A French Exception: Mind Mapping à la française in the cyberspatial dimension

Katherine Watson
Distance Learning
Coastline Community College, USA
Bizarrissime@gmail.com

Abstract: Both hemispheres of the human brain are effectively excited to learn through cross-cultural "mind mapping" techniques, which stimulate ideation with the same forms, colors, and designs that define technology-assisted education. Thus, mind-mapping exercises encourage the logical, language-centered left cerebral hemisphere to work in concert with the artistic right side of the brain. Teachers and learners can "mind-map" any subject matter by complete brainstorm to discern "nodes of ideation", using systems of heuristics developed by English psychologist Tony Buzan, popularized in France, and applicable anywhere in cyberspace.

Background

Third-century Neo-Platonist philosopher Porphyry created a hierarchical ontology to help students of logic see in a concrete way how human reasoning progresses. Nearly a thousand years later, Ramon Llull conceived his "Lullian Discs" to generate combinations of ideas, displaying graphically all possible perspectives on a subject set forth at the center of a circle. Porphyry and Llull both felt that knowledge falls out of an understanding of graphically representable "elemental truths", logical bases underlying human concept development, no matter the academic field of interest.

Much more recently, during the last half of the twentieth century, British popular psychologist Tony Buzan systematically and successfully marketed his own version of Porphyry- and Llull-style logic as "Mind Mapping", a system of heuristics designed to exploit creativity even as it stimulates awareness.

Calling Mind Maps "the most powerful thinking tool of our time" (Gates, 2006), Bill Gates has marveled at Buzan's use of imagination and association to "give thoughts freedom to spread out in all directions and (let the) brain express itself more naturally and without being maintained in the boundaries found in the linear…".

Interestingly for users of Gates's own tools, Buzan-style Mind Maps use the same forms, colors, and designs that have rendered technology-assisted education the darling of teachers who would meet students in the sort of media-rich environment suffusing our twenty-first-century existence, leading them beyond "chalk and talk", as economist John Budd (2003) writes, and stimulating alternative learning styles.

Mind-mapping techniques such as those that were popularized by Buzan on his British Broadcasting (BBC) television series thirty years ago can clearly be used effectively across the curriculum in our new millennium to expedite learning online.

Although Buzan-style Mind Maps are based on radial hierarchies and tree structures that are meant to render a third dimension to an apparently two-dimensional design for reports, speeches, and the like, they can be exploited more broadly as well to explicate at once idiosyncratic and culturally alternative modes of ideation. Furthermore, despite complaints that the Maps lack the simple-to-see uni-directional connections that "concept maps" (Novak, 1991) encourage, Mind Maps' graphic layout is demonstrably valuable to learners, showing them how they can each create their own concrete, visual connections between ideas and the diverse focuses to be pursued in any course of study. And as the French *Ecole française de l'heuristique* founder Frédéric Le Bihan states, one can use "heuristic schemas", or Mind Maps *à la française*, to stimulate in an extraordinarily complete manner the "most simple and most natural computer we have available to us, the human brain" (Le Bihan, 2007b).

An exemplary method of putting Mind Maps and concept analysis to work

At Coastline Community College, in Fountain Valley, California, students of French language and culture online have been able to understand multi-faceted subject matter by means of bi-cultural Mind Maps. That is, students in a virtual classroom in California who never see either a required hardbound textbook, a real teacher, or their fellow learners have been able to conceive their own individual Buzan-LeBihan-style Mind Maps in doing their course work, discovering for themselves how language learning, like mind-mapping, is a brainstorming process of *association*. Just like ordinary memory formation, the process of learning a new language requires the attachment of images, of key words, to linguistic phenomena, whether they be phrase or sentence structures, vocabulary, or semantic notions. Too, each language learner must devise his own way to render his subject matter memorable; he must decide how things are useful to him, applicable to particular social contexts, or pragmatic, and to do this, the learner must *associate* what he is studying *to* something, an idea, a person, a thing, a context.

Foreign language students conceive of these associative heuristic schemata in a non-linear way, just as concentric mind maps are generated. Happily enough for students of French at Coastline, this non-linear, synthesis-based thinking is also typical of francophone argumentation, reasoning, ideation (Hall, 1977). Thus, just as Coastline learners of French language and culture can facilitate their grasp of their course material through mind-mapping, so can they learn how to apply mind-mapping techniques to other endeavors, feeling for themselves a fresh French perspective on things they may have thought of for decades in only a typically American way.

Mind map design --Elements

France's *Ecole française de l'heuristique* (EFH) cites seven elements necessary to the creation of a Buzan-style Mind Map; unlike Buzan himself, the French school offers logically reasoned bases for the necessary existence of each element:

1. Paper layout: Blank, white paper is to be laid in landscape format: Frédéric LeBihan, of the EFH, notes that "humans take greater advantage of the breadth of their visual field than they do of its height."
2. Drawing/writing implements: Color is important; black pens or crayons are all right—even a simple lead pencil is enough--, as long as color appears somewhere. Pens and crayons should "feel good" in the hand.
3. "Core": The central idea is to be written or drawn in the middle of the paper; it should be expressed in one word, if possible. This is the theme, as Buzan has called it, the "trigger" to logical associations.
4. "Branches": These are lines emanating from the core in an organic way, "inspired from nature," like a tree, in LeBihan's words
5. Words: These "left-brain" elements are chosen for their evocative tone and must be written clearly by hand; it is preferable to place only a single word on any one branch, to retain simplicity and clarity, again serving as associative triggers
6. Images: These "right-brain-based" devices are to be treated as pictograms, although they may be photos; "there is no need to be an artist in all this," states LeBihan; "simplicity and evocativity are important".
7. Color: Non-jarring colors and black should be most frequently used, although colors that express the mind-mapper's emotional connection to the topic might act as memory triggers; color should assist in readability, and as LeBihan asserts, it stimulates the involvement of the right cerebral hemisphere in the formation of a logical map created by the left side of the brain.

Mind map theory –Cultural variations

A brief overview of mind maps in use throughout the world can shed light on the modes of reasoning that typify various cultures. For instance, the French tendency "…to emphasize (or invent) continuity over rupture", as Bowen (2006) puts it, "to frame the discussion of nearly any important social issue in terms of its long-term history", is apparent in *Ecole française de l'heuristique* mind maps citing the certain key phrases, values, relationships among words and thoughts that francophone schoolchildren learn from their earliest days on. French mind maps, or heuristic schemas, are imbued with a logic based in history and in philosophical connections that unite diverse fields of interest. By contrast, the American tendency to mingle the profound with the superficial, without attending to the logical development leading from one to the next, and yet remaining within one disciplinary milieu, is apparent in mind maps that strike the French viewer as being diffuse, disorganized, lacking in an ability to connect rationally. To the American, everything French is frustratingly long-term, digressing constantly, almost timeless; to the francophone, the American view is limited to the synchronous, to the here

and now. Even the active, collaborative Mind Maps of the kind the Budd (2003) has used effectively in economics classrooms have an air of what the French would call too concrete, not satisfactorily multi-faceted. Such distinctions are part of the cross-cultural Mind Mapping that Coastline Community College online students of French language and culture have learned to manage.

Mind map utility –Putting Mind Maps to work with six "mind tools"

With his notion of "the cultural Web," Manktelow (2007) has taken Buzan-style mind maps to a new level, using the maps as springboards to the conception of practical, utilitarian "mind tools." These last comprise six techniques for exploiting mind maps across cultures or across fields of interest to stimulate discussion and promote interactive, collaborative learning. Thus, *stories*, *rituals/routines*, *symbols*, *organizational structures*, *control systems*, and *power structures* are revealed through mind maps, no matter the culture in which they are used. Learners' various reactions to one another's mind maps can be analyzed, discussed, and brainstormed about by means of mind map tools for international, inter-disciplinary understanding.

At southern California's Coastline Community College, online learners of French language and culture are asked to draw series of mind maps throughout their semester-length course, seeing for themselves graphically how their attitudes, opinions, and understanding of themselves and of the world's speakers of French can change through time and inter-cultural interactivity. Each mind map is generated through the use of six "mind tools" conceived by James Manktelow (2007).

Manktelow (2007) defines the *Stories* mind tool as "revelations of personal and cultural values"; stories expose what people consider to be important, favored, accepted and rejected. As part of their coursework, Coastline Community College online learners of French language and culture share *stories* about themselves to disclose basic information, both verbally and graphically. Just as all people do, Coastliners make selective disclosures, however, each student revealing his uniqueness, his "condemnation to solitude", as Sartre has put it (1946). But at the same time, *stories* show how each of us chooses to reveal what, based on what our culture finds significant. For instance, it has been demonstrated that when Americans tell stories about themselves or others, they tend to use their "action-orientated masculine language" (Hall, 1977), using strong active verbs, citing their achievements, their material success, even their personal lives. When Americans define themselves, professions, prizes, and income often come up; their "autobiographical mind maps" show themselves at the center, with branches radiating out from a photo or a drawing of themselves. Coastliners learn through participation in shared francophone social networks that French speakers everywhere tend more to the "feminine" in self-expression, using logical excurses, references to events in the outside world, and litotes more frequently than do their American counterparts. Francophones' autobiographical mind maps thus tend to the formulaic and to the genealogical, with a home or a family or even the image of an idea at the center; francophones depend upon what Bowen (2006) calls *la pensée unique*, a single way of thinking, and they make clear reference to the individual's family background. Activities and accomplishments do not

radiate from a central figure; rather, a person's essence is central, and his birthplace, educational background, and philosophies define his mind map's branched nodes.

After they write their first "self-sketch" and draw their first "autobiographical mind maps" in French, Coastline onliners are asked to form into a page-long essay, or *exposé,* their answers to a list of web-delivered questions about themselves; they are then invited to compare/contrast their *stories* and mind maps to the ones that students in the University of Paris 2-Massachusetts Institute of Technology-based *Cultura* Project have composed (http://web.mit.edu/french/culturaNEH/); furthermore, Coastliners may add personal comments or media at their class's social networking site: http://bizarreries.ning.com .

Coastline French language onliners are subsequently called upon to exploit Manktelow's second mind tool, examining how and why they practice *rituals and routines;* Manktelow suggests that an individual's mind maps will reveal that it is culture that underlies his daily activities. Indeed, Americans and francophones tend to draw their *routines* mind maps in slightly different ways; the former are festooned with myriad list-like tendrils, while the latter are decorated with abstract goals, along with meals eaten and familial activities taken. When asked to discuss their *routines* mind maps, Americans cite a cluttered, demanding, activity-filled work schedule, a struggle against the clock; francophones note the need to make an effort each day, to follow a rhythm, to do what is expected of someone of their socioeconomic/demographic status. Thus, while the American might feel frustrated by schedule, drawing parallel lines with simultaneously competing requirements listed on each, the francophone often considers routines to comprise a restful ritual, each comprising a custom leading to the next.

Even as *rituals and routines* represent a temporal, physical, and sometimes mental manifestation of a culture's value system, Manktelow's third mind tool, *symbols,* would comprise visual representations of those values. The French are known for stylish dress, for *la présentation*, for instance, but colors are usually subdued, meant to harmonize. Neatness is important, while the casual is chic in Coastline's southern California. Californians' symbolic mind maps tend to look much like collages, with layers of popular local looks. Contrarily, with much recent discussion in the international press having concerned the French government stance that no head scarves symbolizing a particular ethnicity should be worn in public schools and no religious icons should be allowed to dangle from the wrists or neck, *symbolic* mind maps in modern France tend to the iconic; if a writer or musician or religious or philosophical leader has influenced the person drawing the map, then that becomes evident. Since Americans sport religious jewelry, clothing, and tattoos as group-membership labels, their *symbolic* mind maps tend to show culturally standardized drawings, pictures, logos, or short verbal expressions.

As Marcus and Gould (2001) have demonstrated, the symbols, rituals, and routines that a particular culture accepts as standard or "in" or "okay", as well as those that the culture rejects as non-standard or unacceptable or "out", are at least as apparent online as they are on the street or in the press. That is, for example, if a culture considers routine and

ritual to be important, if it places high value on symbols such as certificates, diplomas, medals, and the like, then its Websites, electronic mind maps that they be, will tend to be symmetrical, they will focus upon the institutional seal, and they will depict monumental buildings; the sites will constitute evidence of the society's strong hierarchy; students' interaction will be monitored and their personal mind maps difficult to share. If people are exhibited at all on such a hierarchical culture's institutional websites, they will be depicted in cap and gown receiving diplomas. But if, by contrast, the culture considers ideas and interaction, argumentation and political involvement to be important, then its sites will be more asymmetrical, incorporating photos of ordinary people rather than of symbolic things, with more harmonious colors leading to more congruous, more interactive utility. Budd (2003) is one of a number of those happy users of Mind Maps to have noticed their utility in demonstrating graphically, through color and layout, our very human ways of achieving mental synthesis as we examine Web-based data, no matter its source.

Exemplifying Marcus and Gould's notion in the virtual classroom, anglophone participants in the MIT-Paris *Cultura* Project have sketched mind maps decorated with institutional seals, certificates, and diplomas; templates limit too much brainstorming or mind mapping variability. By contrast, francophone *Cultura* participants select artistic works, influential pieces of literature, even culturally definitive foods as the cultural *symbols* that would decorate their maps; Web design and coursework must express beauty, as defined by their organization, and each student product must undergo a collegial, critical *toilette du texte.*

Furthermore, although French institutional Websites are permeated with the same sorts of symbolism and "monumentalism" that Marcus cites as anti-individualistic, counter to Buzan's Mind Map-style "whole-brain" work or interactivity, they share with *Ecole française de l'heuristique*-style mind maps a "design harmony". That is, they invite the visitor in, exploiting a "left-brain-based" form that engages the "right-brain-based" senses. French Websites, like French mind maps, are multi-tiered, vermicular, like the francophone reasoning process. It is perhaps the fact that he can make his mind maps so dynamically, synesthetically dense that leads the francophone to prefer them over the more uni-directional, less layered, and explicitly verbal constructivist concept maps (Novak, 1977, 2008). Thus, Coastline French language onliners discover in their totally-online course French Websites that are at once "monumental", depicting eighteenth-century façades and nineteenth-century art covering many pages, and asymmetrically artistic, harmonious, inviting, interacting with the user. Like any francophone, Coastliners are invited without security- or password protection to surf through these sites, which serve as their only course "text", in the francophone multi-tiered, vermicular manner, symbolizing the French reasoning process; indeed, Coastliners find that even the French-imbued Franco-American *Cultura* project site radiates a non-linear, open, culturally distinctive air.

Whether concrete or abstract, painted on paper or transmitted online, cultural symbols tend to communicate both implicitly and explicitly what Manktelow cites as mind tool

#4, *organizational structure*. Manktelow holds that this structure reveals the seen and unseen lines of power and influence in a social group or culture. Most francophone countries, France included, are not only "collectivist", as Hofstede (2001) has called them, but highly unionized; although francophone society is hierarchical, however, each level of the hierarchy feels the need and the power to express its wants as needs; French mind maps are therefore at once highly personal and recognizably group-governed; francophone mind maps, like those emanating from any cultural group, exhibit a shared quality that differentiates them from German ones, Italian ones, or American ones, for instance.

Coastline onliners, like *Cultura* Project participants, have learned quickly that francophones harbor a group need for organized self-expression. Exemplifying this was a series of transportation strikes of late 2007-early 2008; the recently elected President Nicholas Sarkozy went into the streets of Paris among the strikers, sometimes touching them, always arguing with them, listening to each person's grievance and responding individually; a mind map for French transportation strikers would undoubtedly cite union slogans, individuals' stances, and press reports on progress made toward articulated goals. By contrast with France, the United States likes to consider itself democratic, classless, without either a suffering *Lumpenproletariat* or a privileged few, but the American President tends to present himself in public, usually behind a podium, almost always with prepared statements. As the *Cultura* project participants have noted, Americans tend fundamentally to fear change, to be suspicious of the individualist whom they claim to admire, and to look to others to define their success. The American unionist of the twenty-first century would probably have trouble making a mind map, not to mention making the map clear to others.

In sum, French hierarchy-rich, collectivist organizational structure appears Byzantine to most Americans; bureaucracy is definitely a French invention, and mind maps that would depict it are impenetrable for ordinary Americans. French schools, offices, businesses, and government all display dizzying levels of pseudo-officialdom; the mind map notion of displaying a "third dimension" to any single concept is perfect to display French *organigrammes* (tables of organization) . By contrast, American society seems to the French to harbor implicit xenophobia and bellicosity along with materialism and an admiration of Hollywood bling. Tables of organization in American institutions seem to the French to sport lots of not-quite-upper management; finding a single *grand directeur* appears to the French to be an impossible task in America; a mind map would have to give lie to reality.

Manktelow's fifth mind tool comprises what he calls *control systems*, the culturally-based patterns of reward and punishment, of benefits, of quality; these things are said to *control* how we think and behave; they differ from society to society. As the Paris-Boston participants in the *Cultura* project have made it plain, French people's values, what the French define as most important in life, underlie that certain *je ne sais quoi* defining a "high-quality life." That is, for instance, because being in good health and retaining good, strong family ties have been cited as the most important aspects of existence to the

French people participating in the *Cultura* project
(http://web.mit.edu/french/culturaNEH/classroom/pages/q3.htm), a "high-quality life"
for the French should ensure long-term wellbeing and proximity to family. The French
control system mind map would be dotted with family relations, activities, and the like.
By contrast, American participants in the same project have claimed professional success
and a good income/financial reward to be of maximal qualitative value; American control
systems mind maps are spiced with personal achievements. Americans seem to the
French to equate reward with money; to the French mind, status counts for at least as
much as do finances. Moreover, Americans place high value on being able to control
their professional lives and their income; Americans tend to have more credit cards,
personal automobiles, and personal computers than do francophones. Americans are
invested far more heavily in stocks and in 401k-style arrangements than are the French,
too; the latter expect that *L'Etat*, the federal government, will take charge of those details;
indeed, francophone mind maps often show a flag or a monument, rather than a
professional connection, as American ones do.

Control system-defined "quality" differs not only culture by culture but also within
cultures. While he is brainstorming about it, an American liberal globalist might, for
instance, consider imports from other cultures to be delightful gifts, as Marcus and Gould
(2001) note; these same items could be associated by others to threat, to danger to the
public good. The partisan of the American melting-pot might prefer that newcomers
assimilate rather than *integrate*, that they abandon their cultural identity in favor of a new
one instead of preserving a language, behavior, diet, and holiday schedule imported from
their countries of origin (Caloz-Tschopp and Dasen, 2007). The benefits of American
society are considered in this belief system to be inherently superior to any qualities that
an immigrant's culture might offer. To the French mind, especially in recent years, the
notion of a "melting-pot" is suspect, risking transformation into the reality of the
"pressure cooker", in which assimilation is imposed by the greater/outside society upon
the minority-group newcomers. French computer users complain frequently of a forced
assimilation by members of non-American cultures into what they see as an
Americanocentric technocracy; the default language and style, format and code are all
American. A number of francophone African Websites are festooned with African
heuristic schemas designed to impart pride in the quality of nature, of good air, of beauty
distinguishing Africa from the rest of the world.

While organizational structure and control systems are somewhat explicit manifestations
of a culture's composition of power management, easily rendered into a mind map or a
heuristic schema, Manktelow's mind tool #6 shows *power structures* to be more implicit,
understood, unspoken; these comprise the "pockets of real power" and are therefore less
straightforward to draw on a mind map. Although France is bursting with petty
bureaucrats, with political parties representing more than a dozen philosophies, French
power is famously invested in an explicit hierarchy; Hofstede (2001) is one of many to
have cited the French as accepting significant "power distance" separating the hoi polloi
from the upper crust. But French citizens are invited to influence decisions made within
the hierarchy by participating in political life of the collectivist society; the French enjoy
the political disputes generated by multifarious political parties; indeed, a francophone

power structure mind map would be an individual's affair, something he has inferred, not verified. By contrast, the two power-controlling American political parties demonstrate very little difference, to the French mind. Moreover, while American businesses' organizational structures may appear at first glance to be transparent, they very often hide "the good old boys" networks that hold real sway. Heuristic schemas of French politics or bureaucracy would unveil the explicit; these "designs for discovery", as their name means literally, are meant to clarify for their user(s) something that is apparently quite obscure. By contrast, mind maps of what goes on in United States government, whether it be federal or municipal, would be difficult for outsiders to discern.

Integrating and explicating: Implications for Mind Tools, mind maps, and polyvalent heuristics

Mind maps, or "heuristic schemas", as they are termed in French, can capture and characterize the essence of an idea, even as they help their designer to organize and develop his ideas, connecting bits of information to one another for his own future use. Although paper and pencil, color and lines and nodes are cited as important elements in the execution of the maps, Le Bihan would remind us that Mind Mapping "..is an approach to discovery, rather than a hard-and-fast procedure that must be followed." Indeed, *heuristics* represents to Le Bihan the effort to resolve a problem, thereby to learn.

Le Bihan's school of heuristics calls for an elegance of thought, a clarity of design, deriving from a "state of questioning." Indeed, since "the question is the open-sesame of knowledge", as Le Bihan puts it (2007), it can be posed across disciplines, in what French educators call a "transdisciplinary" manner. Moreover, adds Le Bihan, because questions are to be posed continuously, from all quarters, the properly done heuristic schema will stimulate more of the brain than will a simple subject-matter outline, a list, or even a graphic table.

"Intuition, imagination, inspiration, and vision…are rendered practical" in the design of the heuristic schema, according to Le Bihan. As Géninet (2008) adds, the heuristic schema adds a spatial dimension to the temporal; it is meant to synthesize with right-brain-centered tactics that which a professor or a book or an authority has presented didactically, through left-brain analysis. "Synthesis", Géninet writes, "reconstitutes that which analysis has taken apart, and in so doing, verifies the analytical process."

Coastline Community College online students of French language and culture have used Manktelow-style mind tools to design Buzanesque mind maps of francophone cultural organizations from the film industry to fashion to dog shows and horse races to the state bureaucracy. Subsequently, these adult learners have applied the philosophy and practice of the heuristic schema to a broad range of academic fields, using the schemas to re-examine from a francophone perspective the astronomy and art, cuisine, chemistry, and television programming that they have studied in their younger years. These learners have seen how French and American participants in the *Cultura* project organize

ideation, and they have come to, as Géninet (2008) has stated, "a satisfactory synthesis", a sense of simultaneity, a cross-cultural, transdisciplinary Le Bihan-style "emergence of discovery."

References

Budd, J. (2003). Mind Maps as Classroom Exercises. Retrieved 25 March, 2009
http://www.legacy-irc.csom.umn.edu/faculty/jbudd/mindmaps/mindmaps.pdf

Bowen, J. (2006). *Why the French Don't Like Headscarves: Islam, the State, and Public Space*. Princeton: Princeton University Press.
http://press.princeton.edu/chapters/s8260.html

Buzan, T. and Buzan, B. (2006). *The Mind Map Book*. London: BBC Active.

Caloz-Tschopp, M. and Dasen, P. (eds.). (2007). Mondialisation, migrations, et droits de l'homme, vol. 1 : Un nouveau paradigme pour la recherche et la citoyenneté. Brussels : Bruylant.

Furstenberg, G. Waryn, S., Levet, S. (1997-2008). Cultura. National Endowment for the Humanities. Retrieved 15 February, 2008 http://web.mit.edu/french/culturaNEH/

Gates, B. (2006). The road ahead : How mind-mappers are takin gour information democracy to the next stage. *Newsweek,* 25 January, id 11020787. Retrieved 12 January, 2009, from
http://www.buzanworld.com/media/the_road_ahead_newsweek.pdf

Géninet, A. (2008). Réussir, ça s'apprend. Retrieved 31 December, 2008, from
http://www.ifgm.org/91-synthese.htm

Hall, E. (1977). *Beyond Culture*, New York: Anchor Books.

Hofstede, G. (2001). *Culture's Consequences, Comparing Values, Behaviors, Institutions, and Organizations across Nations*. Thousand Oaks: Sage Publications.

LeBihan, F. (2007). Règles de base. L'Ecole française de l'heuristique. Retrieved 4 January, 2009, from http://www.efh.fr/fr/cartarium/papier/regles.html

LeBihan, F. (2007b). Salon de la micro-entreprise. Entretien. TiViPro. Retrieved 31 December, 2208 from
http://www.tivipro.tv/chaine_salons.php?id=2414&id_salon=62

Manktelow. J. (2007). The Cultural Web: Aligning your organization's structure with strategy. *MindTools*. Retrieved 6 November, 2007, from
http://www.mindtools.com/pages/article/newSTR_90.htm

Marcus, A. and Gould, E. (2001). *Cultural dimensions and global Web design: What? So what? Now what?* Emeryville: AM and A. Retrieved 6 November, 2007 from
http://www.amanda.com/resources/hfweb2000/AMA_CultDim.pdf

Novak, J. (1977). *A Theory of Education.* Ithaca, NY: Cornell University Press

Novak, J. (1991). Clarify with concept maps: A tool for students and teachers alike. *The Science Teacher,* (58), 422- 457.

Novak, J. and Cañas, A. (2008). The theory underlying concept maps and how to construct them. Technical Report IHMC CmapTools 2006-01 Rev 01-2008, Florida Institute for Human and Machine Cognition, 2008. Retrieved 31 December, 2008 from http://cmap.ihmc.us/Publications/ResearchPapers/TheoryUnderlyingConceptMaps.pdf

Sartre, J-P. (1946). *L'existentialisme est un humanisme*. Paris : Nagel.