CREATIVE CONCEPT MAPPING: FROM REVERSEENGINEERING TO WRITING INSPIRATION

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Abstract. A semi-formal meta-analysis of current research into concept mapping suggests that very few teachers are using concept mapping to help their writing students create better essays or stories. Most studies tend to focus on "content-based" subjects such as math and science. However, there is also content, and, therefore, structure in literature and writing. While some students who read prodigiously have some basic grasp of this content, most do not. To help them first realize that there is such a learnable schema of content in my domain, students work through a series of concept maps. Starting with teacher-generated maps demonstrating the relationships among such argumentative strategies as claims and appeals and such literary devices as plot, character, setting and language, my composition and creative writing students, respectively, move on to generating their own maps, or completing scaffold maps, based on essays, short stories or films. Thus they begin the process of "reverse engineering," or "disassembling" essays and stories to analyze how their parts fit together structurally. Analyzing these primary sources teaches the basic components of exposition, argument and fiction in a more meaningful way than could be accomplished by lectures or "free for all" class discussion. From here, students use the maps as prewriting or planning documents. Finally, creative writing students use concept mapping as a peer- and self-critique device for workshop discussion and story enhancement.

1   Introduction

Researching a text on concept mapping, I printed and reviewed 380 abstracts of dissertations on the use of this technique for research, curriculum planning, learning and teaching, in subjects as diverse as mathematics, nursing, chemistry, biology, ecology and physics, as well as a few in literature and such far-flung fields as patient care, artificial intelligence, corporate training, fishing rights and medical patient education. Of these 380 abstracts, I selected 211 of the most relevant for an informal meta-analysis. After careful review, I labeled each study's assessment of concept mapping's efficacy according to the following categories: "tests and supports," "tests and denies," "inconclusive," and "applies." (A small number, <1%, analyzed various aspects of concept mapping itself, such as the comparative effects of stressing or not stressing cross-links, and so, weren't included in this analysis.) Of all abstracts studied, including those who did not explicitly test concept mapping as a teaching tool, 49% affirmed the technique, 10% denied its efficacy, and 6% showed unclear or questionable results, while 35% used concept mapping in data reduction or other qualitative and/or quantitative analyses.

Combining studies explicitly supporting concept mapping with those applying the methodology to other research tasks, since this is a tacit affirmation of the technique, showed 84% expressing a favorable opinion of concept mapping (49 and 35%), overall. The breakdown by subjects was most interesting: Of the 211 studies assessed, almost half (49%) researched concept mapping in sciences such as physics, biology, chemistry, and ecology, for instance. This is not surprising given the high level of government and workplace dissatisfaction fueling the widespread educational reform movement in these fields. In fact, several of these studies cite this reform movement directly as the primary impetus for their research.

2   General Conclusions of Meta-Analysis

While my book (actually being co-written with a former colleague) goes into far more detail on these results, suffice it to say here that science and math were concept mapping's "biggest clients," and that, while there were some naysayers among these "content-based" domain teachers, far more affirmed than denied its usefulness.

My allegedly non-content domain of literature and writing, however, was an entirely different matter. Despite the fact that essay writing was cited in studies as an alternative way to assess students' in-depth understanding of concepts in math and science courses, very few researchers (about 2%) showed much interest in applying the technique directly to fields requiring writing, such as literature or humanities classes. Although Novak (1999) discusses this possibility in relation to a student's reading and mapping of James Joyce's "Eveline" (p. 46) and planning a paper with concept mapping (p. 49), I found very little research applying concept mapping to composition or creative writing classes.[1]

2.1 Content- vs. "Non-Content" Subjects: a False Dichotomy

Because of its graphic nature, a concept map would seem to be the perfect learning and memory aid for such content-oriented subjects as science and math, for example. In fact, regarding memory and mapping, remember that "concept maps present a way to visualize concepts and the hierarchical relationships between them. Whereas most humans have a notoriously poor memory for recall of specific details, their capacity for recall of specific visual images is remarkable. . . . Concept mapping has a potential for enlisting this human capacity for recognizing patterns in images to facilitate learning and recall" (Novak, 1999, p. 28).

However, while the applicability of this structural aid to memory and understanding is obvious and well-researched in domains labeled "content-rich," it may seem less applicable to teachers of literature and writing, where creativity and inspiration are deemed more pertinent than content and structure. Much of this attitude, alas, is based on the philosophical schism that divides math and science, for instance, widely acknowledged to be content-based, from all the rest of us way over there, on the other side. These are the humanities courses, where, as one of my science-teaching colleagues expressed it, writing and grading the writing of others are "entirely subjective." According to this school of thought, there are no real facts, or, for that matter, any objective standards, upon which to test or grade student writing. For her, my field, unlike her own, is entirely subjective because it is "without content." However, all subjects have their domains; all have their store of ordered and interrelated concepts that we need to convey to our students. Being a structure-oriented humanities professor in a technological teaching environment puts me in a unique position to question these binary assumptions and try my own concept mapping experiments in all my classes, from technology and modern civilization to studies in literature, to composition, to creative writing. [1]

In fact, both content and, therefore, structure, obtain in my field; therefore graphic representation of both is equally applicable. Writing is also grasping and creating structure; writing also requires the mastery of a field of specific and learnable concepts. As Novak (1999) also states, "Every human activity, when carried to a point of sufficient proficiency, creates its own concepts, labels, words, actions, and ways of working and wondering that simply exclude the rest of us who are untutored in the events, objects, concepts, and facts about that activity" (p. 10). What's more, teachers in my field, just as in so many traditionally defined content-oriented domains, are also ". . . subject to the same rules as the students, and these are not the rules of an authoritarian hierarchy but of a shared structure of concepts - of shared meanings" (Volmink, qtd. in Novak, 1999, p. 11).

2.2 Concept Mapping in Literature and Writing Domains

If teachers and scholars ignore the content in my domain to hew to these harsh distinctions between "content to actually learn," and "no content to actually learn," how do we blame the students for showing the same attitude? Obviously, we can't, but what we can do is use such a structuring device as concept mapping to help counter this bias by demonstrating that, yes, literature and writing do have content and there are standards to learn in critical reading and in essay writing. By foregrounding my writing criteria, concept maps also help me make clear to my students that I don't grade their essays or stories subjectively according to how much they echo my own opinions or worldviews, but rather objectively according to how well they express their own thoughts in accordance with established standards of writing.

3 General Discussion of Concept Mapping in Writing Classes

3.1 Composition Classes

For me, the most content-oriented of my English classes are always the writing classes, particularly, composition, where students are expected to learn and practice the critical reading and communication, as well as problem-solving and collaborative learning skills, needed to carry them through all their college courses and beyond into a successful career "out there, in the real world." In practice, everything my students do can be seen as pre-writing exercises, from reading to mapping to planning their own critical response and argumentative essays. Emphasizing the pre-writing nature of concept mapping, and the fact that they count toward the "Gordon-Rule 6,000"[2], helps me convince students, from the outset, that concept mapping is of practical value to them. Otherwise, they might dismiss the

whole process as "busy work," especially in light of their already dismissive view of literature and writing, in general, as "contentless" and purely subjective. Thus, the mapping helps me to overcome some my students' natural bias, while getting them started in learning to summarize and critique the writing of others successfully according to a specific set of criteria.

In working toward my own understanding of good, clear persuasive writing, I have always been drawn to the specificity of rhetorical analysis which asks three very basic questions: 1) What is the writer trying to convince us of? 2) How is the writer trying to inform or convince; i.e. what strategies is he or she using? 3) How successful is the attempt to inform and/or to persuade the reader? The first question can be stated more specifically: what claims is the writer making? Claims are quite specific rhetorical gestures, divisible into four distinct types, factual, causal, value and policy. In beginning composition classes, students need to start by "reverse engineering" other arguments, successful and unsuccessful, before they can successfully structure their own critiques or original arguments. Applying these general questions to the source being critiqued supplies a ready-made conceptual scaffolding into which students can place specific critical observations on any argument. Linking these specific claims in a hierarchical structure, then, becomes the basis for a far more cogent and objective summary and critique of the original writer's ideas than one might otherwise hope for. Without such a structure, students tend to fall back on reacting in an emotional and subjective manner based upon the happenstance of their prior positions visa vi these new arguments. A concept map of actual claims and appeals can help students get past their first impulse to settle for a Jamesian "rearranging of their prejudices" to a real, well-considered and well-supported argument.

In addition, without such a conceptual structure, students tend to respond to the written argument by following its paragraph-by-paragraph structure, never creating their own order. In their attempt to superimpose critique over the source argument's established order, they create no organization of their own. Such response essays are a disorganized mess, showing, at best, a loose or associative order moving from one disconnected point to another.

Added to an argument's claims and structurally linked to them in the following concept map [see Fig. 1] are Aristotle's rhetorical appeals of *logos* (appeal to reason), *ethos* (appeal to trust), and *pathos* (appeal to emotions). While writers and speakers need to win over their audience with these appeals, it's also true that they do this for a purpose, to convince them of their various claims. At the same time, it is also necessary, in critiquing the writing of others, that students recognize not only the successful use of claims and appeals, but also the unsuccessful ones. Among these are many specific and well-defined rhetorical fallacies[3] that a writer might resort to, consciously or unconsciously, in an attempt to sway readers into accepting his or her claims through emotional manipulation or illogical arguments.
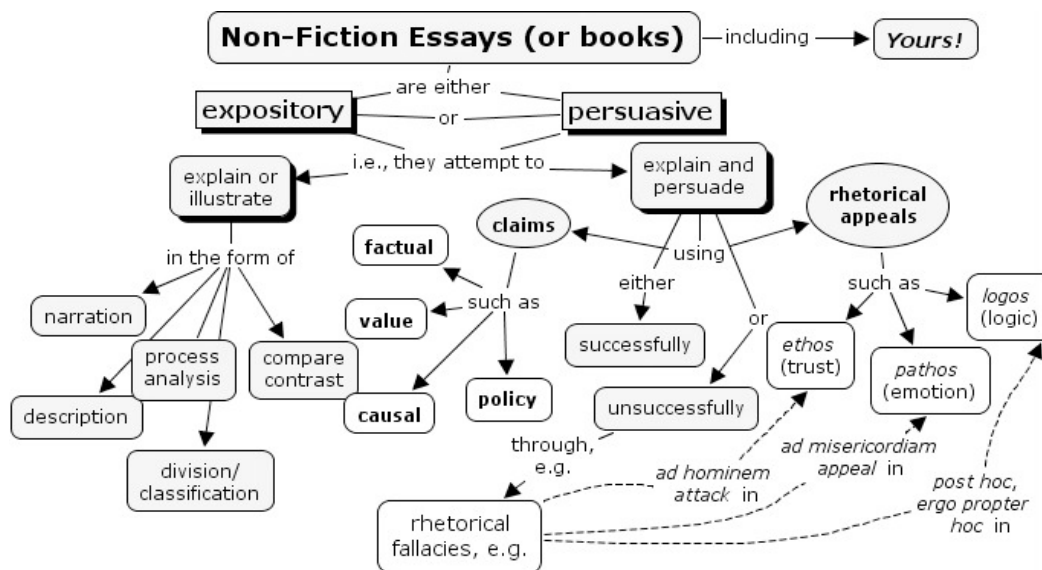

Figure 1. Teacher-generated concept map explaining distinctions between expository and persuasive writing, with claims and rhetorical appeals and some suggested connections between appeals and unsuccessful arguments

Through such maps, we briefly review basic distinctions between expository and persuasive (argumentative) essays, and then focus on argument. Following the hierarchical links from claims to the subsumed modes of factual, value, causal and policy claims; and from rhetorical appeals to the subsumed modes of *ethos, pathos* and *logos* gives my instruction and the students' critical readings, structure. Once they "see" the outline of the basic propositions included therein, such as, "Non-fiction writing either attempts to instruct readers through narration, e.g., or to persuade readers of claims through appeals such as *logos*," they are well on their way to assessing source essays and writing successful critical responses. Eventually, we add a variety of fallacies, easily subsumed as unsuccessful attempts at rhetorical appeals such as *ad hominem* attacks or *ad misericordiam* appeals. Poor organization and bad grammar, mostly in the students' own work, are eventually subsumed as bad *logos* or bad *ethos*.

As we gradually introduce the use of quotes and documentation as evidence, students turn their raw maps into critique-essay-planning documents. See Figure 2 for a student-generated example of such a pre-writing map.
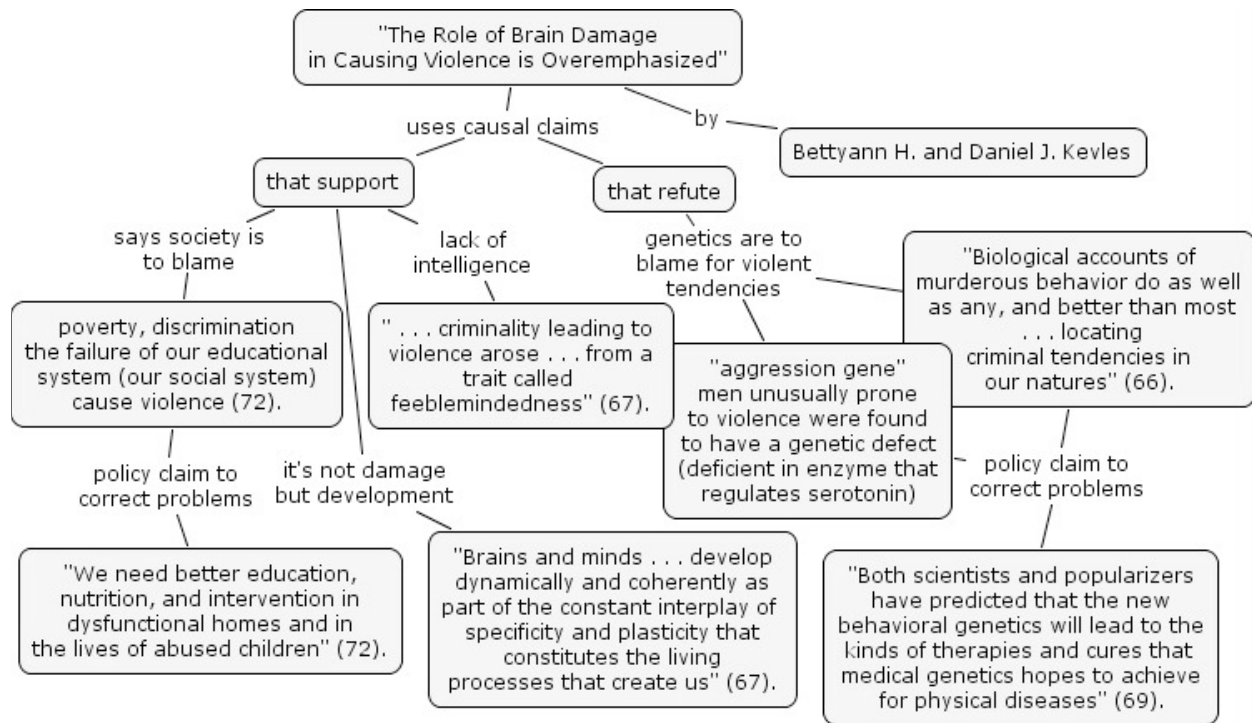

Figure 2. Student-generated map used to organize a critical essay assessing the use of claims
in an essay from one of their required texts - Note the use of exact quotes and page numbers. (Used by permission.)

3.2   *Concept Mapping in Literature and Writing Classes*

In teaching creative writing, we do try to help our students find their inner wellspring of inspiration. However, to write well, one still needs to learn and understand a certain number of essential concepts. As such, part of learning to write successfully is learning to appreciate how other writers have used such concepts. Even here, therefore, concept mapping can prove invaluable for any student of writing, (and aren't we all always students of writing?), from "reverse engineering" a story to planning and/or enriching their peers' and their own stories.

3.2.1   Teacher-Generated Maps - Reverse Engineering as a Guide to Creativity

Novak (1999) writes,

> Undoubtedly, we may develop new concept relationships in the process of drawing concept maps, especially if we seek actively to construct propositional relationships between concepts that were not previously recognized

as related: Students and teachers constructing concept maps often remark that they recognize new relationships and hence new meanings (or at least meanings they did not consciously hold before making the map). In this sense, concept mapping can be a creative activity and may help to foster creativity. (p.17)

Indeed, in searching out a few of literature's universal lessons to share with my literature and creative writing students, I happened upon this central fact: contrast is the key to it all.

For my introductory literature classes, the devices through which writers express their themes are divided into concepts such as "plot," "character," "setting," and "language." Starting with these basics, the hierarchy sub-divides itself into enough subsumed concepts to produce a cogent and organized analysis of story, in general, and any specific story, as well. However, while revising this basic schema for my creative writing class, the very general concept of "contrast," in one form or another, began appearing, as if by magic, subsumed under all other subcategories. In other words, elements of contrast began popping up in plot, character, and language, generating a new map with "Contrast" as its most general topic of discussion, as seen in Figure 3, which follows. Contrast, through this new organization, emerges as the essence of creativity.

Even metafiction, in its interrogation of the relationship between fiction and real life, can be explained thus in terms of its sometimes singular contrast between plot expectations and actual outcomes. For instance, Joyce Carol Oates includes numerous tragic devices in her novel *American Appetites*, producing a tragic expectation that she intentionally thwarts with a rather absurd ending. Margaret Atwood's *The Edible Woman*, on the other hand, contrasts fairy-tale and two-suitor motifs with an unexpectedly "uncomic" and "unhappy" ending of a broken engagement. As a final example, Raymond Carver's "Cathedral" contrasts the majesty of its central symbol to the singularly unimpressive, almost puny, epiphany of its moderately insightful main character. Thus, the mapping process works either way, starting with the major concept then subdividing or reasoning backwards from many specifics to a new major concept, such as contrast.
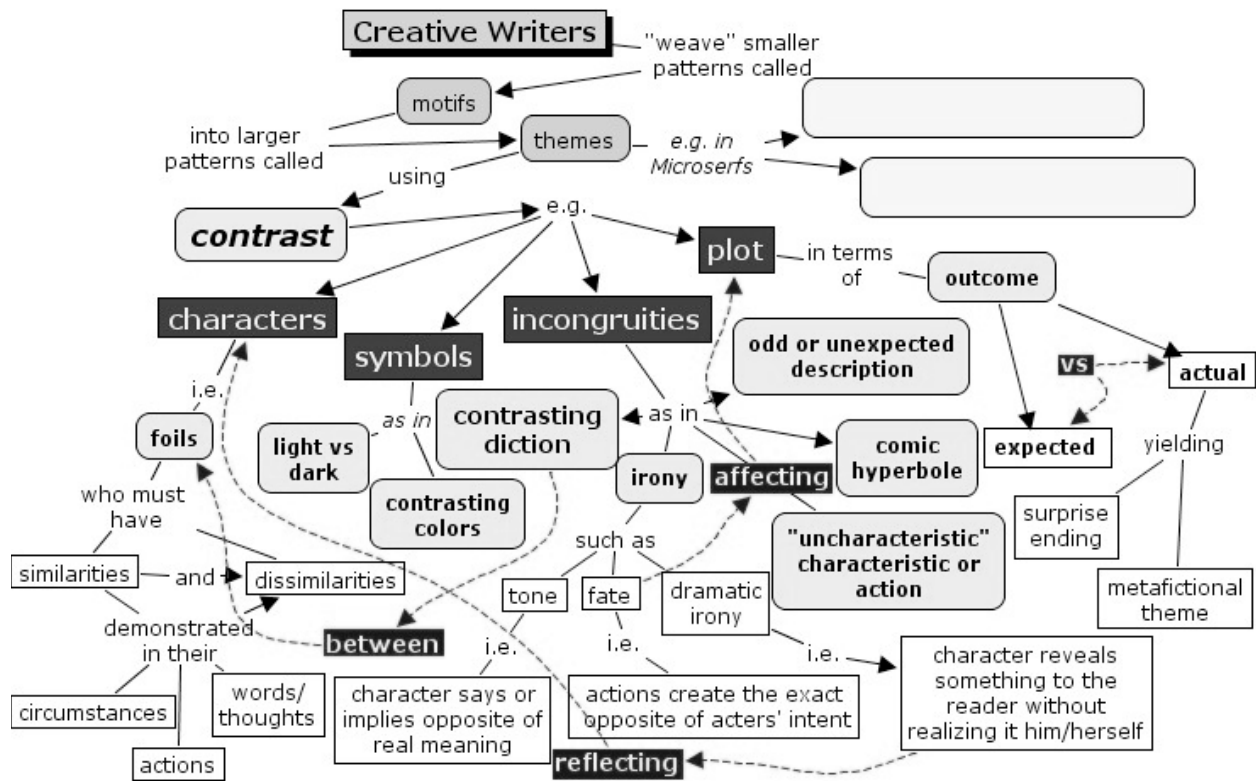

Figure 3. Writers' use of contrast in terms of plot, character and symbolism, e.g., with some blanks for workshop discussion.

This newly emerged hierarchy helped me bridge the gap from literary analysis to creative writing by yielding a new "reverse-engineering" device; once the student has recognized contrast as an important device in the plots,

characters and/or symbolism other writers have used, students can see more clearly how to enhance their own, "borrowed from reality" stories. There's a paradox, however, in moving students from critical analysis of extant stories to creating their own. For those inexperienced in learning and applying the writing lessons of others to their own work, there is a tendency to treat plot and characterization in the stories they've read as if they were all foregone conclusions. At the same time, they seem to view their other source of inspiration, their own real-life stories, as just as concrete and foregone. In other words, they get stuck in the factoids of their lives and fail to explore the possible truths art about their lives could reveal.

3.2.2 Student-Completed Scaffold Analysis Maps

One concept mapping technique I've been developing to resolve these conflicts, using my own "node heuristic" of creativity, is discussed in depth and exemplified in another paper. Here, I wish to discuss an alternative exercise using a combination of literary analysis, film discussion and scaffold concept mapping focused on one crucial use of contrast in story structure, the character foil. Beginning literature students tend to gloss over the writer's carefully constructed "compare-contrast" structure of characterization. By the same token, so do beginning writers. Understanding character foils can help creative writers add the contrast and structure most lives lack to constitute interesting stories.
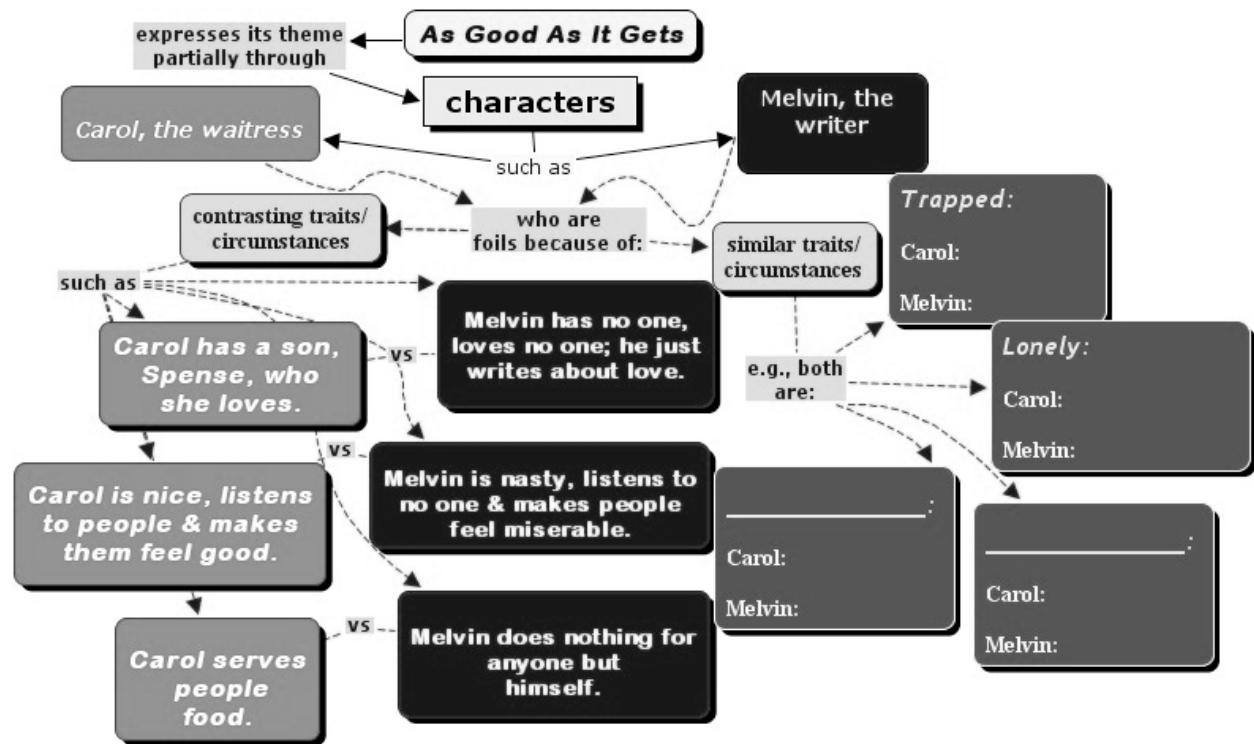

Figure 4. Partially completed scaffold map allows workshop groups to collaborate on discussion of character traits

After screening part of the film *As Good As It Gets*, my creative writing class divides into small workshops to reverse engineer its character structure to reveal how contrasting characters can add conflict and drama to their own stories using scaffold maps such as Figure 4, above. Careful placement highlights the characters' common and contrasting elements, such as the commonalities and contrasts between Carol and Melvin. It works equally well with other character pairs, such as Simon, the artist and Melvin or Simon and Carol. Cross-links on such a concept map can also help students tease out the motifs and themes of the story. Creative writing students can use blank scaffold maps to go beyond this analysis to apply the same principals in a creative way to their peers' and their own stories, in other words, to move from reverse engineering to creative use of structure. Naturally, to help the workshop process along, constructivism meets the Socratic method in such questions as, "What is the central element that leads to the redemption stories of Melvin, Carol and Simon?" and "What do Melvin's compliment, 'You make me want to be a better man,'" and his sending a doctor to examine Carol's son, Spense, have in

common?" With a little effort, students can see the cross-links among these separate acts and bits of characterization, and through the effort of cross-linking them on a map, find a label that works, such as "acts of intimacy and acts of kindness," illuminating another structural element of story, motif.

3.3   Peer- and Self-Critique Scaffolds

The next obvious step is to apply elements of character and plot to specific, original stories to help my students critique each other's work and to add more structure, conflict and drama to their own. The following invites further insight and creativity in terms of characterization and plot and their interactions.
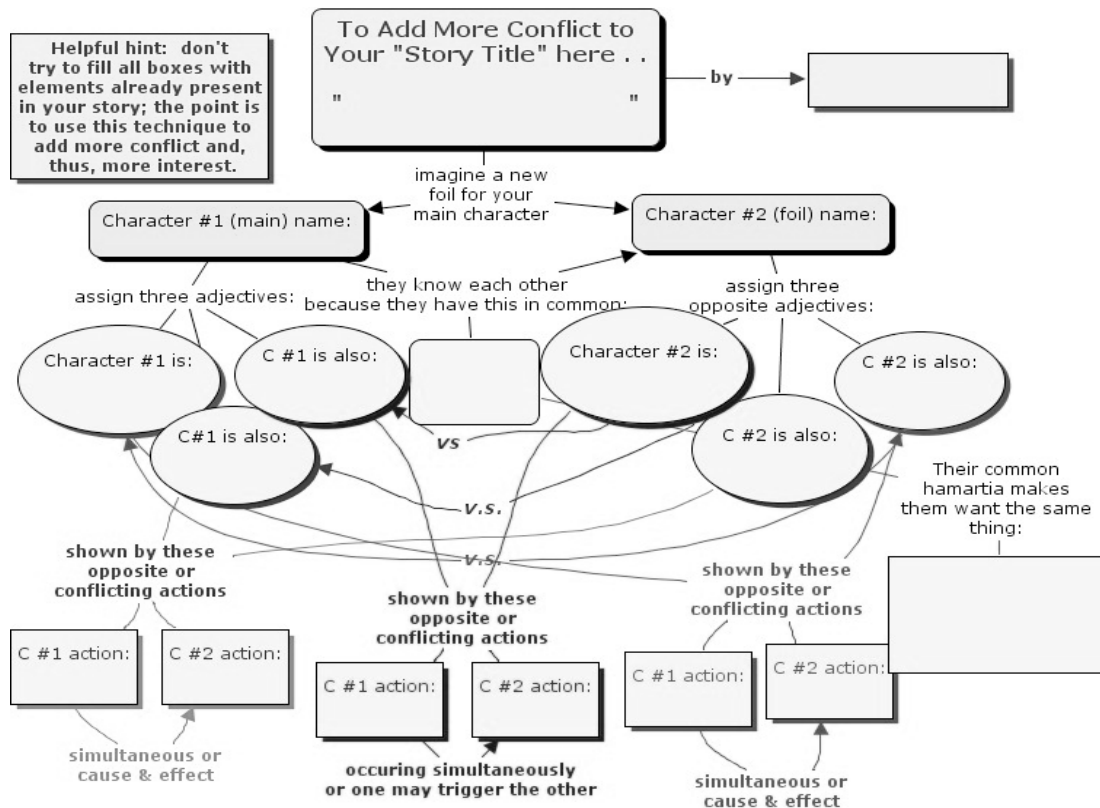
Figure 5. Scaffold map filled in by creative writing students for peer and self-critique
(*Hamartia*, Greek for "characteristic," is often mistranslated as "tragic flaw.")

4   Summary

The structured, hierarchical nature of concept maps has proven useful in all stages of non-fiction and fiction writing classes. After a brief introduction in the form of teacher-generated maps explicating the basic and subsumed aspects of expository, argumentative and literary writing, students move on to their own analyses of extant works. Following this reverse engineering process, students add direct quotes and documentation to their maps to transform them into planning documents for their own essays. Using this heuristic process has resulted in writing, based on analysis of both fiction and non-fiction, which is more rigorous in structure and more objective in content; as well as fiction that is richer and more interesting than that produced without it. Finally, students absorb the lesson that humanities courses also have their content to communicate and apply these lessons to writing, critiquing and revising essays and short fiction.

Notes

1. While there are such mapping techniques as "The Captain Correlli Character Frame," included with the *Conception* package (available at www.parlog.com), lacking structural rigor, it does little to clarify the relationships among a story's separate facets. Therefore, it does not work to "reverse engineer" extant, or to structure new, essays or stories.
2. The Gordon Rule is a state-wide agreement in Florida, similar to agreements in other states, that freshmen and sophomore writing students require at least 6,000 words in writing assignments per semester to improve their writing.
3. Since not all fallacies are failed attempts at logic at all, I resist the standard label "logical fallacies."
4. Due to space limitations, only a small sample of dissertation abstracts reviewed is included in this list; the entire list is available upon request.

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