture of assigning different portions of the weekly cycle to work and non-work. An implicit awareness of this particular organization of our physical and social world provides the conceptual basis for a fairly large body of lexical material, including common nouns like *week* and *day*, their adjectival derivatives, the individual weekday names, and such special categories as *week-end* and *fortnigh*t. Borrowing from the language of gestalt psychology, we could say that the assumed background of knowledge and practices—the complex frame behind this vocabulary domain—stands as a common ground to the figure representable by any of the individual words. Such a frame represents the particular organization of knowledge which stands as a prerequisite to our ability to understand the meaning of the associated words.

Similarly, a single word like *home* conjures up a complex range of conceptual associations grounded in a cognitive as well as cultural dimension inasmuch as individuals' life experience. Fig. 4 illustrates a plausible interpretation of the [HOME] frame (In the Data Analysis Section, frames and sub-frames will be indicated typographically by small capitals enclosed within brackets).

Cognitive frames operate predominantly on the basis of long-term memory and are determined by pre-established cognitive models—larger than frames—which have a primary role in the shaping of world views, beliefs, judgement, and assessment of reality. The fact that frames go hand in hand with world and experientialist knowledge is indicative of their culture-bound nature. Clearly, subjective perceptual factors motivating the selection of prominent parts cannot be detached from the influence of cultural background. As an idealised representation of categories, frames capture culturally ingrained assumptions and viewpoints which may or may not reflect the frame-system of a particular speech community.

Fig. 4 [HOME] frame

The architecture of frames is very much like a lattice or web whose structure can be subdivided into *scenarios* (the stage-sequential arrangement of a category); *domains* (the context surrounding cognitive units), *interactive networks* (the links established between mental associations), and *scripts* (knowledge structures encompassing commonly occurring event sequences). In turn, this overall structure can be further subdivided into sub-frames, which stresses two essential characteristics of cognitive frames: (a) their infinity, as reflected in their inherent capacity to proliferate and build up new connections and interrelated meanings, and (b) their multi-dimensionality, as indicated in the multiple

interpretations or ways of viewing and understanding a single category (Ungerer and Schmid 1996; Lee 2001).

As mentioned above, the viewing perspective of reality is reflected in our linguistic choices. At a cognitive-syntactic level, frames are linguistically rendered in the constituent sentence elements such as subjects, objects (direct, indirect), verbs, and adverbials. As shown mostly in the work of Fillmore, Langacker, Goldberg, and Croft, the frame-based approach has rendered fruitful insights in the study of grammatical constructions. In a sense, words and their interaction with other words are viewed as constructions whose linguistic, syntactic make-up cannot stand in isolation from the symbolic properties stemming from the web of interrelated frames.

(11) The basic assumption of Frame Semantics […] is that each word evokes a particular frame and possibly profiles some element or aspect of that frame. An "evoked frame is the structure of knowledge required for the understanding of a given lexical lexical or phrasal item; a "profiled" entity is the component of a frame that integrates directly into the semantic structure of the surrounding text or sentence.

Fillmore et al. (2000: 2; Bretones 2003)

There are times, however, when cognitive frames may not be linguistically expressed. They may be hinted at by words chosen by language users or even by non-verbal communication. In either case, contextual cues and background knowledge will be in charge of activating and guiding conceptualisers' inferences. Additionally, cognitive frames play a key role in the process of semantic extension and formation of new lexemes and lexico-syntactic constructions, a phenomenon which has profound implications for language change. In this respect, Lee (2001: 10) adds that "[w]hen new frames arise, existing words are carried over into the new domain, thereby undergoing some change of meaning." Consider, for example, the frames involved in the moves that motivated the creation of novel expressions like *hands-free* or *loan sharking*, or the metaphorical extension of such lexemes as *gatekeeper*.[4] The formation of these words could not have been possible without the structuring function of frame knowledge. As we shall see, the cognitive frames[2] activated in the construction of words and phrasal components structure and cohesively condense our perception of human experience in a way that trascends linguistic knowledge. The subsequent analysis sets out to determine how the complexity of frame knowledge operates in conjunction with other cognitive mechanisms in the construction of lexical and lexico-syntactic forms.

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[4] The metaphorical sense of the term, as it began to be used by the end of the 20th century, is that of individuals who control the flow of information and make important decisions regarding someone's eligibility for a given role (eg. academic admissions).

4.1.4. Radiality

Both an important mechanism for language innovation and a central concept in cognitive linguistics, the notion of 'radiality' has come to shed light on a diverse range of linguistic phenomena such as suffixing, tense choice, adjectives, nouns, and, broader disciplines within cognitive linguistics like discourse analysis. Since the goal of the present study is geared to uncover the cognitive mechanisms underlying lexical and lexico-syntactic forms, we will place our interest in nouns as pervasive instantiations of radiality.

It would be sensible to start this discussion with a brief reference to a concept which constitutes the non-cognitive counterpart of radiality, what has been traditionally referred to as *polysemy* or 'multiplicity of meaning' (Lyons 1995). This is, in fact, a pervasive quality of language evidenced in speakers' tendency to employ a single lexical item to convey several meanings. Two central features characterise polysemy: (i) extendable semantic networks are closely related and (ii) these derive from a core, central meaning. A clear case of polysemy is the word *mouth* (of an animal vs. of a river) as in the sentences below (Hurford and Heasly 1983).

> (1) *Most of the fish caught were hooked in the mouth.*
> (2) *They lived near the mouth of Nansemond River.*

Although used in clearly different environments, the conceptual connection between the senses of *mouth* as of a river and of an animal arises from the concept of an opening. Sometimes, however, there are unclear cases when sense relatedness is not straightforward. Ambiguity of this sort might lead language users to confuse polysemy with another sense relation, homonymy, "different words with the same form" (Lyons 1995), which, for purposes of focus, we are not going to explore any further.

Lakoff proposes an interesting treatment of polysemy. Polysemes, as lexical units, should have the status of conceptual categories whose sense is built upon a prototype. This implies that rather than stemming from a single central concept their meaning derives from a network of related concepts (Evans and Green 2006). We will return to this point shortly when discussing Lakoff 's ICM treatment of categories.

Polysemy poses challenging questions regarding the behaviour of words in different environments and the mental processes governing the organisation and allocation of attributes. All in all, polysemy is 'a symptom (rather than a primitive component) of the

way in which various cognitive operations allow for creativity at many levels' (Fauconnier and Turner 2003: 2) and so is its cognitive counterpart, radiality. Basically, radiality encompasses all the essential features exhibited by polysemy; they consist of a semantic, mainly metaphorical or metonymical, extension whereby a cognitive category acquires a network of related senses. That is, its core meaning takes on new dimensions (e.g. specialist meanings). In some cases, the move underlying this change is said to occur in a physical domain from concrete to abstract categories; in others, it may imply the obsolescence of the basic meaning of a word whose current use is motivated by the foregrounding of a salient feature. In either case, the central member is said to branch out to less-central and non-central cases.

At the very center of radial networks is categorisation, the process of mental classification discussed in see Section 4.1. Approached eminently from the perspective of the cognitive view rather than the traditional model, category membership operates on the basis of the interaction between salient properties stemming from world stimuli in a wide range of phenomena, namely 'superordinate' categories like human beings, living organisms, and non-living entities, and basic level categories the derive from these umbrella tems (e.g. mother, tree, car).

In the formation of radial categories, members of a particular category are instantiated as an idealised realisation of the cognitive category. Semantic extension points to the fact that the inclusion of new members rests on the attributes arising from the overt, basic, or somewhat hidden resemblance to the idealised entity. Earlier studies of the classic theory used to equate these binding properties to "a set of necessary or sufficient conditions" determined by clear-cut boundaries. Prototype Theory, formulated by Eleanor Rosch (1975) and her research group, reversed this view by highlighting the role of background knowledge and experience in the formation of categories, commonly instantiated through prototypes on the basis of similarly or resemblance. Unlike the classical model, Prototype Theory acknowledges the fact categories may have unclear boundaries, that attributes are gradable features and not necessarily shared by all members

> (12) Much work in philosophy, psychology, linguistics and anthropology assumes that categories are logical bounded entities, membership in which is defined by an item's possession of a simple set of criterial features, in which all instances possessing the criterial attributes have a full or equal degree of membership.
>
> Rosch and Mervin (1975: 573-575).

The Idealised Cognitive Model (ICM) proposed by Lakoff (1987) offers an insightful understanding of how conceptualisers form categories. He departs from the basic tenet of Prototype Theory which equated prototypes with abstract representations and centers on the manifestation of typicality (goodness ratings, stereotyping, closeness, expectations, etc.) through categorisation judgements resulting from intricate mental models (Evans and Green 2006). Thus, the central structure consists of a 'cluster model' which perspectivises a single category from different dimensions. In Lakoff's instantiation of the point in discussion, a pervasive category like MOTHER may be decomposed in terms of five distinct models: the BIRTH MODEL, the GENETIC MODEL, the NURTURANCE MODEL, the MARITAL MODEL, and the GENEALOGICAL MODEL. The bulk of relational knowledge gives rise to a schematic representation of the composite structure of the prototypical category. As suggested by the figure below, the architecture of radial categories, likewise that of frames and mental spaces, may be represented as a 'radiating lattice structure.' In Lakoff's view, further mappings and relations are far from being random but directly determined by the configuration of central categories.
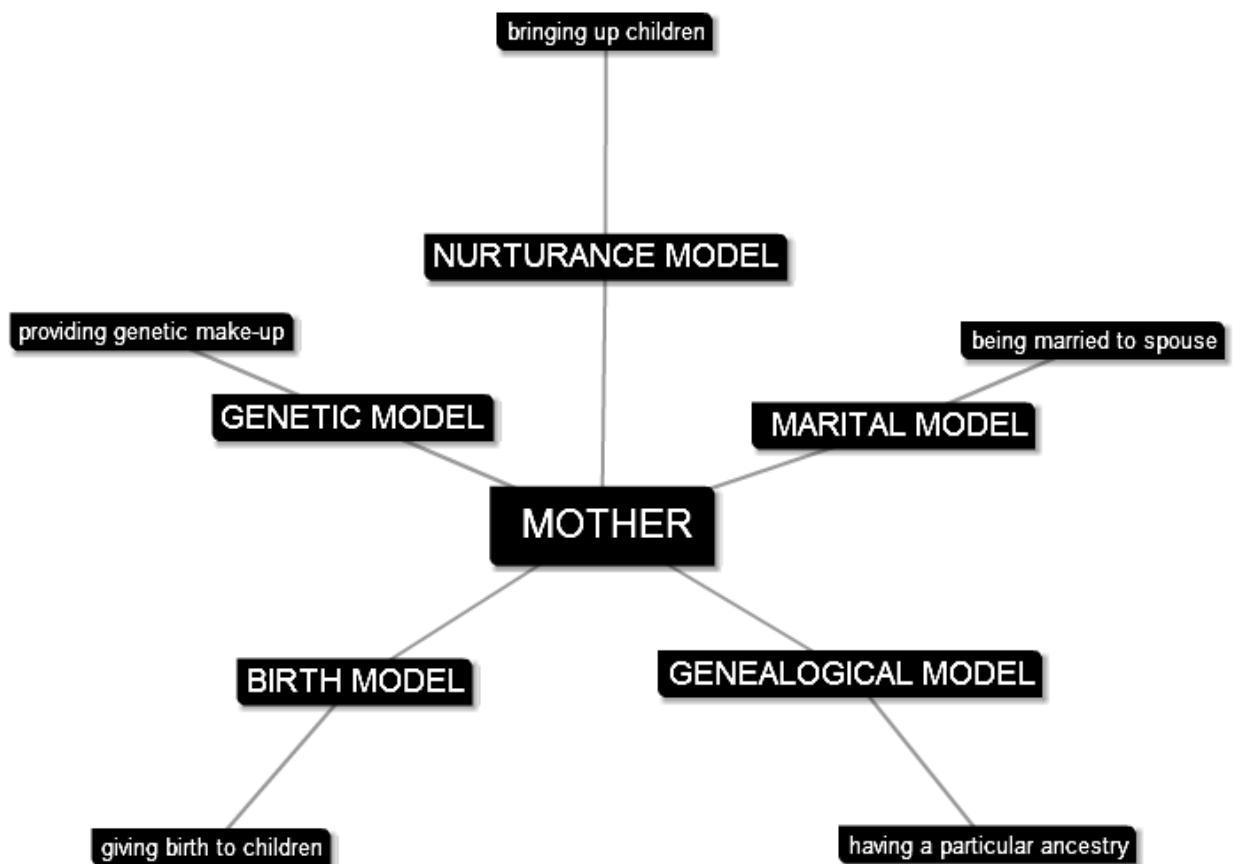

Fig.5 Radial network for Lakoff's MOTHER category

Overall, radial categories are established via metonymic links as instantiated by a set of commonly defining groups which ICM describes follows: stereotypes (prototypes arising from public consensus); typical examples (pervasive features lead conceptualisers to rank a category as primary while the others as less important); ideals (positive assessment of an entity on the basis of desirable characteristics); paragons (the concrete realisation of ideals by means of one category member; e.g. Elvis Presley as a paragon of Rock and roll); generators (members of a category being radiated by a central subcategory); and salient examples (a single category serves as a reference point for assessing other categories); in all such radial categories operate metonymic links whereby a single member of a category comes to signify the whole category.

What certainly defies conceptual correspondences of this sort is the unclear and often times extendable boundaries of deviant categories, marginal or peripheral examples motivated by convention. As we shall see, attributes are not necessarily assigned in view of the similarities or commonalities arising between entities. Interestingly, radial relations can also be built on the basis of opposing or marginal features that set them apart. As Ungerer and Schmid (1996: 21) point out, a feasible mechanism to clarify the puzzle when unfolding the cognitive structure of categories is by "collecting both the shared and the distinctive properties." This is the analytical method that section 6.1.4. attempts to follow.

The activation of radial categories is firmly rooted in mental spaces, which according to Lakoff (1987: 281) represent "a medium for conceptualisation and thought. Thus any fixed or ongoing state of affairs as we conceptuali[s]e it is represented by a mental space." An equally important function is played by frames, clusters of related senses encompassing belief systems and factual or counterfactual factors guided by idealised cognitive, cultural and social models. Pre-established knowledge activated by frames enables language users to weave, directly or indirectly, conceptual links between the set of defining properties of the central categories and the emergent radial members.

Radial categories and the frames that they invoke are heavily attached to speaker meaning, i.e. the subjective life experience of conceptualisers. The fact that meaning varies from person to person, therefore, may invite different readings making categories prone to misunderstandings. Context, in its cognitive and situational view, plays a key role guiding the inferential moves in filling in missing slots of information. With regards to this point, Ungerer and Schmid (1996: 47) point out,

(13) It stands to reason that for all kinds of phenomena that we come across in everyday life, we have experienced and stored a large number of interrelated contexts. Cognitive categories, are not just dependent on the immediate context in which they are embedded but also on this whole bundle of contexts that are associated with it.

In the formation of radial categories the selection of prominent parts tends to be influenced by more than just a single factor. Although it is clear that the organisation of stimuli (e.g. sensory input such as color, shape, size, texture, sound, and smell, at a concrete level) is largely grounded in perception, thought processes are also attibutable to individual and shared knowledge reflecting language users' interaction with the world. In this respect, as Rosch and her research team's findings reveal, perceptual salience acts in tandem with 'social, and memorial salience' (Rosch and Mervin 1975).

There are countless examples of words which depart from their original meanings. But are language users truly aware of the internal conceptual structure of the words they use? Creativity in radial categories can be found in the process of meaning construction as reflected, for instance, in the novel use of a lexeme or lexical expression. An exemplar of radiality is 'semantic expansion,' which is manifested in a wide range of lexical items. Consider, for example, what the lexeme *mouse* has come to denote in our Information Technology era. Clearly, the conceptual associations to its counterpart referent are guided by metaphorical mappings (A more accurate analysis of *mouse* is done in Section 6.1.4).

Radial members are also represented by metaphorical extensions, a fact easily illustrated in words for body parts. For example, *face* in common collocates like *face of the earth*, *cliff face*, *the face of a palace*, *face of a clock*, *coal face* or simply *face* (British slang for a well-known person). What allows us to see the central category *face* in terms of other relations is the metaphorical link established by analogy to the sense of *countenance*. According to Mc Carthy (1990), this view of radiality [5] is creative in metaphorical extensions which carry over the prototypical features to new uses of the word.

Innovative conceptual correspondences are also encoded in newly coined words (i.e. neologisms) whose formation, often rooted in shared knowledge of the world, soon extends its central meaning. Contemporary usage of English is rife with examples of this sort: earworm, fashionista, ringtone, vook, copyleft, among many others.

Another exemplar of radiality is 'conventionalisation,' mostly associated with the usage of ready-made, formulaic lexical expressions. Also known as 'conventionalised metaphors' (Lakoff and Johnson 1980), these expressions are used pervasively by speakers.

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[5] In his description of metaphorical extension, Mc carthy uses the term *polysemy* as a competing label for radiality.

speakers. As in other similar constructions, their metaphorical nature often escapes detection. A commonly quoted exemplar of conventionalisation lies in the use of the verb *dial*. The term is widely used by language speakers even when the old-fashioned device (the numbered circular disc on telephone receivers) is a thing of the past (Taylor, 2002).

The notion of radiality bears strong implications for language change. Words, more precisely full words, are invested with various senses which may or may not be necessarily related. In fact, they might be arbitrary at times. To make matters slightly more complex, the semantic nature of words can be further expanded by specialist terminology in a wide range of fields and everyday slang terms which might not always stand the test of time. A pervasive feature of language, radiality demonstrates its coping capacity for linguistic renewal behind a seemingly identical façade. As in frames, Lee also highlights the contribution of radiality to language change based on the following assertion:

> (14) Since the semantic networks associated with words and morphemes are open, new phenomena can be assimilated to existing categories on the basis of perceived similarities, without the need to create a new word every time we encounter a new phenomenon. Thus, a (more or less) finite system is able to cope with a world that is infinite and in constant flux.

Section 6.1.4. attempts to bring out the conceptual force of radial networks in their interaction with other cognitive mechanisms at work, namely mental spaces and cognitive frames.

5.0. METHODOLOGY

The present study is intended to provide a qualitative, mainly, and quantitative analysis of spoken English discourse as a reflection of the role of creativity in the context of ongoing linguistic change in the contemporary English-speaking specialist community. To suit this purpose, our research deals exclusively with lexical and lexico-syntactic creativity as manifested in the oral production of English-speaking specialists. The data analysis is based on hand-collected samples drawn from 62 lectures taken from TED ('Technology Entertainment and Design'), a global set of online talks intended to disseminate 'ideas worth spreading.' The lectures, which have a time length of about 20 minutes each and an average word count of 1,400 words, reflect on a wide range of issues facing the world today. They are delivered in English by leading researchers and specialists in their respective areas of

expertise and, given their lexical density, provide a valuable source of data for the present cognitively-oriented linguistic research.

In the initial quantitative stage of analysis, a random selection of lectures will be made. This will encompass six major topic domains, namely, technology, entertainment, business, science, design, and global affairs. We will closely examine the speakers' language use, mostly consisting of specialist discourse, in order to identify, approximately, 100 newly-formed lexical items and lexico-syntactic constructions which reflect the influence of technological and cultural innovations. Since there is no consensus over how old a word must be to be considered a novel formation, our selection criteria will focus only on those formations whose date of coining is not prior to 1960. As a statistical tool for word selection and analysis, we will mainly rely on three major corpus dictionaries: The British National Corpus (BNC), the Corpus of Contemporary American English (COCA), and FrameNet. The first corpus corresponds to a 100-million-word synchronic dictionary consisting of samples of written and spoken British English retrieved from a variety of sources and genres. The compilation, as yielded by corpus linguistics, covers English lexicon from the late twentieth century, 2007 being its latest edition. Although the corpus has not been renewed (created in 1991 and completed in 1994), this database proves to be a reliable tool for date validation of novel formations registered during and after the mid 1990s; the second dictionary, the largest of its kind available, includes a 425 million-word corpus of American English. It is also retrieved from a wide range of texts and genres and accounts for the English lexicon from 1990 to 2012; the third data source is the current research project undertaken by Fillmore on the English lexicon. It is a project based on semantic frames and contains a lexical database of around 10,000 lexical units, 800 semantic frames and over 120,000 example sentences.

For a consistent interpretation of usage and linguistic context, our data analysis will be aided by four online dictionaries globally visited for their ongoing redefining of lexical knowledge-gathering: a) Dictionary.com, an authoritative, comprehensive reference source in the context of emerging technology; b) Wikipedia, the free encyclopaedia, with a fresher, more dynamic view of present encyclopaedic knowledge, offering updated content built collaboratively by its own users, people from different cultural and professional backgrounds; c) Wiktionary, born as a 'lexical companion to Wikipedia,' and intended to enrich and expand on the commonly fixed definitions of word meanings; and, finally, d) Merriam-Webster, which after more than 150 years, continues to be one of the most widely consulted providers of language information.

For purposes of date validation of word origin, or coining, BNC, COCA, Dictionary.com, and Wikipedia will prove highly beneficial. Subsequently, a descriptive analysis of the data selected will be first conducted in order to account for the cognitive categories in operation, namely, mental spaces, frame knowledge, and radiality, and possibly other cognitive resources. This task is to be followed by a quantitative analysis which is intended to establish the frequency of occurrence, i.e. relative predominance, in the formation of lexical and lexico-syntactic constructions.

The process of data analysis is expected to follow a linear, hierarchical development by combining general and specific research strategy steps (Creswell, 2009). These may be described as follows:

Stage 1. *Organisation and preparation of data*. This stage will involve making use of the raw data (lectures), i.e. identifying the target sample data (the lexical and lexico-syntactic categories) and keeping a record of the excerpts previously listened to in order to later locate context of usage.

Stage 2. *Coding process*. This stage will consist of segmenting and categorising the sample gathered and organising the transcripts containing core linguistic expressions.

Stage 3. *Data analysis and interpretation*. In this ultimate strategy step the theoretical framework validating the present research aim will be used as a backdrop to perform a qualitative and quantitative of the data.
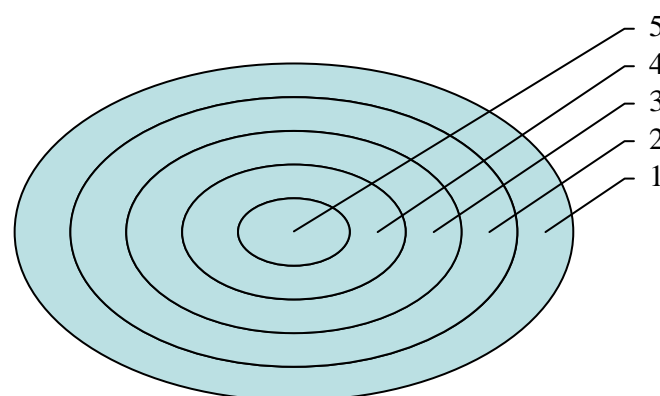

Fig. 6 Data analyis process (adapted from Creswell 2009)

1   Raw data: listening to lectures
2   Preparing data for analysis
3   Reading through all data
4   Coding the data
5   Interpreting themes/descriptioN

5.1. CHRONOLOGICAL SCHEDULE

Our study will comprise four main stages which will be conducted over a three-month period (12 weeks) in accordance with the following research schedule:

ACTIVITY	PREDECESSOR TASK	ESTIMATED TIME PERIOD
Random selection of TED lectures in accordance with topics listed.	—	1 week (*O*)
Data collection: identification of novel lexical items and lexico-syntactic constructions reflecting the creative mechanisms of conceptual projection (mental spaces, radiality, and frames).	Selection of TED lectures	1 month (*O*)
Corroboration of meaning of forms in (corpus) dictionaries prior to and after 2000 (the oldest occurrences dating back to 1960).	Data collection	1 month *(O)*
Data analysis: qualitative and quantitative analyses of the linguistic expressions on the basis of the aforementioned creative mechanisms.	Corroboration of meaning of forms in (corpus) dictionaries	2 months (*P*)

optimistic time estimate (*O*)   normal time estimate (*N)*   pessimistic time estimate (*P*)

6.0. DATA ANALYSIS

6.1. Mechanisms of cognitive projection in the formation of lexical and lexico-syntactic constructions

Given the intricate properties of cognitive operations, their manifestation can be accessed through the conceptual mechanisms involved in the process of meaning construction and knowledge representation; specifically, by examining the activation and feasible interaction of mental spaces, frame knowledge and radial categories. The first three sections of data analysis examine the structure of pormanteau, closed compound nouns, and complex nominals, all of them productive forms of lexical and lexico-syntactic compounding. Special attention is placed on blending, or conceptual integration, in that, as a basic cognitive operation, is firmly entrenched in the construal of conceptual structure. In the

following set of constructions analysed, MST operates in tandem with cognitive framing. The analysis cannot be devoid of this interrelation since, as discussed in Section 4.1.2., frame knowledge acts at all levels of abstraction permeating its function both in the input spaces and in the conceptually integrated structure. The remainder of the present description focuses on the cognitive moves surrounding the formation of nouns as novel instantiations of radiality.

6.1.1. Pormanteau or melded words

As previously discussed, word formation as a linguistically creative act comes to fill a void in language in that it compensates for meanings lexically unavailable in the speaker's mother tongue. This is clearly illustrated in the construction of portmanteau words, or 'blends,' i.e. single lexical items formed out of parts of other words. Apart from being a rich instantiation of morphological creativity, our ability to make words out of pre-existing words gives evidence of a powerful mechanism of cognitive construal.

Cognitively creative moves can be found in the perceptual correspondences established in the creation of the word *cyborg*, short for *cybernetic organism*. Although initially introduced to refer to human-machine systems in outer space, the term now applies to any entity endowed with both biological and artificial parts or, more strictly, to any organism having technologically-enhanced abilities. The inadvertent similarities between the 'cyber' space (C) and the 'organism' space (O) are brought into light by examining the process of conceptual integration, which can be described as follows:

(a) C highlights the structural and regulatory properties (e.g. electronic, mechanical or robotic) of control systems proper to technological devices, machines or other sorts of equipment.

(b) O activates frame knowledge relative to bodily capabilities as those exhibited by human beings and other mammalian creatures (e.g. adequate flexibility, functional mobility, movement speed, motor skills, etc.).

(c) The input structure of C propagates into its neighbouring space, activating relations which were not originally present in the input spaces.[6]

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[6] Fauconnier and Turner (2001) define this set of newly-established conceptual relations as 'emergent structure.

(d) Under blending, cross-space mappings fuse the input properties into a single space: one that connects artificial and biological attributes or, more specifically, human-and machine-performed tasks. The cognitive visual representation of *cyborg* thus emerges as an entity whose physical or mental abilities far exceed those of the human counterpart.

The actual reasoning that guided the creative construction of *cyborg* unfolds the significance of the blended space. Its dynamic structure comes to signify a 'new frontier' whereby the counterparts [OUTER SPACE] frame and [INNER SPACE] frame are no longer projected separately but integrated into a single entity intended to bridge the gap between 'mind and matter.'[7] In the diagram below, varying colors represent the recruitment of conceptual structure.
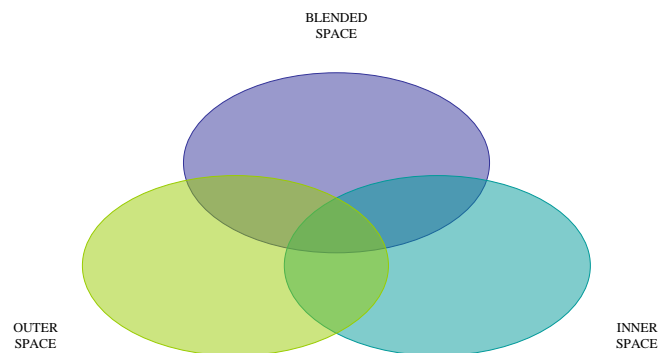
Fig. 7 Venn diagram for blended spaces

The word *cyborg* has deviated from its central attributes. In fact, the properties of the human frame running counter to the machine frame has rendered innumerable senses that equally apply to living organisms and non-living entities (e.g. road systems, corporations and governments).[8]

Complex projection mappings emerge from *cybercrime*, a melded word for cybernetic crime. With the juxtaposition of the source input space, 'cybernetics,' and the target input space, 'crime,' it is possible to retrieve the conceptual structure commonly associated to the term, 'the criminal exploitation of the Internet.'[9] The blended space profiles the role of

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[7] D. S. Halacy's *Cyborg: Evolution of the Superman* (1965).

[8] Retrieved from http://en.wikipedia.org

[9] As defined by crowdsourcers.

two main participants, cybercriminals, and their victims. Conceptual mappings stem from the [CYBERCRIME] frame which structures conceptualisation in terms of five main sub-frames: [TECHNOLOGICAL RESOURCES], [OFFENCES], [MODUS OPERANDI], [CYBERCRIMINAL ROLES], and [VICTIMS]. The [TECHNOLOGICAL RESOURCES] sub-frame encompasses the modern telecommunication devices used by cybercriminals which are not exclusively limited to computers (the Internet, mobile phones, video game consoles, etc.). The [OFFENCES] subframe activates the whole range of felonies committed by cybercriminals. These include, among others, espionage, financial theft, data theft, identity theft, spam, drug traffficking, spreading of viruses, fraud, illegal gambling, cracking, copyright infringement, offensive content, blackmail, forgery, embezzlement, child grooming, child pornography, and cyber terrorism. The [MODUS OPERANDI] subframe perspectivises the strategies or methods of operating employed in netcrime such as phishing or pharming (to steal personal information), creation of fake websites (e.g. to access clients' banking information). The fourth sub-frame projects the different roles taken on by cyber criminals, mainly including programmers, distributors, IT experts, hackers, fraudsters, system hosts and providers, cashiers, money mules, tellers, and leaders.[10] Finally, the fifth fifth subframe profiles as major victims of cybercrime: the general public, children, businesses, institutions and governments. Interestingly, each of the sub-frames mentioned represents a rich cognitive structure giving rise to infinite conceptual networks. However, what each subframe encompasses is not a matter of mere enumeration of closely related states of affairs. The exploitation of mental spaces will integrate, beside background knowledge, the subjective experience of conceptualisers; evaluative judgements, beliefs, and perspectives which will certainly vary from person to person.

MST can be illustrated through an idealised example of blending, the term *Amerasian*,[11] a combination of the words *American* and *Asian*. In the current historic context of discourse, the activation of the input spaces is straightforward. An 'American'space (A1) inducing the identity of US citizens and an 'Asian'space evoking persons born in Asian countries. In accordance with the Access Principle discussed in Section 4.3.2, the linking of reference points operates in any direction (the entities, in this case, do not stand in a relation of co-reference). A third space, a generic space, recruits the commonalities of both spaces which are later imported in the fourth space, the blended

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[10]   Information retrieved from http://www.techopedia.com
[11]   Facts retrieved from Left by the ship, a documentary about Amerasians in the Philippines.

space. In it the emergent structure of the inputs makes explicit the connections not overtly expressed in the input spaces (Fauconnier and Turner 1998): a frame profiling individuals of mixed racial ancestry born either in the United States or in Asian countries. This straightforward reading of mappings becomes certainly more intricate and elaborate with the inclusion of background knowledge to the word in its original context of usage, an emotion-laden knowledge structure that still prevails in the minds of those whose experience was directly touched by Amerasian offspring.

With this perspective in mind, the blended space 'Amerasian' sets up a complex knowledge frame contextually localised in the in the aftermath of World War II known as the Korean and Vietnam wars. The input space A1 induces an intricate conceptual system which foregrounds, as objectively identifiable individuals, US servicemen stationed in military bases in Asia. The frame assembles a network of cognitive representations pertaining to US troops' presence, life of military personnel overseas, the recreational needs of sailors and marines (nights and clubs frequented by these), their surreptitious dealings as sex trade customers, and indirect boost to local economy. Each of these cognitive domains represents a mental space in its own right establishing the proliferation of extendable mental spaces. For example, the 'life overseas' space, if perspectived in its specific localised discourse, profiles the life of servicemen in the company of local women functioning as "wives for rent" or "stand-ins for [their] family back home." [12]
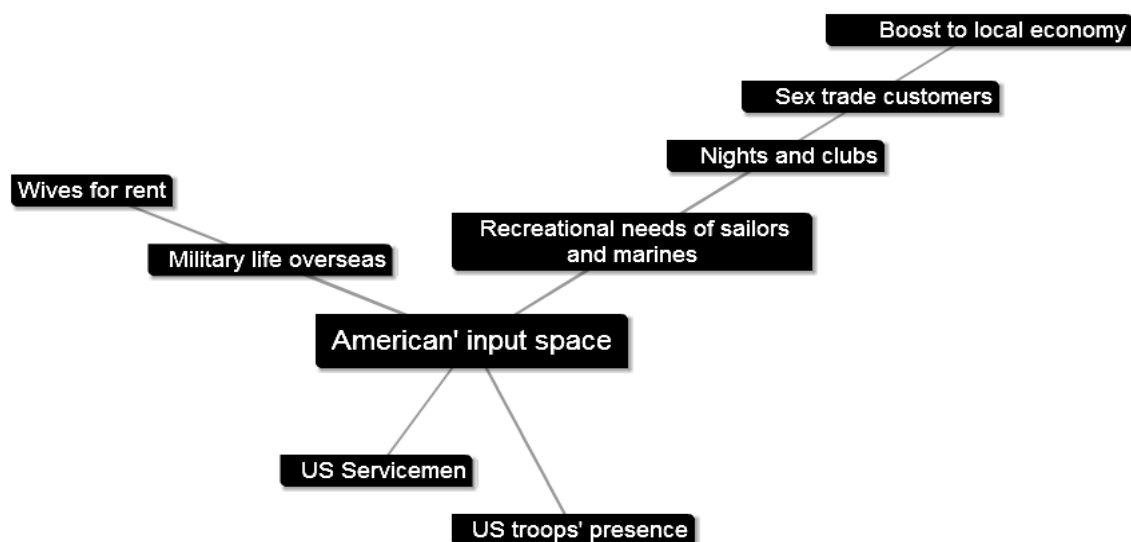

Fig. 8 'American' input space

The A2 input space highlights two major conceptual regions, an 'Asian women' space (AW) and a 'sex trade' space (ST), from which stem a lattice of cognitive representations entwined with their own set of conceptual domains. AW acts as a trigger for background knowledge relative to the reality of women in the context of a communist society, their social needs and legal vulnerabilities as well as their submission to Confucionist norms which set the standards of women's virtue and moral conduct (chastity, obedience, and silence). ST, on the other hand, recruits distinct yet interrelated mental spaces commonly associated to the plight facing prostitutes and their impoverished lives: physical and sexual abuse, subjugation as symbolised by the controlling figure of men in uniform and pimps, social discrimination, and a host of negative feelings including humiliation, shame, fear, and grievance.[13]
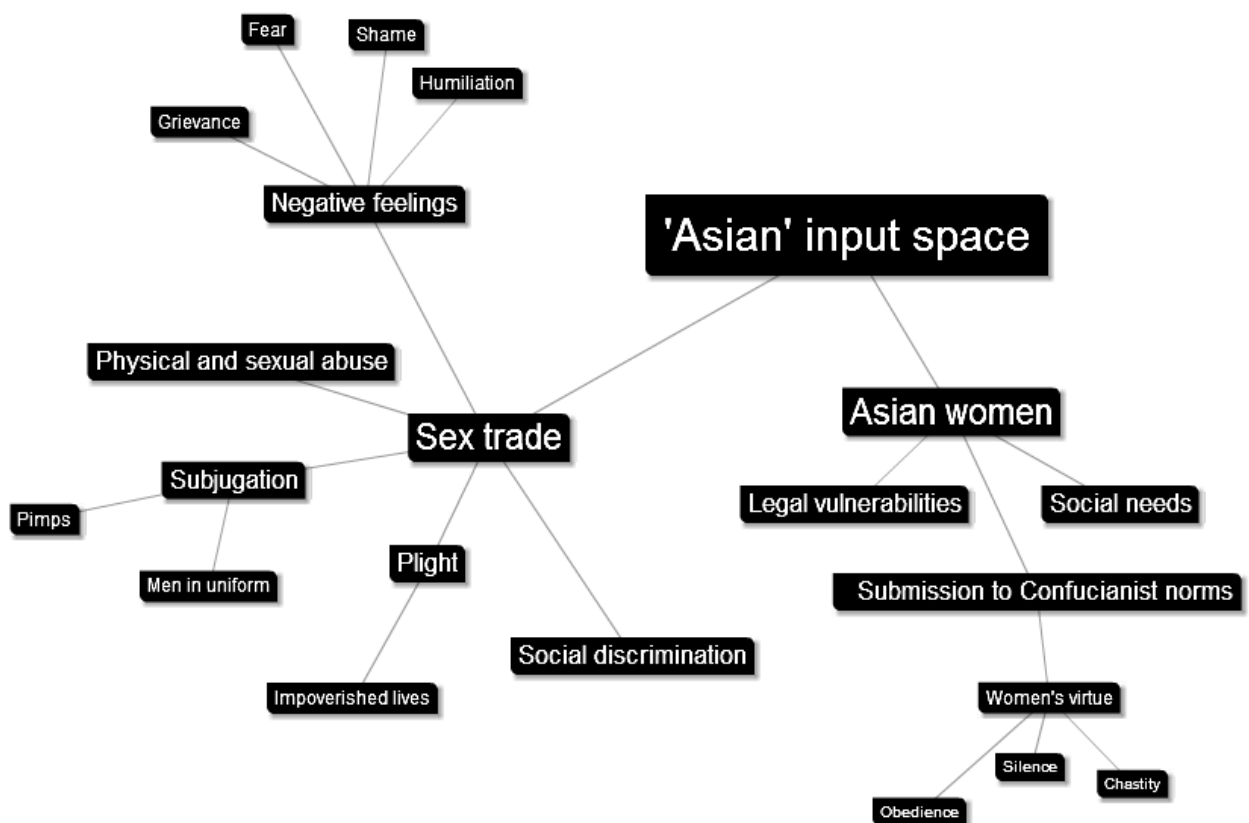
Fig.9 'Asian' input space

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[13]   The terms above were taken verbatim from "Stars and stripes and sex: nationalisation and globalisation in the Gijichon," an essay by Katharine Hyung-Sun Moon (2004) in reference to prostitutes in Korea. The words, rich in imagery and conceptual force, capture the experiences of those whose lives were directly touched by military presence. She points out, "[…] No one could predict in November 1954, when the Korea-US Mutual Defense Treaty became effective, that millions of Americans and Koreans would get to know each other through the rubbing of flesh and the sharing of bodily fluids for fifty or more years. […] 2003 marked the 50th anniversary of the military alliance. It is evident that the US troop presence has been a permanent fixture on South Korean soil and in the psyche of millions in both the South and the North.

This complex web of imagery-rich mental connections and common-sense inferences resolves itself explicitly through a concrete realisation: Amerasian children, the illegitimate offspring born to US military men and Asian prostitutes. The blended space imports much of the knowledge structure from the input spaces, but redefines itself under a new lens, prompting for the activation of additional conceptual structure predominantly shaped by the experience of those left behind, including illegitimacy and identity issues, poor self-esteem, citizenship rights, and the current problem of Amerasian prostitution. At an ideological level, the space activates the connotational force linked to image-laden concepts 'stars, stripes, and sex.' All in all, *Amerasian* offers an elegant instantiation of blending on linguistic, conceptual, and genetic grounds.

Another example built upon word association is *digerati*, short for *dig(ital)* plus *(lit)erati*, a term applied to technologically knowledgeable people in the context of Information Technologies and the Internet. The word sets up two mental spaces: a 'technology' space (T), highly evocative of the advent of the digital era, and an 'intellect' space (I), triggered by the rarefied world of literati or intellectuals. Each space activates a set of frame relations firmly entrenched in pre-established judgemental assumptions; the former, with regards to the use of information tools in an increasingly globalised world, and the latter, in relation to the stereotypical image of scholars. Blending results in pragmatic integration, which helps us link back the concepts and properties of the frames being recruited. In the blended space, we can visualise two intertwined roles: INTELLECTUAL and USER. The view of scholars as passive, contemplative thinkers is thus replaced by that of active users who have empowered themselves through the knowledgeable application of the technology at their disposal.

Mapping operations are also present in the production of *biomaterial*,[14] a scientific term for implants made of synthetic material suitable for repairing damaged or diseased parts in a living body. The word-internal structure activates two seemingly incongruent mental spaces: a 'biology' space and a 'material' space. Projected separately, each domain prompts for the proliferation of concepts on the basis of two distinct frames, a [LIVING ENTITY] frame and a [NON-LIVING ENTITY] frame. Incongruity dissolves once the blended space brings into contact the functional properties linked to both spaces. In this respect, the blended space can be referred to as a 'role' space in that, irrespective of the devices or

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[14]   Although first introduced in the late sixties, the word has gained widespread use with the
          advancement of implant technologies.

material used (synthetic or biological; solid or liquid), the role of artificial organ applications—just like that of biological materials—is to guarantee proper functioning of biological systems in their interaction with living tissue.

A melded word which has entered the English language fairly recently is *freakonomics*,[15] the study of economics which, based upon the perspective of pop culture, looks at the obscure side of subjects falling out of the scope of conventional economics. The cognitive moves guiding lexical construction stem from a 'freak' space (F) and an 'economics' space (E). F recruits frame knowledge relative to [UNUSUALNESS], [ODDITY], and [IRREGULARITY] (or anything that is outside the norm); E encodes frame relations commonly associated to the realm of economics as a science ([PRODUCTION], [DISTRIBUTION], [CONSUMPTION], etc.). The unpacking of the blend projects a powerful, dynamic structure with links to two seemingly dissonant conceptual dimensions: a [CONVENTIONAL WISDOM] frame encompassing the common set of ideas, beliefs, and practices proper to "mainstream culture" and a [RESISTANCE] frame, evocative of rebellious, subordinate groups in their struggle to defy consensus. In other words, the blended space brings the juxtaposition of 'mainstream' versus 'non-mainstream.' Hence the understanding of freakonomics as anything that traditionally escaped the notice of economists (e.g. working conditions of drug dealers, street gang culture, etc.) .

The mental associations established in the production of melded words is more transparently manifested in *smartphone*, a short for *smart telephone*. The conceptual correspondences are perceived on the basis of a trigger and target configuration. The base space, or 'smart' space (S), brings with it an array of knowledge frames linked to modern mobile phone technology: [MULTIPLE FUNCTIONALITY], [CONNECTIVITY], [USER-FRIENDLY APPLICATIONS] and [COMPUTER-LIKE CAPABILITIES]. These essential features are mapped onto the target, the 'telephone' space (T). In our perception of the telephone domain we recruit pre-existing knowledge of cell phones, namely a prototypical member of the cognitive category [FEATURE PHONE]. The blend, laden with a strong image structure, takes on a dynamic of its own, prompting for the creation of another space; one that invites the inference of 'smart phones' versus 'dumb' phone. In short, the enhancements that set these devices apart from their outdated predecessors.

The meaning potential of iPod, a trademark for the overly-familiar, portable, easy-to-

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[15] The term was coined in 2005 by authors Steven D. Levitt and Stephen J. Dubnerin in their book entitled 'Freakonomics: A Rogue Economist Explores the Hidden Side of Everything'.

use item of technology, may at first be easy to unfold. In fact, our first approximation to its conceptual structure would be that of iPod as a receptacle of information, just like peas in a pod. However, deeply embedded contextual relations emerge as we uncover the actual metaphorical meaning underlying this construction. To begin with, the image of pod soon dissolves once we learn that the term owes its name to the acronym for Internet Portable Open Database. Creativity, however, is demonstrated in the contextual and pragmatic factors that motivated its coining.[16] Guided by the lines of a movie (*2001: A Space Odyssey*—"Open the pod bay door, Hal!"), the conceptual correspondences established by the first user stem from the similarities that he perceived between the iPod prototype (trigger) and the image of a space pod (target), a tiny back-up computer employed by space crafts for a predetermined task. More specifically, the parallel is motivated by the pragmatic features of the recoverable space vehicle in its ability to separate itself from the main part and perform its duties. The sub-frames [RECOVERABILITY], [DETACHABILITY], And [SPACE MISSION] are elegantly mapped onto its trigger: "[L]ike a pod that must return to the space ship for refueling, so the iPod must return to the computer to add any new items you may have downloaded since its last docking."[17] Although impossible to retrieve from its purely morphological features, the term is thus the result of a fundamentally conceptual process rooted in context-bound associations and intentions of its creator. This relationship is captured in Fig 10.
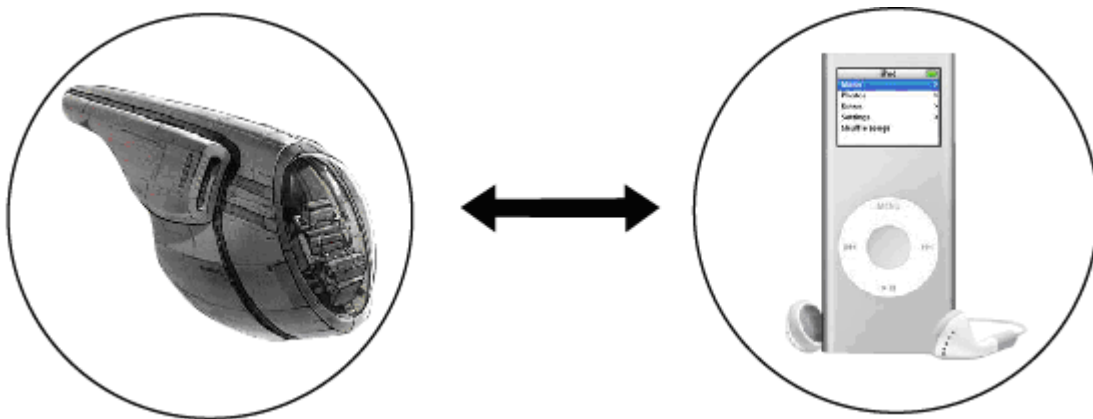

Fig. 10 iPod vs. space pod

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16   The iPod name is attributable to Apple assessor Vinnie Chieco.

17   Data retrieved from http://reference.yourdictionary.com/word-definitions/definition-of-i-pod.html

Our analysis of iPod could be further enriched with similarly formed lexical constructions. Thus, mental spaces created on-line merge into a single whole whose structure, once it enters the mental lexicon, is no longer entrenched in the specificity of local discourse. In fact, over the last decade, the *i* in iPod rather than a mere prefix has become a mental space of its own, being collectively shared by language users worldwide—despite the general unawareness of the conceptual moves herein discussed. Its pervasive use has given rise to a highly conventionalised set of words to denote a whole generation of mobile technology included under the umbrella term 'iDevices' (e.g. iPhone, iPad, iMac, iTunes, iPad, among others). In all these examples, the dynamic, self-evolving structure of the blended space demonstrates its capacity for proliferation and conventionalisation. Commonalities arise from [SIMPLICITY], a central, blanket frame with links to sub-frames [NANO TECHNOLOGY], [TOUCH TECHNOLOGY], and [DETACHABILITY].

Robopocalypse [18] merges two seemingly incompatible domains, a 'robot' space (R) and an 'apocalypse' space (A). This newly created word is meant to capture the sense of devastation and impending doom brought forth by robotic technology. Conceptual relations can be accessed from the perspective of A settled upon a strong image of the world's destruction from a biblical standpoint (as the term 'apocalypse' has been loosely misconstrued). An [END TIME] cognitive frame projects into R an intricate web of negative attributes and fear-driven emotions stemming from the sub-frames [MAKER], [DOOM], [CATASTROPHE], [CASUALTIES], [PANIC], and [DEATH].
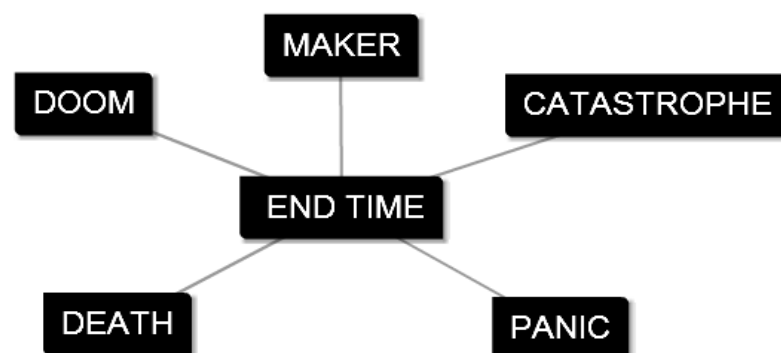

Fig. 11 [END TIME] frame

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[18]   The term was originally introduced as a name for a video game.

The recruited mappings in R redirect our focus of attention to the downside rather than the positive features linked to robots. In the blend, the omnipotence of God as the sole authority of the shape of things to come is superseded by that of mankind, metaphorically envisaged as the source of destruction hidden behind the mask of its robotic inventions.

A rather inadvertent example of lexical creativity can be found in the pervasive common noun *blog*, a shortening of *weblog*. Although the relevance of this example may seem purely linguistic, rich conceptual mappings are interwoven between a 'web' space (W) and a 'log' space (L). The W domain evokes a network of frames associated to [WEB], in its literary usage, and to that intricate fabric known as the [INTERNET]. Perspectivised from the latter dimension, W gives us access to a network of frame relations on the basis of three main categories: [COMPUTER NETWORK], [WORLDWIDE COMPUTER USER], and [INFORMATION TECHNOLOGY]. In turn, the trigger space L recruits a set of concepts pertaining to [SYSTEMATICITY], [RECORDING / STORING OF INFORMATION] (as in a logbook), and [PROGRESS]. The merging of the counter spaces allows us to see the correspondences commonly linked with the term *blog*: a website consisting of a written record of people's views and experiences usually interconnected to other links or websites. The conceptually integrated space has a powerful structure of its own in that, unlike the 'log' space, it foregrounds the role of the writer or writers and highlights the prominence of information as a matter of public domain. Central frames associated to this new space are [DISCLOSURE], [DISSEMINATION], and [SOCIAL NETWORKING]. The metaphorical productive capacity of the 'web' space has permeated through similarly constructed words such as *website* and *webpage*, examples of closed compound nouns to be described in section 6.1.2.

A novel formation in the economic arena is *crowdsourcing*, a portmanteau of *crowd* and *outsourcing*. The term has been defined as "the act of outsourcing tasks, traditionally performed by an employee or contractor, to an undefined, large group of people or community (a crowd), through an open call" [19] for solutions to a problem. As in the previous lexical items described, the word prompts for the construction of two mental spaces: a 'crowd' space (C) and an 'outsourcing' space (O), each containing a rich network of conceptual associations. C evokes relations pertaining to [LARGE NUMBER] and [UNDEFINED IDENTITY], whereas O recruits frame knowledge relative to [BUSINESS PROCESS] with subframes [SERVICE], [FOREIGN CONTRACTING] and [LOW-COST LABOR].

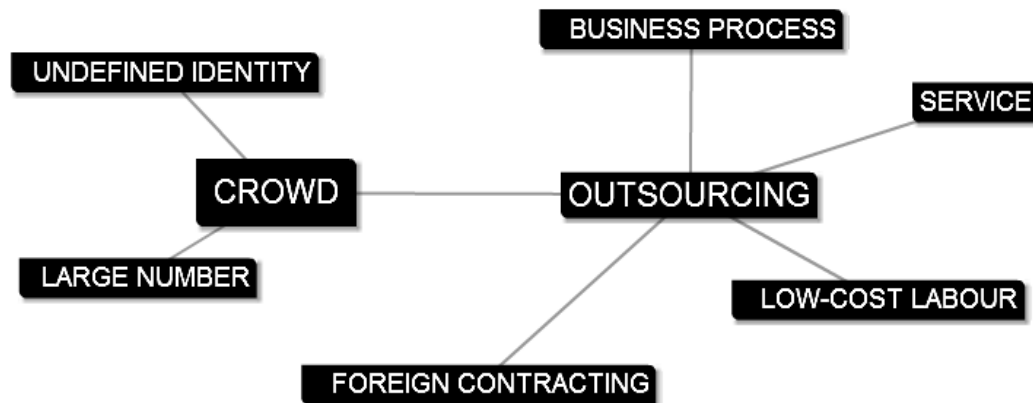[19]   Definition retrieved from http://en.wikipedia.org

Fig. 12 Conceptual network of *crowdsourcing*

The conceptual value of the blended space can be explored from the perspective and intention of the person who coined the term.[20] Echoing his line of reasoning, *crowdsourcing* is primarily focused on the role of those contributing to knowledge gathering, who, regardless of sex, age, or social status, must be solvers with bright, innovative ideas and willingness to confront challenging tasks. With this view in mind, the integration of spaces foregrounds the related frame categories [OPEN CALL], [SELECTIVITY], [EFFICIENCY] and [SOCIAL RESPONSIBILITY].

A term gaining widespread usage in specialist discourse communities and the world as a whole—although not yet officially or formally incorporated into lexical resources—is *TEDster*, a portmanteau for *TED* and *master*. Generally speaking, a TEDster is a member (speaker, mainly, or listener) of a TED community, a non-profit online conference platform which, as formerly discussed, is dedicated to the diffusion of innovative ideas drawn from worldwide experts in different disciplines. As in the other examples analysed, the concept is constructed on a dual basis with the recruitment of a 'TED' space, projecting the concepts of the acronym for *technology*, *entertainment*, and *design*, and a 'master' space, profiling the role of a skillful person. Despite the polysemous meanings conceptually stored for the word, context guides its interpretation as someone of outstanding achievement or one whose teachings or doctrines are worth-following. The Mappings projected into the blend preserve the central conceptual structure derived from the input spaces, but highlight a shift in context and location guided by the intentions and specific motivations of the profiled participants: leaders, thinkers, and doers conceptualised as 'world-changing innovators.'

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[20]   The term 'crowdsourcing' was coined by Jeff Howe in the article "The Rise of Crowdsourcing"
    published in June 2006 by *Wired magazine.*

Under this perspective, the hidden meaning of master undergoes a semantic extension which transforms the somewhat passive role of the expert into an active one. In the blend, a master becomes a TEDster, the embodiment of an ideal, an individual whose curiosity, energy, passion, and enthusiasm makes possible to turn ideas into immediate action in an intricately interconnected world.

6.1.2. Closed compound nouns

Our ability to produce and combine meaning is also manifest in the creation of closed, or solid, compound nouns, a combination of two or more words written as a single word. As in most compounds, meaning is not always transparently predicted from its constituent parts.

An idealised example of closed compounding is *facebook*, a word for the most popular social-networking website worldwide. An approximation of its meaning inevitably takes us back to the days before computers: *facebook* initially denoted a reference book containing university students' photographs and names which was distributed at the beginning of the US academic year to facilitate social interaction.[21]

There is no doubt that the formation of this once novel word was guided by the conceptual associations established by its first user, a creative event which brought together a 'face' space (F) and a 'book' space (B) on the basis of a figure and ground configuration. In the speaker's mind, the fact that students were allowed to use photographs for facial recognition can be captured by the perceptual salience of the objects that attract our attention: *face* and *books* (hence the correlation 'books with faces'). The term, as it is used today, is a metaphorical extension of its hard-copy predecessor, making it a fine example of radiality. A network of frame relations arises from the analogies between two counter mental spaces, which, for analytical purposes, we will call 'facebook 1' space (F1) and 'facebook 2' space (F2). The unifying force of analogy rests upon the defining or central properties which overlap in both spaces. By mixing what we know about F1 with what we know about F2, it seems possible to configure the following set of central attributes:

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[21]   Retrieved from
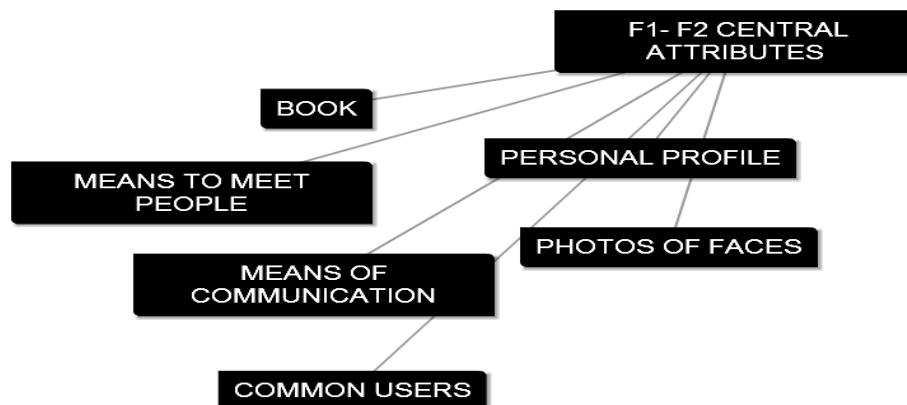http://www.readwriteweb.com/archives/mark_zuckerberg_inspiration_for_facebook_before_harvard.php

Fig. 13 …Projection of mental spaces in *Facebook*

In turn, if perspectivised from F2, a whole new array of conceptual associations emerges from each attribute. For example, the 'common users'[22] attribute is no longer applicable to university students but to the general public. The same applies to the 'means to meet people' property in that frame relations go beyond the scope of academic life. These include common-interest user groups categorised according to workplace, school or college, friends and the like. The 'photos of faces' attribute, on the other hand, triggers concepts which may not necessarily apply to facial pictures but to a wider range of personal photos and image formats (e.g. videos). prostitution, and drug dealing, to name a few.

The aforementioned attributes extend the conventionalised knowledge of the compound noun as it was initially used. For anti-Facebook users or those not acquainted with its enhanced capabilities, F2 propagates multiple internal readings linked to subjective, psychological experience. Among these stand out negative perceptions concerning narcissism, waste of time, and—due to the restricted access to Facebook users—the hurt feelings caused by request rejection. All in all, the versatility of the term has been evidenced in its four-fold perspective to meaning construction: one that comprises, in a unified manner, context of creation, background knowledge, current usage, and shared social beliefs.

Background knowledge helps us establish links in the composite structure of *steampunk*,[23] a genre that combines features of science fiction, fantasy, and horror themes as

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[22]   For analysis purposes, entities' defining attributes will be enclosed within single quotation marks.

[23]   The word *steampunk* was apparently coined in the late 1980s by science fiction author K.W. Jeter as he himself acknowledges in a letter to *Locus*, a science fiction magazine printed in the April 1987 issue: […]Personally, I think Victorian fantasies are going to be the next big thing, as long as we can come up with a fitting collective term for Powers, Blaylock and myself. Something based on the appropriate technology of the era; like 'steam-punks', perhaps. —K.W. Jeter

envisioned by Victorian period. The term originated out of the necessity of its first user to create a word that could successfully describe the distinctive artistic work developed by him and other writers of his time. As in many other compounds, meaning cannot be directly retrieved from its stems but from deeply embedded metaphorical relations. The blend results from the imaginative transformation of the words *steam power* recruited in the 'steam' mental space (S) and *cyberpunk* in the ´cyber' mental space (C). 'In S, the image of steam power is symbolic for anachronistic technology (fictional machines and artifacts) in a steam-era or other imaginary setting. C brings with it the force of [BREAKDOWN], [REBELLION], and [RADICAL CHANGE] associated to our understanding of cyberpunk as the word was initially used.[24] Blending yields a powerful imagery-laden space that projects the intersection of past and future reality. However, given the specificity of the local discourse, unpacking the metaphorical mappings interwoven in the word proves to be a challenging task.[25] Although it started as as genre, the term has metaphorically extended to signify all sorts of artistic manifestations inspired by the aesthetics of steampunk literature formerly discussed.

Interesting observations derive from the analysis of *scrollbar*, a computing term for the graphical widget that virtually all computer users are familiar with: the vertical or horizontal bar (also known as thumb, slider) used to select the portion of information to be displayed within a display screen. Clearly, *scrollbar* is a thought-provoking word to analyse in that it serves as an example of a motion event-frame.[26] In the 'scroll' space (S), we can visualise the sliding motion itself characterised by the upward, downward, and horizontal movements on the computer page. In the 'bar' space (B), we find the image of the movable object, the bar that acts as figure. The third and fourth components of the cognitive frame emerge with the conceptual integration of S and B: the computer screen which, as a static object, can be regarded as ground, and the distance followed by the dragging motion of the slider, the path. Thus, like its initial name (*handle*), *scrollbar*, or *scrollwheel*, metaphorically captures the motion properties of the tool as a physical extension of its function.

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[24] The word *cyberpunk* in this context is not evocative of its common usage but as a science fiction genre originated in the early eighties characterised by 'its focus on "high tech" and "low life."'

[25] As a blogger himself states: "What is steampunk? This is a good question that is difficult to answer. To me, Steampunk has always been first and foremost a literary genre, or least a subgenre of science fiction and fantasy that includes social or technological aspects of the 19th century (the steam) usually with some deconstruction of, reimagining of, or rebellion against parts of it (the punk)." Retrieved from http://www.steampunk.com/what-is-steampunk/

[26] An example largely inspired by Ungerer and Schmid's analyses of motion frames (1998)

Metaphor is at the heart of a similar compound noun, *desktop*, short for *desktop model computer*. The blending of *desk* and *top*, with the obvious correlation of "computer that sits on top of a desk," yields a rich network of analogies set up by the projection of two mental spaces: a 'desktop 1' trigger space and a 'desktop 2' target space. In other words, a *desktop* is a metaphor for a real desk: drawers or compartments for papers are files and folders, pictures are icons, groups of files are programs; a resemblance that has not escaped the notice of the general observer: "[y]ou can arrange the icons on the electronic desktop just as you can arrange real objects on a real desktop—moving them around, putting one on top of another, reshuffling them, and throwing them away." [27]

Conceptual links may be more directly retrieved in the composite structure of *laptop*, a portable computer small enough to fit on your lap. In spite of the overt salience of the linking elements, it is interesting to uncover the mental moves that guided the formation of the word. The 'lap' space brings with it conceptual relations relative to 'comfort,' 'warmth' and 'space.' The 'top' space, on the other hand, recruits the locative and functional attributes of the desktop counterparts. Notice, however, that in the blended space there are no desks. The emergent space has instead transformed each set of relations into the defining properties of laptops as user-friendly devices, namely, 'portability,' 'wireless networking,' 'capability,' 'adaptable usability,' and 'design.' With the advances of newer and innovative technologies, current usage of the words *desktop* and *laptop* [28] remains unchanged despite the fact today's computers are not exclusively set on top of desks and the lap can be the least suitable place to guarantee equipment durability.

In the field of meteorology, a word with a fairly recent existence is *supercell* [29] used in reference to one of the four classifications of thunderstorm. The exploitation of mental spaces is heavily grounded in specialist knowledge as well as the experience frames of conceptualisers. On the one hand, following the intended reasoning of the expert who coined the term, the word renders the juxtaposition of two mental spaces: a 'super' mental space projecting the sensory-perceptual salience of the weather phenomenon (size, intensity,

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[27]   Retrieved from http://www.webopedia.com/TERM/D/desktop.html

[28]   On the origin of the words, an October 23, 1988 article of the New York Times explains:
The desk is the clue to the formation of >laptop. The earlier word was >desktop, which was coined on the analogy of >tabletop by Dashiell Hammett in 1929: "He . . . returned his feet to the desk-top." Other mystery writers, such as Rex Stout, picked up the word (it was a favorite area for activity by private eyes), and it was adopted in the late 1960's to describe computers then on the drawing boards
that could be used in homes as well as offices. Today, it describes computers that are not as portable as laptops and is gaining frequency in the phrase >desktop publishing.

[29]   The term was coined by British meteorologist Keith Browning in 1964.

range of impact, time span, and speed) and a 'cell' space importing expert knowledge relative to the many 'storm cells' that make up a thunderstorm and their configuration (technically defined as 'an air mass that contains up and down drafts in convective loops'and behaves as a single entity). [30] Integrated into a single space, the blend suffices the defining features of the term: the least common yet most severe, destructive form of rotating thunderstorm.

The blend also incorporates conceptual knowledge regarding the stages of development of the supercell which, if equated with those of a fire, profile four distinct stages: 'incipient,' 'growth,' 'fully developed,' and 'decay.' From a layman's perspective, the conceptual path triggers mental associations linked to the [NATURAL DISASTER] script whose conceptualisation is structured in terms of four major scenes: [IMPENDING MENACE], [DEVELOPMENT], [DEVASTATION], and [RECONSTRUCTION]. The interaction of these scenes, in an ordered sequential arrangement, profile the most salient features of supercell thunderstorms: from damaging floods, baseball-sized hailstones to heavy winds to damaged property and potential death toll. [31]

6.1.3. Complex nominals

Creativity is displayed at a lexico-syntactic level in the formation of complex nominals (CNs). These constructions consist of a head noun and a sequence of one or more nominal or adjectival pre-modifiers. Given their versatile structural configuration, formalising the semantic process of CNs does not offer a clear-cut solution (Abdullah and Frost, 2007). Zenteno (2009)[32] sheds light on this unique form of compounding by regarding CNs as units which are intermediate between the lexical and syntactic levels. Thus, a semantic analysis cannot be effected on purely lexical grounds in view of the type of lexical constituents comprising CNs, mainly adjectives and common nouns, and their formal arrangement, which follows the standard syntactic rules of English syntax. Therefore, these constructions should be strictly treated as lexico-syntactic categories.

The endless meaning-making capacity of words in their interaction with other words results in a renewed and invigorated outlook on concepts and ideas. Such is the case of

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[30] Taken and adapted from http://en.wikipedia.org and http://www.merriam-webster.com

[31] Information retrieved from the http://www.farmersalmanac.com

[32] Communication via lecture notes

whistle-blower,[33] a non-established word whose coining has been revitalised to describe any person who publicly denounces acts of corruption or dishonesty committed by businesses or government organisations. At first glance, the juxtaposition of the 'whistle' space (W) and the 'blower' space (B) yields a straightforward correlation based on the readily identifiable features of the entities being denoted. A closer look, however, uncovers specific metaphorical mappings guided by the intended reasoning of the original user of the term. In W, the image of the whistle is symbolic for the whistle used by sports match referees. With the image of the referee in mind, the input space structure propagates associations related to our pre-existing knowledge of wrongdoing and misconduct (e.g. foul play). Viewed in isolation, B perspectivises the source of the energy, that is, the person who produces the loud high sound. But once the mappings from the input space are projected into B, the function of 'source' begins to be replaced by that of 'effect': the sound of whistling is not just a sound but one intended to summon and command.

In the blended space, a powerful cognitive structure emerges, a cognitive frame which serves as a metaphor for the act of whistleblowing: a [SPORTS MATCH] frame. In it, we can identify as three major categories [SPORTS MATCH PLAYERS], [SPECTATORS], and a [REFEREE]. [SPORTS MATCH PLAYERS] can be the wrongdoers; the cheering [SPECTATORS] watching the match are made into the general public witnessing dishonest activities; and the role of [REFEREE] is taken over by the responsible citizen denouncing rule violations.

This cognitive frame directs our attention to the prominent figure of the [REFEREE], the metaphorical projection of the whistleblower who is likely to suffer retaliations on the part of those who play or have a stake in the game. Taking our analysis a step further, a fourth category, the [STADIUM], might project itself as international organisations when denouncements go beyond the boundaries of local governments.

A novel formation which is undergoing gradual conventionalisation is *technology crafts*, resulting from the integration of two seemingly dichotomous concepts: *sophistication* versus *rudiment*. To disclose the conceptual processes that motivated the creation of this complex nominal, we need to delve deep into the context of use and the intention of the group of language users[34] that coined the word: put plainly, technology crafts are tools for

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[33] The term *whistle-blower* was coined by US civic activist Ralph Nader in the early 1970s "to avoid the negative connotations found in other words such as 'informers' and 'snitches'." Retrieved from http://en.wikipedia.org

[34] Frugal Digital is a small research group at C.I.D. led by Vinay Venkatraman. In a lecture delivered at Ted in 2012, he explains: "There's the traditional crafts, and then there's the technology crafts. We call it the technology crafts because these are emerging. They're not something that's been established. It's not something that's institutionalized. It's not taught in universities. It's taught [by] word of mouth, and it's an informal education system around this.

'the technologically undeserved.' Anything from an alarm clock, a flashlight or any other gadget that can be re-utilised or "re-purposed" to meet the fundamental needs of technologically deprived communities.

Conceptual mappings in the 'technology' space (T) are highly productive. These entail pre-existing knowledge pertaining to ways of doing things, techniques, knowledge of systems and usage. Directly entwined with T is the [TECHNOLOGY] frame, projecting, as main participants, [USERS] and [OBJECTS] from which merge a vast mental imagery of machinery and equipment, digital devices, and other latest dazzling gadgets. The 'crafts' space (C) shifts our attention to work that requires special skills and knowledge that is passed on through word of mouth. It is also a powerful imagery-laden structure, but, unlike T, the [CRAFT] frame in C projects much more prominently the role of a [DOER], the artisan and creator of unique hand-made crafts.

The blended space marks the intersection of old technology and new technology, putting into perspective the concepts of equity and inclusiveness. Fig. 14 shows a cluster of differing attributes fusing into a single blended space.
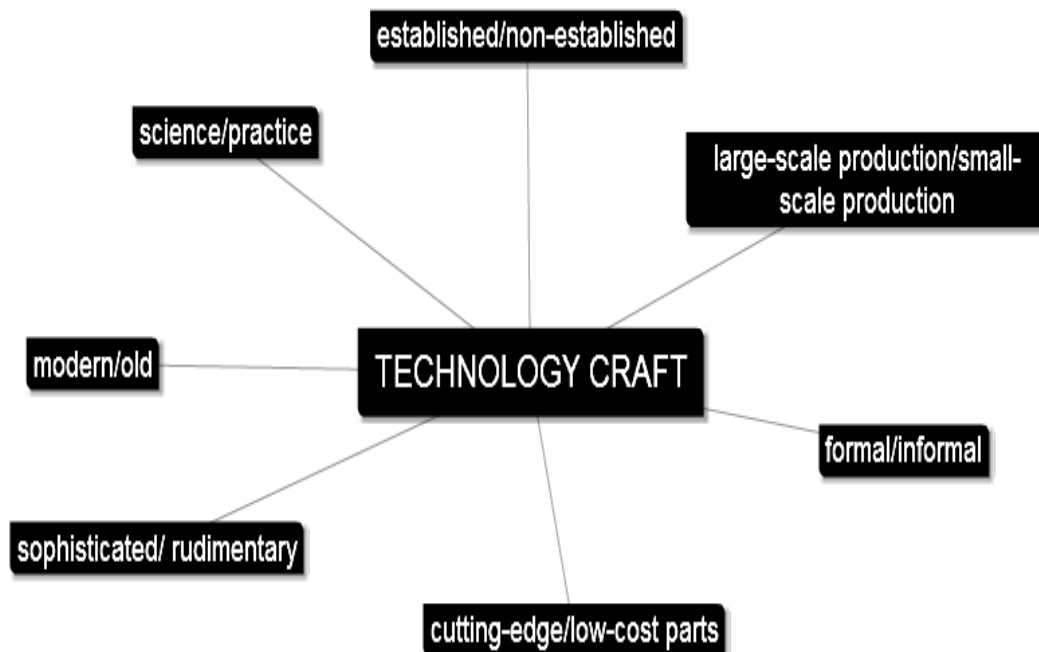
Fig. 14 [TECHNOLOGY CRAFT] frame

Emerging technologies have also prompted for the creation of numerous complex nominals containing the adjective *digital*. Such is the case of words like *digital native, digital*

immigrant,[35] *digital book, digital woods* and *digital world.* The first two tend to co-occur in similar contexts of use. What brings these concepts together is the digital divide: those born before it are referred to as *digital immigrants* whereas those born during or after its arrival are called *digital natives.* From the perspective of three mental spaces, namely, a 'digital' space (D), a 'native' space (N), and an 'immigrant' space (I), we can observe the following: The input space D activates cognitive structures related to ways of processing information, the realm of computers, and Information Technologies; N recruits frame relations which derive from the analogy of technology users as native speakers of a language. The frame has as main frame elements [NATIVE SPEAKER], [LANGUAGE COMMAND], and [BIRTHPLACE]. A somewhat similar cognitive process occurs in I, which construes a whole network of metaphorical mappings based on the analogy of computer users as immigrants. The [IMMIGRATION] frame has, as main participants, [IMMIGRANT] or [ALIEN], [FOREIGN COUNTRY], [CUSTOMS], [FOREIGN ACCENT] and [FEELINGS].

It is only through the conceptual integration of D and N and D and I, respectively, that the concepts *native* and *immigrant* take on their true dimension, thus unfolding the intended reasoning of the original contributor: just like newcomers to a foreign land who need to learn a foreign language and acquaint themselves with the customs of the new culture, so do novice computer users need to trespass the barrier of the digital divide. Some may feel comfortable in the new territory even if their accent[36] gives them away; others, overwhelmed by the newness of it all, may simply decide not to set foot in an unknown territory ever again.

The formation of *shadow economy*, also known as underground economy, brings with it a rich representation of interrelated concepts. Analysed in isolation, the 'shadow' space (S) could be said to have a minimum frame structure with [PLACE] or [AREA],

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[35] Term *digital native* was coined IN 2001 by <u>Marc Prensky</u> in an essay entitled *Digital Natives, Digital Immigrants.* In his discussion of today's students, he writes: "What should we call these "new" students of today? Some refer to them as the N-[for Net]-gen or D-[for digital]-gen. But the most useful designation I have found for them is ***Digital Natives.*** Our students today are all "native speakers" of the digital language of computers, video games and the Internet. So what does that make the rest of us? Those of us who were not born into the digital world but have, at some later point in our lives, become fascinated by and adopted ***Immigrants.***

[36] According to Prensky, 'having an accent' is what truly separates digital natives from digital immigrants. He writes: "As Digital Immigrants learn – like all immigrants, some better than others – to adapt to their environment, they always retain, to some degree, their 'accent,' that is, their foot in the past. The 'digital immigrant accent' can be seen in such things as turning to the Internet for information second rather than first, or in reading the manual for a program rather than assuming that the program itself will teach us to use it. Today"s older folk were 'socialized' differently from their kids, and are now in the process of learning a new language. And a language learned later in life, scientists tell us, goes into a different part of the brain."

[THING] and [POOR ILLUMINATION] as main frame elements. The 'economy' space (E), on the other hand, activates background knowledge regarding the realm of business and finacial affairs with so complex a network of frame relations that it could not be explicitly condensed into a single frame. Among these stand out [MONEY], [PRODUCERS], [DISTRIBUTORS], [CONSUMERS], [COMMERCIAL TRANSFER], [MANAGEMENT], [WORKFORCE], [RESOURCES], [GOODS] and [SERVICES]. Blending of the reality spaces S and E brings out the conceptual force of the complex nominal, which could be best understood as "marketbased production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP" (Schneider and Enste, 2000). With the foregrounding of *shadow*, now a metaphorical extension for concealment, uncertainty, and dishonesty, the implication of money as something hidden in the shadows entwines with the image of malpractices whose 'blurred,' unmeasurable contours often escape the attention of governments: the dark side of service economy (plumbing, car repair, etc), prostitution, and drug dealing, to name a few.

Similar cognitive mechanisms are activated in the formation of *patent cliff*,[37] an economy-related term used to denote the decline experienced by revenues upon expiry of a given product. Mental correspondences become overt with the mapping of a 'cliff' space onto a 'patent' space, whereby the central attributes of the geographical formation ('steep rock of face') are carried over to a hypothetical space, one which invites the analogy of imminent fall ('fall off a cliff'). With products unable to the beat the competition, the [SALES DROP] frame is equated with a [COLLAPSE] frame which internally recruits as sub-frames [ERECT POSITION], [DOWNWARD MOTION], and [CASUALTY].

A term which has recently entered the English financial jargon is *cow-pooling*, formed by analogy with *car-pooling*. Beside the creative manipulation of an existing word, innovation is reflected in the use of vivid imagery to integrate two conceptually diffuse, incongruent spaces: A 'cow' space (C), which projects the actual image of the female bovine, and a 'pool' space (P), which highlights the presence of participants brought together by a common purpose: enhance safety and cost-effectiveness (likewise careful drivers). The superimposition of C onto P provides mental access to a set of systematic correspondences established between product of consumption, consumers, joint purchase, and food safety. All these attributes make up the definition of cow-pooling as it is used today: "the whole phenomenon of consumers organising together to buy meat from organic

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[37] Retrieved from http://www.investopedia.com

farms"[38] or, put plainly, "[t]he practice of two or more parties jointly purchasing all or part of a butchered cow and dividing the meat between them."[39]

Computing has given birth to *multi-touch*, an umbrella term for a digital devices involving touchscreen technology such as mobile phones, surface tablets, interactive books and interactive whiteboards, all of them instances of complex nominalisation. In the assembling of the input spaces, the multiple, versatile properties of the 'multi' base space are assigned to the sensory reality of the 'touch' space. The assembled domain yields a rich conceptual structure. On the one hand, it depicts the immediate features associated to the use of [MULTI TOUCH], namely [GADGET], [USER], [FINGERS] (as indicated by pinching and stretching gestures), [MOTION], and [SPEED]. And, on the other, it activates a hypothetical mental space projecting the strengths of new technology versus the limitations of outdated technology (dials, buttons, keyboards, and the like).

6.1.4. Nouns as instantiations of radial categories

As previously discussed, creative semantic extension is all-pervasive in the formation of radial categories. An idealised instantiation of radiality is fulfilled in *virus*, the malicious, and oftentimes, surreptitious form of malware found in computers. The term is generated as a semantic extension of its biological counterpart and, likewise the novel use of *infection*, its rich frame structure is firmly entrenched in metaphorical and image-schematic mappings. In he light of MST the radial category VIRUS projects two input spaces; a base space containing the central, prototypical concept of the infectious agent in the world of microscopic life (plants, animals and bacteria); a target space, on the other hand, captures the salient features of the biological counterpart in the online world. Background frames help guide the overt resemblances that ultimately radiate from the blended space. The convergent attributes arise from the metonymic association + CAUSE FOR EFFECT+ which lead conceptualisers to substitute virus for disease. All in all, the metonymic and metaphorical links highlight the undesirability of viruses given their destructive capabilities.

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[38] Definition by TEDster John Gerzema (2009)
[39]   Retrieved from http://www.wiktionary.org/
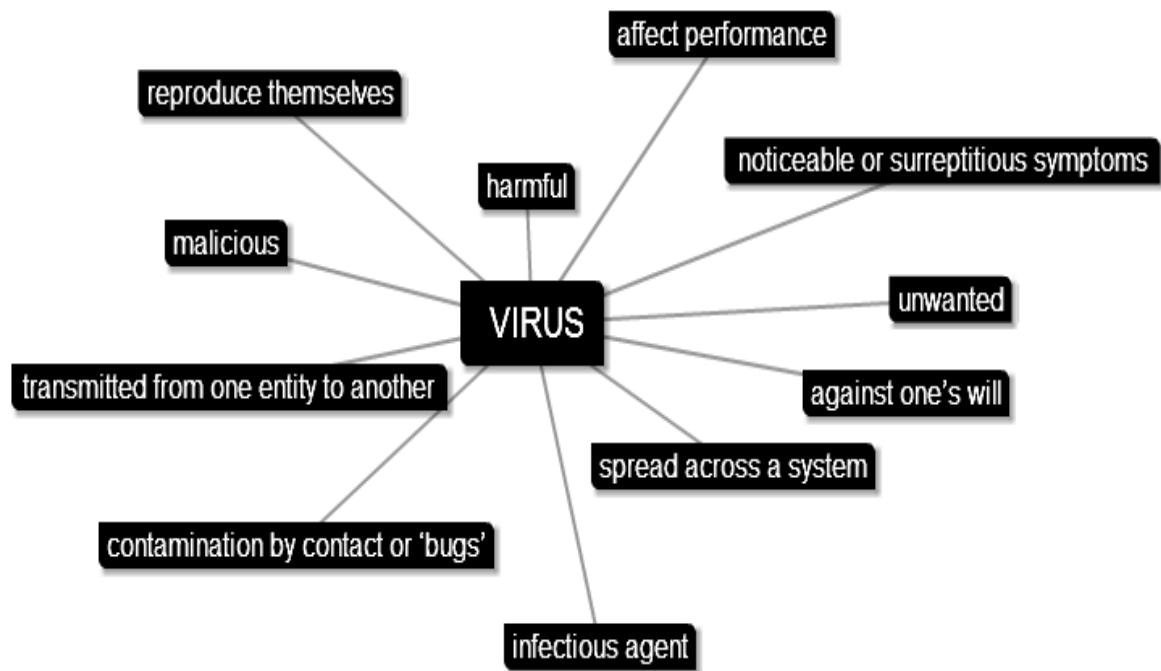
Fig. 14 Set of attributes stemming from the radial concept VIRUS

The spread of viruses from one computer to another may also invite a specific reading; that of venereal diseases transmitted from person to person. From a subjective, evaluative standpoint, the category VIRUS and its radial member are encoded by the negative emotions and state accompanying ailments, including 'vulnerability,' 'fear of destruction,' and 'depression.'

Another exemplar of semantic extension is the radial concept *mouse*, the hand-controlled pointing device which is still found on many computers. This radial category could be referred to as a deviant member of the central prototype; first, in that the 'rejection' attribute has been superseded by 'likeness' and, second, in that the degree of closeness to its rodent counterpart is solely based on a physical resemblance. The salient attributes involve 'shape,' 'size,' and 'motion.' The image metaphor is thus guided by the concrete properties emerging from the 'mouse' space, a different substance yet a similar appearance.

Metaphorical mappings also guide the formation of *site*, an information platform on the World Wide Web. The radial category is generated from the locative attributes of the central concept. In other words, analogy rests on the cognitive representation of a [PLACE] frame, which is projected from a source space into a target space in two distinct dimensions: a physical setting and a virtual setting. Conceptual links are, therefore, less straightforward

and are activated through the juxtaposition of the attributes 'static' versus 'mobile'and 'tangible' versus 'abstract.' Resemblances are mainly represented by the features 'place occupied by people' and ' a setting where events take place.'

Likewise, the meaning of *browser* has acquired a relatively similar sense. The central origin of the word in relation to a person who randomly looks through books or other documents has been equated with the role of a computer programme which lets you "traverse" or "navigate through" information resources on the Internet. Commonalities arise from the frame elements [INQUIRER], [SEARCH], and [MEDIUM] whereas variations result from the metonymic replacement of person for thing.

A word which has equally departed from its original sense is *avatar*. In the context of digital technology, 'the incarnation of a god' attribute has been replaced by that of a graphical representation of a computer user. Clearly, the properties that tie the central category to the new radial member derive from the essential attributes 'embodiment,' 'personification,' and 'image.' Resemblance is structured by the activation of two mental spaces; a base space grounded in a fictive reality (the manifestation of deities or imaginary entities) and a target space projected in an online virtual reality.

The novel use of *application* slightly captures the core meaning of its basic or central concept, i.e. 'the act of putting to use.' Under its new definition, the radial concept has incorporated the pseudo-physical properties of computer software intended to provide users with specific solutions to real-life problems. This being said, the missing or deviant attributes include 'substance' (a thing, not an action), 'purpose' (problem-solving) and 'functionality' (enterprise software, accounting software, graphics software, etc.).

Geek has taken on an extensive radial network, from a'foolish, inept, clumsy person' to a successful, affluent computer expert or enthusiast likely to have been teased at school. The radial concept shares little or no resemblance with its prototypical counterpart. Instead, it activates a network of conceptual mappings based on the psychological perception of language users. Knowledge assumptions entwine with a set of deviant attributes, namely 'poor social skills,' 'intellectual bent,' 'fascination with computer technology,' 'success,'and 'affluence.' prostitution, and drug dealing, to name a few.

Aura is a novel radial category undergoing conventionalisation. The term[40] applies to

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[40] The new sense of *aura* is motivated by the intentions of a specific group of Cambridge experts. Scarcely included in the consulted dictionaries.

A newly introduced technological tool which enables mobile users to augment reality by transforming digital content into something physical and audible (e.g. by making a painting talk or a still, printed newspaper photo come to life). Though difficult to pinpoint, the marginal resemblance between *aura* and its central category arises from direct links to core meaning: a subtle emanation surrounding a person, thing, or place. Correspondences, however, are processed differently on the basis on two distinct frames: an [UNSEEN] frame and a [SEEN] frame. The former is evocative of the invisible, mysterious, and elusive nature of phenomena which is beyond the grasp of human reason; the latter opens up a window to that hidden world by making the unseen seen, thus broadening the boundaries of visual perception and inference. All of this thanks to the emerging capabilities of digital technology.

A radial category which has enjoyed widespread popularity over the last five years is *gesture* as applied to the use of finger movements to control multi-touch interfaces. The term captures the basic attribute of the central category, i.e. the 'visible bodily action to communicate a specific message.' Variations upon the core meaning result from two major deviant attributes: first, rather than doing gestures 'in the air,' the novel sense evokes the touching of a real instrument (in this case a surface); and, secondly, this form of non-verbal communication serves a functional purpose in that, unlike commonly used bodily movements, it is devoid of emotion or feelings.

A new radial member recently introduced to modern English usage is *cloud*, a computing term for a software service enabling Internet users to access 'a shared pool of resources' (data storage, servers, applications, and the like). The salient attribute of the CLOUD category is that of functionality. The metaphor at work lies in the analogy OBJECTS ARE CONTAINERS; just like clouds serve as receptacles of rain water so do software archives act as receptacles of information. Another attribute apart from function is 'infrastructure.' In fact, in its actual usage CLOUD is a metaphor for the Internet based on the perceived similarities between the internal structure of clouds (a collection of millions of water droplets) and the web's intricate computer networks (a collection of interwoven resources).[41] A less salient or overt resemblance emanates from 'movable object,' a property which can be attributed to water particles in motion and the 'interconnected motions' of Internet resources.

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[41]   The cloud-like shape has become the standarised abstraction for the Internet since the mid 1990s.

A word which significantly exploits a wide range of links to its radial category is *menu*. The central category MENU captures the metaphorical links between the restaurant menu and the computer menu. Undoubtedly, the most transparent similarity between the core meaning and the radial counterpart rests on the attribute 'list of options;' the former as a presentation of food and beverages and the latter as a list of commands displayed on a screen; another direct analogy is generated by the property 'pre-established sequence' which characterises the schematic arrangement of information; while a 'list of options.' By way of illustration, the MENU metaphor can be conceptually exploited through the [RESTAURANT] script developed by Schank and Abelson in 1977 (Ungerer and Schmid 1996). From this standpoint, the script generates a cluster of correlations concerning props and roles. Tables are computers, customers are computer users, waiters become the servers (the operating system), the menu is the on-screen list of options and the dishes served or available at a meal, the information available for use.

The distinct stages of the script, mainly entering, ordering, eating, and exiting, can be elegantly overlapped onto the computer menu in a perfect sequential sequence.

Restaurant menu script	Computer menu script
Enter the restaurant ↓ Be seated at a table ↓ Order from a menu ↓ Eat food ↓ Pay the bill ↓ Leave the restaurant	Enter the computer system ↓ Navigate through the menu tree ↓ Select an alternative ↓ Use the function selected ↓ Save or delete file ↓ Exit the computer system

Table 3 Radiality instantiated through the stereotypical restaurant menu and computer menu scripts (adapted from Norman and Chin 1987)

A feature which remains backgrounded is the static nature of restaurant listings in comparison the dynamic, mobile properties of graphical user interface.

7.0. QUANTITATIVE RESULTS

The actual data was collected from 62 lectures over a two-month period. Word search yielded a total of 97 constructions. Upon consultation of (corpus) dictionaries, this number was reduced to 92 in accordance with the selection criteria proposed by the present study (i.e. instantiations whose date of coining is not prior to 1960).

For analytical purposes, qualitative description of data was conducted on the basis of a four-fold morphological categorisation of the linguistic corpus: portmanteau (23), closed compound nouns (15), complex nominals (22), and nouns (21). A fifth category, not included in the analysis, consisted of a set of novel constructions (11) whose morphological properties did not correspond to any of the categories herein described. The table below presents an overview of the hand-collected data. Words not regarded as novel creations are indicated by asterisks.

Pormanteau	Closed compound nouns	Complex nominals	Nouns	Other
Amerasian	desktop	cardio glider	actuator	clickiness
biomarker	Facebook	cow-pooling	application	dot com
biomaterial	firmware	crack cocaine	aura	library of knowledge
blog	inbox	digital book	avatar	Mc Mafia
Chinanet	interface	digital immigrant	badge	mobile
crowdsourcing	Internet	digital native	bit	movers and shakers*
cybercrime	laptop	digital technologies	browser	pop-up menus
cybercriminal	screensaver	digital woods	canvas	recycle bin
cyborg	scrollbars	digital world	cloud	sexting
digerati	snollygoster*	global village	configuration	smarts
email	steampunk	interactive animation	folder	texting
emoticons	supercell	interactive book	gamer	tracker
freakonomics	touchscreen	interactive whiteboard	geek	
humanoid*	webpage	life hack	gestures	
infographic	website	multi-touch	infection	
iPhone	upgrade	multimedia platform	Kiosk	
iTune		patent cliff	menu	
iPod		shadow economy	mouse	
momversation		social network	site	
quadcopter*		surface tablet	tag	
robopocalypse		technology craft	virus	
smartphone		whistle-blower		
technocrats*				
TEDster				
webcam				
workafrolic				

*not applicable

As suggested by the corpus data, portmanteau words account for the most productive cognitive-semantic process of word formation (25%), followed closely by complex nominals (24%) and nouns (22.8%) as instantiations of radial categories; closed compound nouns occupy the last position (16.3%).

Descriptive analysis of the cognitive mechanisms of conceptual projection in operation, namely, mental spaces (MS), frame knowledge (F) and radiality (R), was conducted on a representative sample of the collected data. Categories displaying similar morphological features and cognitive-semantic processes were marginally analysed. In response to our major research question, i.e. to establish the frequency of occurrence of the cognitive mechanisms at work, it can be concluded that, out of a total of 45 constructions, MS, F, and R are intrinsically embedded within the conceptual structure of all of the categories examined. Table 4 condenses the results herein discussed.

	P	CCN	CN	N	Total
	12 (+5 c/a*)	6	8 (+3 c/a)	11 (+1 c/a)	**46**
MS	✓	✓	✓	✓	✓
F	✓	✓	✓	✓	✓
R	✓	✓	✓	✓	✓
Total	**17**	**6**	**11**	**12**	**46**

* cohesively analysed

Table 4. Quantitative display of MS, F, and R

Lectures yielded an average of 3 novel formations and in some instances, none (as in the case of 22 lectures). Although stemming indirectly from the motivations of this study, lexical and lexico-syntactic innovations are predominantly displayed in the context of technology (specialist and non-specialist terms); in this respect, the most fruitful occurrences emerge in mobile and computing terminology with a total of 79 out of 92 novel constructions.

For a representative sample of lexical and lexico-syntactic innovations analysed in the present study, see spreadsheet attached in Appendix. It is a simple and straightforward overview of the cognitive mechanisms in operation on a par with relevant data pertaining to meaning, date of origin, topic, and context of usage.

8.0. DISCUSSION

The present study has highlighted the role of mechanisms of cognitive projection in the construction of novel creations (lexical and lexico-syntactic categories). The findings yielded by our analysis are conclusive: MS, F, and R account for the internal conceptual structure of the total number of instantiations examined. Arriving at this conclusion was, however, not a simple enterprise.

In the initial phase of the study, the extensive compilation process, despite being generally productive, proved at times to be unfruitful with lectures rendering few or no occurrences. Upon embarking on the second phase, qualitative analysis posed a major challenge. This mainly concerned the perspective from which to analyse the results and how to possibly integrate the two databases, i.e. the cognitive mechanisms in operation in relation to the selected corpus. After a careful examination of the sample at hand, it became sensible to simplify analysis through the categorisation of the novel formations based on the commonalities arising from their composite structure. Morphologically speaking, categories were divided into portmanteau, closed nouns, complex nominals, and nouns. A fifth and last category not included within the analysis consisted of a set words whose linguistic configuration did not fit the nomenclature at hand. In this manner, the assortment of the data from a purely linguistic basis would be the launching platform for the cognitive analysis herewith undertaken. Once the temporary obstacle was overcome, it was possible to undertake the analysis of MS, F, and R from the perspective of each category.

During this stage, another challenge was to provide an objective treatment of the meaning construction process surrounding the creation of novel formations. However, breaking down the composite structure of the mental lexicon was not sufficient to unfold the 'backstage' of cognitive operations at work; it was also necessary to access the line of reasoning of those who coined the terms or, at least, to access enough information available to draw correct inferences when facts relative to context of use were unavailable. Thus the analysis of MS, F, and R was conducted by means of three main, oftentimes overlapping strategies: by resorting to lexical references which provided the denotation of the words in use; by accessing encyclopedic references which offered insightful information about the creation of linguistic forms in their original context of usage; and by using personal, common-sense judgements supplied by the author of the present study.

The first strategy, the dictionary approach, although in many ways represents the anti-ideal of the cognitive view, proved highly useful in the structuring of mental spaces,

frames and radial categories by proving hints that could guide the selection of entities projected within them as well as the identification of attributes and salient features. At times, however, corroboration of meaning came to a halt upon discovery that the novel formations consulted had not yet been included as lexical entries. In that case, it was necessary to enlarge the scope of lexical references or resort to the use of the third strategy. The second strategy was helpful in providing a direct route of access to 'the window of the mind' of those held accountable for the creation of novel forms; information concerning the specific intentions, motivations, and experience of language users together with knowledge relative to the social and cultural context of creation contributed to build a better understanding of the cognitive moves underlying these forms. In the technical and analytical interpretation of data, the bulk of facts gathered made possible to replicate, to the best of its ability, the plausible mental operations and conceptual paths followed by conceptualisers. Combined with a fair amount of subjectivity, the third strategy involved the interpretation of the conceptual structure embedded within linguistic form by means of inferences drawn within the bounds of common sense and logic. In this manner, simulation of the cognitive moves —as arbitrary as it may seem— was both a matter of deconstruction and reconstruction; mainly in that by breaking down the conceptual structure into discreet components it was possible to recreate, as accurately as possible, the motivations and conceptual interrelations drawn by language users during the process of meaning construction. Interestingly, the degree of cognitive effort employed in the 'undoing' or 'unwrapping' of internal conceptual structure accounts for the cognitive contention that creativity is a dual endeavour, operating equally at the level of production of new words and interpretation of such creative acts.

Upon completion of analysis, MS, F, and R were found to be interwoven in a whole range of context-bound instantiations grounded in the background knowledge, sociocultural experience and subjective perception of language users. Some of these instantiations could be described as purely novel formations whose "on-line" construction as specified led to conventionalised usage. In other cases the reverse applied, i.e. conventionalisation preceded creation. Some linguistic forms, on the other hand, were semi-conventionalised in that a part of their construction relied on pre-stored knowledge encapsulated in fixed expressions. In all such cases the transferring of collective and individual experience embedded within conceptual structure could be said to follow a predictable pattern: from a single language user to many language users and from many to one.

Radiality represented the ultimate stage of language transformation whereby fixed, pre-fabricated lexical and lexico-syntactic forms became subject to further conventionalisation. Such was the case of words whose original conceptual structure did not correlate actual usage. Their core meaning remained somehow dormant until it was finally revived (in some cases, after many years) by new conceptual domains activated within the word-internal structure (e.g. cyborg). In turn, extended senses were applicable not only to radial categories in relation to new contexts of use but also to the composite structure of the blended constructions analysed. Under blending, the spaces evoked by word components took on fresher, richer and more dynamic meanings (e.g. *digital native*, *digital immigrant*).

At most levels of conceptualisation, MS, F, and R were found to interplay with a wide range of interrelated, frequently overlapping cognitive mechanisms. Among these stand out prominent themes of cognitive linguistics such as abstraction, schematisation, perspective, foregrounding, backgrounding, salience, attention, categorisation, mapping, and, in the domain of figurative thought, metaphor and metonymy. As demonstrated in the analysis of linguistic instantiations, all these mechanisms alongside MS, F, and R reflected patterns of conceptualisation, i.e. the systematicity and organisation of thought in the structuring of concepts and ideas. Operations of cognitive processing became overt during the stage of decoding linguistic structure which unfolded a highly structured yet complex conceptual system. Moreover, construction proved not only to be guided by function but also reflect the strong attachment of human cognition to three external factors: knowledge (expert, encyclopaedic), experience (subjective, sociocultural, sensory-motor), and context (situated, real-world, fictive). Through questions like *when*, *why*, *who*, *how*, and *what*, data analysis sought to bring out this attachment as embedded within or prompted for by the underlying conceptual system of linguistic structure.

The prolific emergence of newly-created formations and the extension of pre-existing words to new environments in a specific area of knowledge such as technology is a theme that, given the concern of this study, will remain open for future investigation. Results, however, are clearly indicative of the overt correlation between language transformation and technologically-driven changes; the lexical and lexico-syntactic innovations analysed enabled language users to fill a void in communication by encapsulating in these new concepts, perspectives, and ideas.

Similarly, the case of derivational innovation (e.g. *clickiness, tracker, texting, sexting, Mc Mafia*) not included within the scope of the present study is a theme that

requires further analysis, especially with regards to the cognitive operations employed in creative word-formation. A feasible line of research would be the study of productivity and the counter-productive effect of overly exploited morphological patterns on creativity also known as overextension.

All in all, accounting for the cognitive moves of creativity in spoken discourse, both in terms of production and interpretation, is an intricate process. As this study has shown, lexical and lexico-syntactic innovations are not static forms. Beyond their linguistic make-up lies an array of conceptual mappings and correlations shaped by contextual factors, the state of affairs in the world, the realm of emotion, and the sensory-motor perception of language users.

9.0. CONCLUDING THOUGHTS

We are endowed with the ability to produce, combine, and extend meaning. Creativity is, in fact, a pervasive property of language; it is not solely restricted to the construction of clauses and sentences but it is also embedded within the vocabulary that we use everyday. The insights from cognitive linguistics have demonstrated that hidden behind the structure of these seemingly rigid forms lies a complex system of conceptual, perceptual, and experiential associations accounting for the formation of linguistic forms and their semantic extension.

As demonstrated in the results rendered by data analysis, our conceptualisation of the world is not devoid of human experience. This view has profound implications in foreign language instruction in that it calls for a re-examination of the current teaching practices. The prevailing approach to English vocabulary teaching in FL/SL classroom settings has been that of lexemes and lexico-syntactic constructions as mere 'containers' for definitions. Vocabulary, in its cognitive dimension, tends to play a secondary role, always in the shadow of an apparently more important task. Commonly practiced activities include, for example, word-formation exercises, matching tasks, multiple-choice exercises and subordinate text glossaries intended to aid reading comprehension. What all such practices have in common is that they background the conceptual, creative value of words.

A sensible approach to the treatment of lexical and lexico-syntactic forms would be the development of a methodology that exploits the intrinsic attachment between linguistic structure and cognitive structure. Its main goal would be to foreground the rich interrelated

conceptual associations that under the traditional perspective would otherwise lie dormant. A general procedure would consist of engaging students' attention in the interpretation of the underlying conceptual make-up of linguistic forms and their implicit links with the background knowledge, sensory-motor perception, and context. As done in the cognitive fashion, plausible tasks could include (a) analysis of linguistic forms in terms of underlying relations of prominence, attention and perspective, (b) descriptions of intrinsic event-frames, and (c) elaboration of mind and concept maps, among others. Such methodologies could have far-implications in the teaching of idiomatic, fixed expressions such as metonymic constructions and conventionalised metaphors in that, rather than applying a mere mnemonic retention, they would exploit their hidden conceptual richness.

The design of teaching material adequate for the fulfilment of this goal is of foremost importance. In many ways it would be true to say that the process of interpretation is as challenging as the process of creation. Therefore, textbook writers and educators as a whole should contemplate (in case they have not done so) a more dynamic, playful, and thought-provoking approach to vocabulary instruction, one that would concentrate on the inferential mechanisms of meaning construction.

By the same token, educators should redefine the use of the lexical resources commonly employed inside and outside the classroom setting. Beside the denotational view of meaning, students should be made to apprehend the conceptual structure encoded in words from an experientialist perspective. Online encyclopaedias elaborated by crowdsourcers (another term for today's information gatherers) may prove helpful in providing definitions that orchestrate the experience of its many different contributors, people of all ages, walks of life, and cultural background. Additionally, unlike traditional dictionaries or encyclopaedias, they comprise ongoing, updated content that redefines itself on a daily basis or at the pace of changing times—a fact that accounts for the dynamic, evolving nature of meaning.

In today's modern world, democratisation of information, symbolised by the Internet, has made it possible to access data that probably twenty or ten years ago would have been unlikely to retrieve from traditional printed sources. Information technology has bridged that gap by making available worldwide vast amounts of contents in all knowledge domains. What are the implications of this evidence for a cognitive view of language teaching? If properly chosen, websites can become valuable sources of information serving a two-fold purpose: they may be used to widen students' encyclopaedic knowledge and, at

the same time, build up fresh, 'living,' emerging vocabulary grounded in the experience of conceptualisers around the globe.

The question above can be also answered with a simple yet illustrative metaphor. Online sources of information should be seen as goldfields. An exemplar of this is TED, the global platform of conferences from which the data sample used in the present study was retrieved. TED is the goldfield; words are the ore; the researcher in search for the precious metal, the miner. Without the goldfield, the miner, and the ore, none of the insights rendered by this endeavour would have been possible. The invitation is clear: those interested in a cognitive view of language should make the most of online resources by tailoring them to the needs of foreign and native language instruction in a way that brings together language, the world, and the human mind.

An aspect of crucial importance, which for reasons of time constraint will remain an open question, is to test in what ways focus on process rather than product can ease vocabulary retention. In other words, what are the long-term implications drawing students' attention to the underlying cognitive mechanisms accounting for word formation rather than to form alone. I would venture to say that focus on process would open up new perspectives to address vocabulary more successfully, especially in an era when meaning cannot escape the ubiquitous influence of time and context.

In view of this, teachers should start rethinking their classroom practices by putting the study of lexis and lexico-syntactic constructions on a cognitive basis. The rigid linguistic view of vocabulary can only be reversed as long as we start thinking of 'learning at the expense of vocabulary,' not of 'vocabulary at the expense of learning.'

I owe a special debt of gratitude to the theoretical proposals of cognitive linguistics for having granted words the status they deserve.

APPENDIX

Tedtalks	Date	
1. **Anthony Atala: Printing a human kidney**	**Mar**	**2011**
2. **Amy Cuddy: Your body language shapes who you are**	**Jun**	**2012**
3. **Baba Shiv: Sometimes it's good to give up the driver's seat**	**May**	**2012**
4. **Brené Brown: The power of vulnerability**	**Jun**	**2010**
5. **Bunker Roy: Learning from a barefoot movement**	**Jul**	**2011**
6. **Caitria and Morgan O'Neill: How to step up in the face of disaster**	**Jun**	**2012**
7. **Dan Gilbert: The surprising science of happiness**	**Feb**	**2004**
8. **Daphne Koller: What we're learning from online education**	**Jun**	**2012**
9. **David Gallo: Underwater astonishments**	**Mar**	**2007**
10. **David Pogue: Simplicity sells**	**Feb**	**2006**
11. **Dean Kamen previews a new prosthetic arm**	**Mar**	**2007**
12. **Diane Kelly: What we didn't know about penis anatomy**	**Apr**	**2012**
13. **Don Tapscott: Four principles for the open world**	**Jun**	**2012**
14. **Erin McKean: The joy of lexicography**	**Mar**	**2007**
15. **Gary Kovacs: Tracking the trackers**	**Feb**	**2012**
16. **Giles Duley: When a reporter becomes the story**	**Mar**	**2012**
17. **Golan Levin makes art that looks back at you**	**Feb**	**2009**
18. **Ivan Krastev: Can democracy exist without trust?**	**Jun**	**2012**
19. **Jane McGonigal: The game that can give you 10 extra years of life**	**Jun**	**2012**
20. **James Geary, metaphorically speaking**	**Jul**	**2009**
21. **Jamie Drummond: Let's crowdsource the world's goals**	**Jun**	**2012**
22. **Jamie Oliver's TED Prize wish: Teach every child about food**	**Feb**	**2010**
23. **Jeff Han demos his breakthrough touchscreen**	**Feb**	**2006**
24. **Jill Bolte Taylor's stroke of insight**	**Feb**	**2008**
25. **John Gerzema: The post-crisis consumer**	**Aug**	**2009**
26. **John Maeda: Designing for simplicity**	**Mar**	**2007**
27. **Jonathan Harris: the Web's secret stories**	**Mar**	**2007**
28. **Jon Ronson: Strange answers to the psychopath test**	**Mar**	**2012**
29. **Juan Enriquez: Will our kids be a different species?**	**Apr**	**2012**
30. **Kirby Ferguson: Embrace the remix**	**Jun**	**2012**
31. **Larry Lessig: Laws that choke creativity**	**Mar**	**2007**
32. **Laura Carstensen: Older people are happier**	**Dec**	**2011**
33. **Marc Goodman: A vision of crimes in the future**	**Jun**	**2012**
34. **Marco Tempest: The magic of truth and lies (and iPods)**	**Jul**	**2011**
35. **Margaret Gould Stewart: How YouTube thinks about copyright**	**Feb**	**2010**
36. **Margaret Heffernan: Dare to disagree**	**Jun**	**2012**
37. **Mark Applebaum: The mad scientist of music**	**May**	**2012**
38. **Mark Forsyth: What's a snollygoster? A short lesson in political speak**	**Jun**	**2012**
39. **Matt Mills: Image recognition that triggers augmented reality**	**Jun**	**2012**
40. **Max Little: A test for Parkinson's with a phone call**	**Jun**	**2012**
41. **Michael Anti: Behind the Great Firewall of China**	**Jun**	**2012**
42. **Mike Matas: A next-generation digital book**	**Mar**	**2011**
43. **Misha Glenny investigates global crime networks**	**Jul**	**2009**
44. **Nancy Lublin: Texting that saves lives**	**Apr**	**2012**
45. **Neil Harbisson: I listen to color**	**Jun**	**2012**
46. **Nicholas Negroponte on One Laptop per Child, two years on**	**Dec**	**2007**
47. **Ostrow Adam: After your final status update**	**Jul**	**2011**
48. **Pattie Maes and Pranav Mistry demo SixthSense**	**Feb**	**2009**
49. **Pranav Mistry: The thrilling potential of SixthSense technology**	**Nov**	**2009**
50. **Ramesh Raskar: Imaging at a trillion frames per second**	**Jun**	**2012**
51. **Reggie Watts disorients you in the most entertaining way**	**Feb**	**2012**
52. **Ric Elias: 3 things I learned while my plane crashed**	**Mar**	**2011**
53. **Richard Dawkins: Militant atheism**	**Feb**	**2002**
54. **Richard St. John: 8 secrets of success**	**Feb**	**2005**
55. **Rick Smolan tells the story of a girl**	**Dec**	**2007**
56. **Robert Neuwirth: The power of the informal economy**	**Jun**	**2012**
57. **Scilla Elworthy: Fighting with non-violence**	**Apr**	**2012**
58. **Simon Sinek: How great leaders inspire action**	**Sep**	**2009**
59. **Stephen Ritz: A teacher growing green in the South Bronx**	**Feb**	**2012**
60. **Steven Levitt: The freakonomics of McDonalds vs. drugs**	**Feb**	**2004**
61. **Timothy Prestero: Design for people, not awards**	**Jun**	**2012**
62. **Vinay Venkatraman: "Technology crafts" for the digitally underserved**	**Apr**	**2012**

AUDIO TRANSCRIPTS: LEXICAL AND LEXICO-SYNTACTIC CONSTRUCTIONS IN CONTEXT

The following excerpts provide the context of usage for the collected corpora. Reference to source is indicated within parentheses (See list of lectures above).

ACTUATOR (Lecture 11) *So, you won't see all the really cool stuff that's in this series elastic set of 14* **actuators**, *each one which has its own capability to sense temperature and pressure. It also has a pneumatic cuff that holds it on, so the more they put themselves under load, the more it attaches. They take the load off, and it becomes, again, compliant. I'm going to show you a guy doing a couple of simple things with this that we demonstrated in Washington. Can we look at this thing?*

AMERASIAN (L. 55) *I used to be a photographer for many years. In 1978, I was working for Time magazine, and I was given a three-day assignment to photograph* **Amerasian** *children, children who had been fathered by American GIs all over Southeast Asia, and then abandoned -- 40,000 children all over Asia. I had never heard the word Amerasian before. I spent a few days photographing children in different countries, and like a lot of photographers and a lot of journalists, I always hope that when my pictures were published, they might actually have an effect on a situation, instead of just documenting it.*

APPLICATION (L. 34) *So the type of magic I like, and I'm a magician, is a magic that uses technology to create illusions. So I would like to show you something I've been working on. It's an* **application** *that I think will be useful for artists -- multimedia artists in particular. It synchronizes videos across multiple screens of mobile devices. And I borrowed these three iPods from people here in the audience to show you what I mean. And I'm going to use them to tell you a little bit about my favorite subject: deception.*

AURA (L. 39) *M: And that linking of the digital content to something that's physical is what we call an* **aura**, *and I'll be using that term a little bit as we go through the talk.*

AVATAR (L. 19) *I wish I'd had the courage to express my true self. Well,* **avatars** *are a way to express our true selves, our most heroic, idealized version of who we might become. You can see that in this alter ego portrait by Robbie Cooper of a gamer with his* **avatar**. *And Stanford University has been doing research for five years now to document how playing a game with an idealized* **avatar** *changes how we think and act in real life, making us more courageous, more ambitious, more committed to our goals.*

BADGE (L. 39) *Okay. Now we're going to switch back into the Aurasma application, and what Tamara's going to do is tag that video that we just took onto my* **badge**, *so that I can remember it forever.*

BIOMARKER (L. 40) *But frustratingly, with Parkinson's disease and other movement disorders, there are no* **biomarkers**, *so there's no simple blood test that you can do, and the best that we have is like this 20-minute neurologist test. You have to go to the clinic to do it. It's very, very costly, and that means that, outside the clinical trials, it's just never done. It's never done.*

BIOMATERIAL (L. 1) *So we can actually use biomaterials now. This is actually a* **biomaterial**. *We can weave them, knit them, or we can make them like you see here. This is actually like a cotton candy machine. You saw the spray going in. That was like the fibers of the cotton candy creating this structure, this tubularized structure, which is a biomaterial that we can then use to help your body regenerate using your very own cells to do so. And that's exactly what we did here.*

BIT (L.13) *So I've started working with a few hundred kids, and I came to the conclusion that this is the first generation to come of age in the digital age, to be bathed in* **bits**. *I call them the Net Generation. I said, these kids are different. They have no fear of technology, because it's not there. It's like the air. It's sort of like, I have no fear of a refrigerator.*

BLOG (L. 27) *"I feel confused and unsure of what the hell I want to do." "I feel gypped out of something awesome here." "I feel so free; I feel so good." "I feel like I'm in this fog of depression that I can't get out of." And you can click any of these to go out and visit the* **blog** *from which it was collected. And in that way, you can connect with the authors of these statements if you feel some degree of empathy."*

BROWSER (L. 15) *So let me expose this lurking industry a little bit further. The visualization you see forming behind me is called Collusion and it's an experimental browser add-on that you can install in your Firefox **browser** that helps you see where your Web data is going and who's tracking you.*

CANVAS (L. 23) *I'll show you something -- a little more of a concrete example here, as this thing loads. This is a photographer's light box application. Again, I can use both of my hands to interact and move photos around. But what's even cooler is that if I have two fingers, I can actually grab a photo and then stretch it out like that really easily. I can pan, zoom and rotate it effortlessly. I can do that grossly with both of my hands, or I can do it just with two fingers on each of my hands together. If I grab the **canvas**, I can kind of do the same thing -- stretch it out. I can do it simultaneously, where I'm holding this down, and gripping on another one, stretching this out like this.*

CARDIO GLIDER (L. 24) *So I got up and I jumped onto my **cardio glider**, which is a full-body, full-exercise machine. And I'm jamming away on this thing, and I'm realizing that my hands look like primitive claws grasping onto the bar.*

CELL PHONE (L. 48) *Or when you go to the supermarket and you're standing there in that huge aisle of different types of toilet papers, you don't take out your **cell phone**, and open a browser, and go to a website to try to decide which of these different toilet papers is the most ecologically responsible purchase to make.*

CHINANET (L. 41) *So, basically the "Internet" has two Internets. One is the Internet, the other is the **Chinanet**. But if you think the Chinanet is something like a deadland, wasteland, I think it's wrong. But we also use a very simple metaphor, the cat and the mouse game, to describe in the past 15 years the continuing fight between Chinese censorship, government censorship, the cat, and the Chinese Internet users. That means us, the mouse. But sometimes this kind of a metaphor is too simple.*

CLICKINESS (L. 14) *So, look at that. Online dictionaries right now are paper thrown up on a screen. This is flat. Look how many links there are in the actual entry: two! Right? Those little buttons, I had them all expanded except for the date chart. So there's not very much going on here. There's not a lot of **clickiness**. And in fact, online dictionaries replicate almost all the problems of print, except for searchability. And when you improve searchability, you actually take away the one advantage of print, which is serendipity. Serendipity is when you find things you weren't looking for, because finding what you are looking for is so damned difficult.*

CLOUD (L.47) *Consider a few stats for a moment. Right now there are 48 hours of video being uploaded to YouTube every single minute. There are 200 million Tweets being posted every day. And the average Facebook user is creating 90 pieces of content each month. So when you think about your parents or your grandparents, at best they may have created some photos or home videos, or a diary that lives in a box somewhere. But today we're all creating this incredibly rich digital archive that's going to live in the **cloud** indefinitely, years after we're gone. And I think that's going to create some incredibly intriguing opportunities for technologists.*

CONFIGURATION (L. 62) *But what fuels this? It's this entire ecosystem of low-cost parts and supplies that are produced all over the world, literally, and then redistributed to basically service this industry, and you can even buy salvaged parts. Basically, you don't have to necessarily buy brand new things. You have condemned computers that are stripped apart, and you can buy salvaged components and things that you can reassemble in a new **configuration**.*

COW-POOLING (L.25) *Then we also look at the idea of **cow-pooling**, which is the whole phenomenon of consumers organizing together to buy meat from organic farms that they know is safe and controlled in the way that they want it to be controlled.*

CRACK COCAINE (L. 60) *So let me start by talking about crack cocaine, and how it transformed the gang. And to do that, you have to actually go back to a time before crack cocaine, in the early '80s, and look at it from the perspective of a gang leader. So being a gang leader in the inner city wasn't such a bad deal in the mid-'80s. In the early '80s, some would say.*

CROWDSOURCING (L.21) *So, if you're with me, I'd say there's three essential steps in this **crowdsourcing** campaign: collecting, connecting and committing.*

CYBERCRIME (L. 43) *What they've done is they've shifted their operations. People don't smoke as much dope, or visit prostitutes quite so frequently during a recession. And so instead, they have invaded financial and corporate crime in a big way, but above all, two sectors, and that is counterfeit goods and **cybercrime**. And it's been terribly successful. I would like to introduce you to Mr. Pringle. Or perhaps I should say, more accurately, Señor Pringle.*

CYBERCRIMINAL (L. 43) *I was introduced to this bit of kit by a Brazilian **cybercriminal**. We sat in a car on the Avenue Paulista in São Paulo, together. Hooked it up to my laptop, and within about five minutes he had penetrated the computer security system of a major Brazilian bank. It's really not that difficult. And it's actually much easier because the fascinating thing about cybercrime is that it's not so much the technology.*

CYBORG (L.45) *That's why, two years ago, I created the Cyborg Foundation, which is a foundation that tries to help people become a **cyborg**, tries to encourage people to extend their senses by using technology as part of the body.*

DESKTOP (L. 17) *A lot of my work is about trying to get away from this. This a photograph of the **desktop** of a student of mine. And when I say desktop, I don't just mean the actual desk where his mouse has worn away the surface of the desk. If you look carefully, you can even see a hint of the Apple menu, up here in the upper left, where the virtual world has literally punched through to the physical.*

DIGERATI (L. 17) *And I was looking around and I found this wonderful picture. It's a letter from "Artforum" in 1967 saying "We can't imagine ever doing a special issue on electronics or computers in art." And they still haven't. And lest you think that you all, as the **digerati**, are more enlightened, I went to the Apple iPhone app store the other day. Where's art? I got productivity. I got sports. And somehow the idea that one would want to make art for the iPhone, which my friends and I are doing now, is still not reflected in our understanding of what computers are for.*

DIGITAL BOOK (L. 42) Mike Matas: A next-generation **digital book** [Lecture title]

DIGITAL IMMIGRANTS (L. 13) *And there's no more powerful force to change every institution than the first generation of digital natives. I'm a **digital immigrant**. I had to learn the language.*

DIGITAL NATIVES (L. 13) *And there's no more powerful force to change every institution than the first generation of **digital natives**. I'm a digital immigrant. I had to learn the language.*

DIGITAL TECHNOLOGIES (L. 31) *I'm talking about people taking and recreating using other people's content, using **digital technologies** to say things differently. Now, the importance of this is not the technique that you've seen here. Because, of course, every technique that you've seen here is something that television and film producers have been able to do for the last 50 years.*

DIGITAL WOODS (L. 15) *Today we've launched Collusion. You can download it, install it in Firefox, to see who is tracking you across the Web and following you through the **digital woods**. Going forward, all of our voices need to be heard. Because what we don't know can actually hurt us. Because the memory of the Internet is forever. We are being watched. It's now time for us to watch the watchers.*

DIGITAL WORLD (L. 62) *So before I start, I want to talk about a little anecdote, a little story about a man I met once in Mumbai. So this man, his name is Sathi Shri. He is an outstanding person, because he's a small entrepreneur. He runs a little shop in one of the back streets of Mumbai. He has this little 10-square-meter store, where so much is being done. It's incredible, because I couldn't believe my eyes when I once just happened to bump into him. Basically, what he does is, he has all these services for micro-payments and booking tickets and all kinds of basic things that you would go online for, but he does it for people offline and connects to the **digital world**.*

DOT COM (L.58) *Most people don't know about Samuel Pierpont Langley. And back in the early 20th century, the pursuit of powered man flight was like the **dot com** of the day. Everybody was trying it. And Samuel Pierpont Langley had, what we assume, to be the recipe for success. I mean, even now, you ask people, "Why did your product or why did your company fail?" and people always give you the same*

permutation of the same three things: under-capitalized, the wrong people, bad market conditions. It's always the same three things, so let's explore that.

EMAIL (L. 10) *Every week it'll arrive at your door. You get to try them out, play with them, evaluate them until the novelty wears out, before you have to send them back. And you'll get paid for it. You can think about it, if you want. I've always been a technology nut, and I absolutely love it. The job, though, came with one small downside. And that is: they intended to publish my email address at the end of every column. And what I've noticed is -- first of all, you get an incredible amount of **email**.*

EMOTICONS (L. 2) *Even more dramatic, Alex Todorov at Princeton has shown us that judgments of political candidates' faces in just one second predict 70 percent of U.S. Senate and gubernatorial race outcomes, and even, let's go digital, **emoticons** used well in online negotiations can lead to you claim more value from that negotiation. If you use them poorly, bad idea. Right?*

FACEBOOK (L. 6) *MO: We didn't get our authority from the board of selectmen or the emergency management director or the United Way. We just started answering questions and making decisions because someone, anyone, had to. And why not me? I'm a campaign organizer. I'm good at **Facebook**. And there's two of me.*

FIRMWARE (L. 62) *But what I was amazed about is this reverse engineering and know-how that's built into this little two meters of space. They have figured out everything that's required to dismantle, take things apart, rewrite the circuitry, re-flash the **firmware**, do whatever you want to with the phone, and they can fix anything so quickly. You can hand over a phone this morning and you can go pick it up after lunch, and it was quite incredible.*

FREAKONOMICS (L. 59) The **freakonomics** of McDonalds vs. drugs [Lecture title]

GAMER (L. 19) *I'm a **gamer**, so I like to have goals. I like special missions and secret objectives. So here's my special mission for this talk: I'm going to try to increase the life span of every single person in this room by seven and a half minutes. Literally, you will live seven and half minutes longer than you would have otherwise, just because you watched this talk.*

GEEK (L. 29) *A second option is the sexy geek option. These conditions are highly rare. (Laughter) (Applause) But what's beginning to happen is because these **geeks** are all getting together, because they are highly qualified for computer programming and it is highly remunerated, as well as other very detail-oriented tasks, that they are concentrating geographically and finding like-minded mates.*

GESTURES (l. 30) *Steve Jobs: And we have invented a new technology called multi-touch. You can do multi-fingered **gestures** on it, and boy have we patented it. (Laughter) KF: Yes. And yet, here is multi-touch in action.*

GLOBAL VILLAGE (L. 10) *If you are buying something on the web, you're supposed to put in your address and you're supposed to choose which country you're from, OK? There are 200 countries in the world. We like to think of the Internet as a **global village**. I'm sorry; it's not one yet. It's mainly, like, the United States, Europe and Japan.*

INFOGRAPHICS (L. 42) *MM: It starts playing immediately. And while it's playing, we can pinch and peak back at the page, and the movie keeps playing. Or we can zoom out to the table of contents, and the video keeps playing. But one of the coolest things in this book are the interactive **infographics**. This one shows the wind potential all around the United States. But instead of just showing us the information, we can take our finger and explore, and see, state by state, exactly how much wind potential there is.*

INTERACTIVE ANIMATION (L. 42) *Mike Matas: And so throughout the whole book, Al Gore will walk you through and explain the photos. This photo, you can you can even see on an interactive map. Zoom into it and see where it was taken. And throughout the book, there's over an hour of documentary footage and **interactive animations**. So you can open this one.*

INTERACTIVE BOOK (L. 42) *So for the past year and a half, my team at Push Pop Press and Charlie Melcher and Melcher Media have been working on creating the first feature-length **interactive book**. It's called "Our Choice" and the author is Al Gore. It's the sequel to "An Inconvenient Truth," and it explores all the solutions that will solve the climate crisis.*

INTERFACE (L. 23) *So, the technology, you know, isn't the most exciting thing here right now, other than probably its newfound accessibility. What's really interesting here is what you can do with it and the kind of **interfaces** you can build on top of it. So let's see.*

INTERNET (L. 39) *We're all very, very familiar with the **Internet**. In the last 20 years, it's really changed the way that we live and work, and the way that we see the world, and what's great is, we sort of think this is the next paradigm shift, because now we can literally take the content that we share, we discover, and that we enjoy and make it a part of the world around us.*

iPhone (L. 18) *These are the people who stood in line for six hours to buy an **iPhone** when they first came out, when you could have just walked into the store the next week and bought one off the shelf. These are the people who spent 40,000 dollars on flat screen TVs when they first came out, even though the technology was substandard. And, by the way, they didn't do it because the technology was so great; they did it for themselves.*

iPod (L.10) *The other products were backed by Microsoft with an open standard, not Apple's propriety standard. But the **iPod** won! This is the one they wanted. The lesson was: simplicity sells. And there are signs that the industry is getting the message.*

KIOSK / INTERACTIVE WHITEBOARD (L. 23) *Now, this is a rear-projected drafting table. It's about 36 inches wide and it's equipped with a multi-touch sensor. Now, normal touch sensors that you see, like on a **kiosk** or **interactive whiteboards**, can only register one point of contact at a time. This thing allows you to have multiple points at the same time. They can use both my hands; I can use chording actions; I can just go right up and use all 10 fingers if I wanted to. You know, like that.*

LAPTOP (L. 46) *And when people tell me, "Who's going to teach the teachers to teach the kids?" I say to myself, "What planet do you come from?" Okay, there's not a person in this room -- I don't care how techie you are -- there's not a person in this room that doesn't give their **laptop** or cell phone to a kid to help them debug it. OK? We all need help, even those of us who are very seasoned.*

LIBRARY (L. 39) *So wouldn't it be amazing if our phones could see the world in the same way that we do, as we're walking around being able to point a phone at anything, and then have it actually recognize images and objects like the human brain, and then be able to pull in information from an almost infinite **library of knowledge** and experiences and ideas.*

LIFE HACK (L. 2) *So I want to start by offering you a free no-tech **life hack**, and all it requires of you is this: that you change your posture for two minutes. But before I give it away, I want to ask you to right now do a little audit of your body and what you're doing with your body. So how many of you are sort of making yourselves smaller? Maybe you're hunching, crossing your legs, maybe wrapping your ankles. Sometimes we hold onto our arms like this. Sometimes we spread out. (Laughter)*

MC MAFIA / SHADOW ECONOMY (L. 43) *Now organized crime has been around for a very long time, I hear you say, and these would be wise words, indeed. But in the last two decades, it has experienced an unprecedented expansion, now accounting for roughly 15 percent of the world's GDP. I like to call it the Global **Shadow Economy, or McMafia**, for short.*

MENU / FOLDER (L. 10) *(Applause) From the drop-down **menu,** choose the first letter you want to type. OK. (Laughter) So there is a limit that we don't want to cross. So what is the answer? How do you pack in all these features in a simple, intelligent way? I believe in consistency with possible, real-world equivalents, trashcan **folder** when possible, label things mostly. But I beg of the designers here to break all those rules if they violate the biggest rule of all, which is intelligence. Now what do I mean by that? I'm going to give you some examples where intelligence makes something not consistent, but it's better.*

MOBILE (L. 18) *I'm afraid I'm one of those speakers you hope you're not going to meet at TED. First, I don't have a **mobile**, so I'm on the safe side. Secondly, a political theorist who's going to talk about the crisis of democracy is probably not the most exciting topic you can think about. And plus, I'm not going to give you any answers. I'm much more trying to add to some of the questions we're talking about. And one of the things that I want to question is this very popular hope these days that transparency and openness can restore the trust in democratic institutions.*

MOMVERSATION (L.25) *Or you look at Johnson & Johnson's **Momversations**. A phenomenal blog that's been built up. Where J&J basically is tapping into the power of mommy bloggers, allowing them to basically create a forum where they can communicate and they can connect. And it's also become a very, very valuable sort of advertising revenue for J&J as well.*

MOUSE (L. 17) *And the thing I'm really trying to do is enabling people to have more rich kinds of interactive experiences. How can we get away from the **mouse** and use our full bodies as a way of exploring aesthetic experiences, not necessarily utilitarian ones.*

MULTI-TOUCH (L. 30) *2007. The iPhone makes it debut. Apple undoubtedly brings this innovation to us early, but its time was approaching because its core technology had been evolving for decades. That's multi-touch, controlling a device by touching its display. Here is Steve Jobs introducing **multi-touch** and making a rather foreboding joke.*

MULTIMEDIA PLATFORM (L.62) *So we said, "What can we do to empower this teacher to do more?" How to access the digital world? Instead of being the sole guardian of information, be a facilitator to all this information. So we said, "What are the steps required to empower the teacher?" How do you make this teacher into a digital gateway, and how do you design an inexpensive **multimedia platform** that can be constructed locally and serviced locally?" So we walked around. We went and scavenged the nearby markets, and we tried to understand, "What can we pick up that will make this happen?"*

PATENT CLIFF (L. 13) *I'll give you an example. The pharmaceutical industry is in deep trouble. First of all, there aren't a lot of big inventions in the pipeline, and this is a big problem for human health, and the pharmaceutical industry has got a bigger problem, that they're about to fall off something called the **patent cliff**. Do you know about this? They're going to lose 20 to 35 percent of their revenue in the next 12 months. And what are you going to do, like, cut back on paper clips or something? No.*

PLATFORM (L.8) *We've tried to build in retrieval practice into the **platform**, as well as other forms of practice in many ways. For example, even our videos are not just videos. Every few minutes, the video pauses and the students get asked a question.*

POP-UP MENUS / SCROLLBARS (L. 30) *Now, can someone own this idea? Now, back in the '80s, there were no software patents, and it was Xerox that pioneered the graphical user interface. What if they had patented **pop-up menus**, **scrollbars**, the desktop with icons that look like folders and sheets of paper? Would a young and inexperienced Apple have survived the legal assault from a much larger and more mature company like Xerox?*

ROBOPOCALYPSE (L. 21) *Actually, it's a bit more complex than that, and there are no magic bullets. I don't have all the answers, but I know a few things. In the wake of 9/11, the best security minds put together all their innovation and this is what they created for security. If you're expecting the people who built this to protect you from the coming **robopocalypse** — (Laughter) — uh, you may want to have a backup plan. (Laughter) Just saying. Just think about that. (Applause)*

SCREENSAVER (L. 23) *This started out as kind of a **screensaver** app that one of the Ph.D. students in our lab, Ilya Rosenberg, made. But I think its true identity comes out here.*

SEXTING / TEXTING (L. 44) *To most of you this is a device to buy, sell, play games, watch videos. I think it might be a lifeline. I think actually it might be able to save more lives than penicillin. **Texting**. I know I say texting and a lot of you think **sexting**.*

SITE (L. 15) *Now don't get me wrong, I'm not for one minute suggesting that sharing data is a bad thing. In fact, when I know the data that's being shared and I'm asked explicitly for my consent, I want some **sites** to understand my habits. It helps them suggest books for me to read or movies for my family to watch or friends for us to connect with. But when I don't know and when I haven't been asked, that's when the problem arises. It's a phenomenon on the Internet today called behavioral tracking, and it is very big business.*

SMARTS (L. 61) *Let's figure out what people want. We killed thousands of Post-it notes. We made dozens of prototypes to get to this. So this is the NeoNurture Infant Incubator, and this has a lot of **smarts** built into it. And we felt great.*

SMARTPHONE (L. 30) *So here's the sort of equation we're looking at. We've got laws that fundamentally treat creative works as property, plus massive rewards or settlements in infringement cases, plus huge legal fees to protect yourself in court, plus cognitive biases against perceived loss. And the sum looks like this. That is the last four years of lawsuits in the realm of **smartphones**. Is this promoting the progress of useful arts?*

SOCIAL NETWORK (L. 15) *So let me go from an example to something very specific and personal. I installed Collusion in my own laptop two weeks ago and I let it follow me around for what was a pretty typical day. Now like most of you, I actually start my day going online and checking email. I then go to a news site, look for some headlines. And in this particular case I happened to like one of them on the merits of music literacy in schools and I shared it over a **social network**.*

STEAMPUNK (L. 14) *And of course, a few of us are saying: okay, computers! Computers! What about computers? The thing about computers is, I love computers. I mean, I'm a huge geek, I love computers. I would go on a hunger strike before I let them take away Google Book Search from me. But computers don't do much else other than speed up the process of compiling dictionaries. They don't change the end result. Because what a dictionary is, is it's Victorian design merged with a little bit of modern propulsion. It's **steampunk**. What we have is an electric velocipede. You know, we have Victorian design with an engine on it. That's all!*

SUPERCELL (L. 6) *MO: So I was here in Boston. I'm a PhD student at MIT, and I happen to study atmospheric science. Actually it gets weirder. So I was in the museum of science at the time the tornado hit, playing with the tornado display. So I missed her call. So I get the call from Caitria, I hear the news, and I start tracking the radar online to call the family back when another **supercell** was forming in their area.*

SURFACE TABLETS (L. 48) *PM: There is a lot of energy here. Lots of learning. All of this work that you have seen is all about my learning in India. And now, if you see, it's more about the cost-effectiveness: this system costs you $300 compared to the $20,000 **surface tables**, or anything like that.*

TAG / WEB PAGE (L. 48) *As you interact with someone at TED, maybe you can see a word cloud of the tags, the words that are associated with that person in their blog and personal **web pages**. In this case, the student is interested in cameras, etc. On your way to the airport, if you pick up your boarding pass, it can tell you that your flight is delayed, that the gate has changed, etc. And, if you need to know what the current time is it's as simple as drawing a watch -- (Laughter) (Applause) on your arm.*

TECHNOLOGY CRAFTS (L. 62) *But what does this new, sort of, approach give us? That's the real question, because this is something that's been there, part of every society that's deprived of enough resources. But there's an interesting paradigm. There's the traditional crafts, and then there's the **technology crafts**. We call it the **technology crafts** because these are emerging. They're not something that's been established. It's not something that's institutionalized. It's not taught in universities. It's taught [by] word of mouth, and it's an informal education system around this.*

TEDSTER (L. 54) *Rupert Murdoch said to me, "It's all hard work. Nothing comes easily. But I have a lot of fun." Did he say fun? Rupert? Yes! **TED-sters** do have fun working. And they work hard.*

TOUCHSCREEN (L. 6) Jeff Han demos his breakthrough **touchscreen** [Lecture title]

TRACKER (L. 15) Tracking the **trackers** [Lecture title]

WEBCAM (L. 48) *I'm wearing a camera, just a simple **webcam**, a portable, battery-powered projection system with a little mirror. These components communicate to my cell phone in my pocket which acts as the communication and computation device. And in the video here we see my student Pranav Mistry, who's really the genius who's been implementing and designing this whole system.*

WEBSITE (L. 8) *DK: It turns out, maybe not surprisingly, that students like getting the best content from the best universities for free. Since we opened the **website** in February, we now have 640,000 students from 190 countries. We have 1.5 million enrollments, 6 million quizzes in the 15 classes that have launched so far have been submitted, and 14 million videos have been viewed.*

WHISTLE-BLOWER (L. 36) *Joe was what a lot of people might think of as a whistle-blower, except that like almost all **whistle-blowers**, he wasn't a crank at all, he was passionately devoted to the organization and the higher purposes that that organization served.*

WORKAFROLIC (L. 54) *I figured, they're not workaholics. They're **workafrolics**. Good! Alex Garden says, "To be successful put your nose down in something and get damn good at it."*

UPGRADE (L. 62) *But then, in the backside, he's got this little nook with a few of his employees where they can fix almost anything. Any cell phone, any gadget you can bring them, they can fix it. And it's pretty incredible because I took my iPhone there, and he was like, "Yeah, do you want an **upgrade**?" "Yes." (Laughter) I was a bit skeptical, but then, I decided to give him a Nokia instead. (Laughter)*

VIRUS / INBOX / RECYCLE BIN / INFECTION (L. 43) *I expect some of you remember the ILOVEYOU **virus**, one of the very great worldwide viruses that came. I was very fortunate when the ILOVEYOU virus came out, because the first person I received it from was an ex-girlfriend of mine. Now, she harbored all sorts of sentiments and emotions towards me at the time, but love was not amongst them. (Laughter) And so as soon as I saw this drop into my **inbox**, I dispatched it hastily to the **recycle bin** and spared myself a very nasty **infection**.*

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