

Stillness in the Composition Classroom: Insight, Incubation, Improvisation, Flow, and Meditation

Ryan Crawford and Andreas Willhoff

Introduction

Motivating students remains an elemental role of instruction. Many have “overlearned” the five-paragraph theme, grammatical rules, sentence and paragraphing exercises, citing sources, and other common forms of instruction. This overlearning presents challenges to the first-year composition instructor who often must disabuse students of what they have taken as gospel during secondary education, before introducing the idea that successful essays require students to engage in writing more creatively. But even the most carefully constructed curriculum or pedagogy must still be implemented in a classroom that contains a very unpredictable variable: the developing human brain. Technological advances in obtaining real-time imaging of the brain, when performing certain tasks, have led to more concrete information on some of its most mysterious functions. What implications might this research have for First-Year Composition (FYC)? To develop a more informed understanding of this question, and to initiate a search for concrete answers, we may need to look more closely at research and advancements in the field of cognitive neuroscience.

The Neuroscience of Creativity: Understanding Insight, Incubation, Improvisation, and Flow

Magnetic resonance imaging (MRI) has proved especially useful in studying which parts of the brain “light up” during various mental activities. By mind mapping, scientists are beginning to understand the roles played not only by the left and right hemispheres, but the interplay of the various sections of these hemispheres during complex tasks. For instance, as Bowden, et al. put it, insight “is best described as impasse followed by restructuring. However, is reaching an impasse a necessary component of insight? Does one need to restructure a problem to reach an insight?” (323; also see Ohlssen).

Researchers have developed ways of artificially stimulating the brain in order to address these questions. Richard Chi and Allan Snyder of the University of Sydney conducted an experiment in 2011 replicating brain activity during moments of insight. They discovered that people having developed brain lesions in certain parts of the brain were able to avoid the “mental set effect” that often prevents fresh insight. In the healthy brain, these sets develop over time in order to increase the efficiency of repeated tasks. But this efficiency comes at a price, “Once we have learned to solve problems by one method, we often have difficulties in generating solutions involving a different kind of insight” (Chi and Snyder).

Most research on insight—despite its great complexity—has involved simple exercises called “insight problems,” usually word problems requiring “thinking outside the box,” or “matchstick problems” which require a single match to be moved in order to change a false equation into a true one (see Figure 1).

False Statement	Corrected Statement
$III = IX - I$	$III = IV - I$

Figure 1: A Matchstick Problem that Helps Measure Insight

By using transcranial direct current stimulation (tDCS), activating the right hemisphere while inhibiting activity in the left, participants solved a series of matchstick problems, which require the exercise of insight. The participants showed a noticeable increase in success: “Only 20% of participants in the sham stimulation (control) group solved the [matchstick problems] by the end of 6 minutes whereas, in contrast, 60% of participants solved it in the L- R+ group.” Importantly, despite the ambiguity of the findings’ uses, Chi and Snyder proved the necessity of the right hemisphere to be most stimulated, establishing dominance: “[B]y diminishing left hemisphere dominance (either by L-, R+, or the combination of both), we might have increased our subjects’ tendency to examine a problem anew instead of through the mental templates of well-routinized representations and strategies.”

This result should sound a recognizable bell for writing instructors. Incubation has been proven to provide this same sort of “opening door to insight” in the brain. During a problem solving activity, whether it involves something as simple as moving matchsticks or as complex as writing a college paper, the sets of learned hypotheses in the left hemisphere of the brain may inhibit fresh insight. We lose time cycling through models students have learned (e.g., formulaic writing patterns), while often the solution is already there, waiting for a chance to make it through that left brain noise and be discovered.

To access this part of the mind requires a certain stillness, or “forgetting.” Margaret H. Freeman, co-director of Myrifiel Institute for Cognition and the Arts, relates how this is achieved by poets who manage, by use of language, to create a sort of apartness or stillness, a “semblance of felt life” that she terms “poetic iconicity” (725). Reaching this semblance requires the same kind of forgetting that the matchstick problems encourage. As Freeman says: “. . . the conceptual reification that marks discursive language serves to block the underlying, preconscious experiences of the working mind” (724). The First-Year Composition student has no real need (nor, perhaps, the skill level necessary) to reach and maintain this complex level of disinhibition. But by finding his or her own kind of stillness—simply stepping away from a paper and working on something new, or participating in some form of meditation—the learned sets within the student’s mind may diminish in importance. Thus, the potential of new insight (which leads to motivation) increases significantly.

Chi’s and Snyder’s results back up decades of research on the hemispheric brain and how it relates to the creative process. The results are, however, inconclusive, as the exact balance of inhibition and stimulation remains at the end of their report a mystery. Chi and Snyder recognize that this relatively small experiment leaves much yet to question, concluding, “Further brain stimulation studies in combination with neurophysiological imaging and a variety of control tasks are needed to determine the specific mechanisms of actions leading to the effect and whether the pronounced cognitive enhancement we found is generalizable to other tasks.”

In order to provide a more developed understanding of exactly what is going on in

the brain during the process of insight, some researchers such as Charles Limb have—even before Chi's and Snyder's findings—constructed experiments that allow functional magnetic resonance imaging (fMRI) paired with BOLD (Blood Oxygen Level Dependent) imaging during moments of improvisation. This process measures blood flow (increase/decrease) in different parts of the brain during different activities. Limb, an otolaryngology specialist, is also a practiced musician, serving on the faculty of the Peabody Conservatory of Music. His research, while examining creativity as a whole, has focused chiefly on music and music's influence on neural activity. His findings are among the most revealing to date on what exactly is happening in the brain during creative work.

Working with jazz musicians and freestyle rappers, Limb monitored blood flow in the brain during two sets of exercises. The first involved a piece memorized (“over-learned”) by the performer days before the experiment. The second exercise was improvisation based. The jazz pianist had to include particular chords as he improvised. The rapper had to incorporate certain words that Limb spoke into a microphone while the rapper was freestyling. During both exercises, the majority of brain activity was seated in the frontal lobe. Within this area is the dorsolateral prefrontal cortex (DLPFC), believed to “be involved in self-monitoring,” and the medial prefrontal cortex (MPFC), “thought to be autobiographical or self-expressive” (“Brain on Improv”). The over-learned exercise revealed active use of the DLPFC, as the brain “remembered” the studied notes. During the improvisational exercise, however, the MPFC was significantly activated while the DLPFC was significantly deactivated. As Limb postulated during a TED talk in 2011,

We think that to be creative, you have to have this weird dissociation in your frontal lobe—one area turns on and a big area shuts off so that you're not inhibited, so that you're willing to make a stake, so that you're not constantly shutting down all of these new generative impulses (“Brain on Improv”).

To align these musical findings more with “expressive communication,” Limb then performed an exercise called “trading fours,” in which musicians trade off improvisational performance—in this case, piano jazz between Limb and a professional pianist. In these studies, he found that Broca's area, a part of the brain involved in communication, was activated during the “conversation” of trading fours. Limb believes this somewhat backs up the idea that music itself is a language, and therefore, has many correlations with language both written and spoken.

He furthers the correlation with language by conducting experiments similar to those with jazz pianists, but involving spoken word artists—in this case, freestyle rappers. Just as with the over-learned versus improvisational sets of the musicians, in every rapper studied, the MPFC was activated and the DLPFC deactivated. What is most interesting about the findings of these experiments is that the visual areas of the rappers' brains were also “lighting up” while their eyes remained closed. This occurred only during the freestyle section of the experiment. They were then, in some sense, “seeing” something as creation was taking place, perhaps watching insights stream past, choosing those they wanted to use and allowing the rest to plunge back into darkness.

A study published in *Neuron* in 2006 supports this theory:

. . . the role of self-related cortex is not in enabling perceptual awareness, but rather in allowing the individual to reflect upon sensory experiences, to judge their possible significance to the self, and, not less importantly for consciousness research, to allow the individual to report about the occurrence of his sensory experience to the outside world. (Goldberg, et al. 337)

More recently, Siyuan Liu and colleagues at the National Institutes of Health have conducted studies which confirm and expand upon Limb's findings. In a study comparing "freestyle (improvised) and conventional (rehearsed) performance," Liu and his team took fMRI scans similar to Limb's. In addition, they utilized spatial independent component analysis (sICA) to "remove imaging artifacts associated with connected speech or song." The results matched Limb's, displaying a significant increase in activity in the MPFC, as well as decreases in the DLPFC. Liu observed:

Improvised performance was characterized by significant increases in activity of the medial prefrontal cortex (MPFC), extending from the frontopolar cortex to the pre-supplementary motor area (pre-SMA), and decreases in the dorsolateral prefrontal cortex (DLPFC), extending from the orbital to superior regions. (Liu, et al.)

To take the research one step further, Liu also scanned the rappers over time. To investigate what changes might be taking place, changes in brain activity were recorded over eight measures. An examination of these findings shows clearly that at the start of improvisation more activity was present in the left hemisphere (associated with the over-learning hypotheses). By the end of the eight measures, the bulk of activity had shifted to the right hemisphere (associated with dreams and meditation). This shift suggests that the performing of a creative task can lead, over time, to a dream-like, meditative state, allowing for a break from self-monitoring and an increased chance of reaching more generative states of invention.

It may not at first be apparent how these studies apply to the composition instructor and the classroom. Jazz pianists and practiced freestylers are, if they are any good, highly trained, while the average FYC student is, at best, a journeyman in the craft of writing. But it is still training that provides the bridge between these disparate groups. Improvisation does not necessarily depend on a high level of skill, but it does require a certain amount of input. The amount of input (preparation) invariably affects the quality of the improvisational act, be it playing a piano or writing a paper. What tapping into the improvisatory parts of the brain could achieve, over time and with much practice, is an internalization of a student's metalanguage, automatically steering the student away from unproductive or over-learned practices and leading her, eventually, to richer insight generating in the early stages of the writing process, and more enjoyment (and therefore motivation) throughout the entire process.

Limb's and Liu's research backs up Graham Wallas's theory of generative structure in his classic text *The Art of Thought*. Considered the seminal text on the creative process, it first laid out what has become a strong support for writing theory. According to Wallas, there are four stages of creation. The first, preparation, involves the absorption of material. Problems revealed within this period of absorption may be solved during the second stage, incubation, during which connections are made and strengthened. The third stage,

illumination, involves the ordering of these connections and the generation of insight. Verification, the final stage, tests the validity of this insight within the context of the medium in which they are presented.

This process is indeed occurring with each individual (jazz pianist and rapper) under study, but so rapidly that they all appear to take place simultaneously. Improvisation can be seen, then, as a rapid succession of insights, achieved and ordered (verified) so quickly they seem to an observer to course effortlessly forth, as if on tap. For the FYC student, this process would, of course, be significantly slower. But by introducing the process early and practicing it often, a transfer may carry into further writing activities and facilitate communication beyond the bounds of the classroom, rendering an otherwise rote responder an enthusiastic generator of insight.

The process echoes numerous psychological studies conducted with the same goals in mind—in particular those of Mihaly Csíkszentmihályi, known for his theory of “flow.” Csíkszentmihályi has published much on this process, describing it in terms very similar to the work of Wallas, Limb, and Liu. His definition of flow is, as he explains it in an online interview,

. . . being completely involved in an activity for its own sake. The ego falls away. Time flies. Every action, movement, and thought follows inevitably from the previous one, like playing jazz. Your whole being is involved, and you're using your skills to the utmost (Geirland).

The fMRI scans of Limb and Liu, revealing areas of the frontal lobe “lit up” during creation, are visual representations of this flow, images giving shape and definition to what before was only theory. Csíkszentmihályi's theory has been applied to many fields, including alternative education systems like Waldorf (which involves a music-based curriculum) and Montessori, both of which support lengthy “free-form” class sessions to encourage the sort of deep absorption they believe necessary for a holistic understanding (read “incubation and insight”) of particular problems and the engendering of a student's motivation to learn curricular material.

Again, there is a very great divide between the skill level of a beginning piano student (in keeping with Limb's research subject) and a highly trained jazz pianist. The same goes for an FYC student and, say, a novelist like Günter Grass, or an essayist like Joan Didion. Csíkszentmihályi addresses this divide: “Flow . . . happens when a person's skills are fully involved in overcoming a challenge that is just about manageable” (*Finding Flow* 30). This balance, he says, is fragile. “If challenges are too high one gets frustrated, then worried, and eventually anxious. If challenges are too low relative to one's skills one gets relaxed, then bored. If both challenges and skills are perceived to be low, one gets empathetic” (30). This issue of challenge is of particular importance.

To a large extent it is not the lack of challenge in the FYC classroom that leads to stale or inadequate papers, but the wrong kind of challenge (often inflexible). The challenge may be one that attracts little or nothing from the student's personal perceptions—such as a topic that an instructor chooses for the student—resulting in an absence of interest. Nakamura and Csíkszentmihályi argue that when flow is reached, there is an intrinsic motivation (89). There must, however, first be a problem or assignment flexible enough to

allow for genuine interest if this flow is to be reached, allowances for what Csíkszentmihályi calls “attentional resources and biases” (89). It might be helpful, then, to think of the requirements of reaching flow (in a composition classroom) as quadrants of a whole: skill level, challenge, *interest*, and *time* must all be matched.

Csíkszentmihályi has observed that those who “find” flow often achieve a great amount of happiness. The psychology behind happiness and its link with creativity is linked with evolution. We are biologically “rewarded” (in the form of positive feeling) for discovering new or novel solutions to problems. This feeling, or affect, encourages us to continue our search for these novel ideas. This is why, as Csíkszentmihályi said during a 2004 TED talk, people with creative careers tend to be happier. While others repeat the same basic patterns on a daily basis, these creative individuals are making discoveries regularly, setting off whatever combination of chemicals that lead to that “rewarding” feeling, and, in the process, encouraging further insight.

With this biological process in mind, we may more easily answer the question of how to motivate the FYC student. To start, we can create and implement exercises and assignments which allow to the greatest extent possible room for discovery. And that requires, among other things, that we focus more on the second stage of Wallas’s model: incubation.

Application in the FYC Classroom: Meditation as Incubation

Limb’s and Liu’s research provides a definite physiological basis to once- mysterious processes, a foundation upon which, one hopes, further research will be conducted and applied to a variety of fields. A fascinating correlation to this research is the increasing number of studies conducted on meditation, utilizing the same equipment for brain imaging that Limb and Liu deployed.

Internationally, and for several years now, researchers have been using fMRI to scan the brains of monks during moments of intense meditation. During a 2003 study at the University of Aarhus, Denmark, researchers reported that while subjects were in a meditative state,

The fMRI images show a significant increase in the activity of the prefrontal cortex (gyrus frontalis medius, right side, Brodmann area) Simultaneously . . . significantly less activity was found in two other areas: the gyrus occipitalis superior and the anterior singulate...[which] is associated with conscious activities that are directed by the will. (Ritskes, et. al. 87-88)

The study discusses the role of the gyrus frontalis medius in relation to previous research:¹

. . . based on studies of people with frontal lobe lesions [the same impetus for Chi and Snyder’s research] . . . increased activity in [the gyrus frontalis medius] is thought to be associated with enhanced insights and attentiveness, heightened interests, sharper mental focusing, and deepened emotional resonances. (Ritskes, et al. 89)

These areas of the brain are within the prefrontal cortex, closely linked with the MPFC.

¹ See Austin, J.H., *Zen and the Brain*. Cambridge: MIT Press, 1998.

The brain images from the research resemble those scans taken from Limb's and Liu's studies. Brian Knutson, a neuroeconomist at Stanford University, conducted a similar experiment targeted towards a particular stage of meditation: focused compassion. He found the MPFC—the exact area activated during Limb's scans of improvisations—showed a noticeable increase in activity, as did the striatum, or reward center, of the brain (see May, *San Francisco Chronicle*).

The results of these studies on meditation offer many parallels to long-standing theories of the writing process. Meditation has been proven useful not only in increasing the overall well-being of participants but also in leading to greater insight. Some have already implemented meditation in writing classrooms, with success, cognizant, perhaps, that it is another form—merely a more conscious and focused form—of incubation.²

In the rush of a FYC semester, incubation is often overlooked or only briefly mentioned to students who, without a clear idea of what the instructor means or perhaps perceiving it as an unnecessary (because ungraded) part of the curriculum, dismiss it. While it is true that incubation often occurs whether students know it or not (as they clean their room or take a drive to visit their parents, for example) the benefits may increase when a certain “focus” is retained. In other words, planning incubation and “experiencing” it might lead, with practice, to more frequent and richer moments of insight.

Often cited, James Moffett suggests that students should be coached to meditate during the writing process in order to allow a more natural affect to imbue their writing. As Moffett writes:

All this traditional school and college writing only *looks* mature because it is laced with highly abstract generalizations, quotations from the greats, current formulations of issues, and other ideas received from books or teachers. Such haste to score, to make a quick intellectual killing, merely retards learning, because those writers have not worked up those generalizations themselves. (233)

Moffett goes on to suggest that what is lacking is adequate “expiation” during the drafting process. Students, he says, need more “small-group interaction” that would allow “task talk, improvisation, and topic discussion” (233).

Emphasis must be held on self-reflection in the composition classroom, not only to improve the quality of student work, but to foster motivation. Moffett notes that the practice needed for any novice to become a better writer (and improviser) can more effectively be achieved by allowing students to locate on their own a personal space in which writing becomes self-expression instead of rote reporting: “If practiced as real authoring, not disguised playback, writing *discovers* as much as it communicates” (234). This can be achieved by consistently encouraging students to reflect not only on what they are writing but why they are writing it, as well as incorporating as much as possible the silent moments necessary for that reflection to take place.

Whether they realize it or not, most writing instructors already do incorporate silence as part of their pedagogy. Charles Suhor states, “Teachers at all levels allow silent time for reading Silence is at a premium during in-class writing time” (24). Suhor is

² Editors' note: For example, see Wenger, Christy I. “Writing Yogis: Breathing Our Way to Mindfulness and Balance.” *JAEPL* 18 (Winter 2012-2013): 24-39.

referring to the humanities classrooms of secondary institutions, but his message applies to writing classrooms in general. He mentions silences during drafting, during “good class discussion,” and in peer editing, all of which apply to the FYC classroom. Suhor suggests various ways of integrating the silence that is necessary to generate students’ insight. He references Moffett and his advocacy of nonsectarian meditation in the classroom, echoing that similar techniques have been utilized in the writing classroom for years with positive results, despite the fact that a certain amount of controversy from outside institutions prevented a wider spread of use because some institutions have “equated it with hypnosis, mind control, and New Age religion” (25). Both Moffett and Suhor argue the insignificance of these potential dangers in comparison to the necessity of stillness, not only in the classroom but in the student’s life outside of the classroom.

Treating a research paper as an occasion for secular meditation is not counterintuitive. Meditation can, in fact, establish firmly in the student’s mind exactly how she feels about the subject or question, leading to a well-developed thesis before looking at page one of research. If sustained long enough, meditation can also lead to the kind of incubation that helps a student arrive at fresh insight. Moffett posits meditation in the writing classroom including the use of mantras similar to the “Jesus prayer of the heart.” Because the mind can be difficult to quiet, the repetition of a single word or phrase can lead, it is believed, to a state of transcendence, a “one-pointed” consciousness (238).

One of the authors of this essay has recently found success in his FYC classroom using guided mediation, with student-chosen theses as “mantras,” preceding freewriting exercises. After a short talk on connotations surrounding meditation, to dispel the discomfort that often accompanies the notion of meditation as New-Age nonsense, students were encouraged to close their eyes and focus on a particular image, then repeat their thesis mentally with every slow inhalation and exhalation of breath. After two minutes, they were to begin writing without pausing or editing. Following this activity, several students reported, unprompted, reaching insight (most often phrased as an “aha moment,” a “different angle,” or a “surprising turn”) that led to greater interest in their particular project (and, subjectively, to a more interesting paper). Another activity which met with similar success was an improvisational freewriting exercise modeled on Limb’s fMRI freestyle rap study. Preceding the activity, students were told that following meditation they would hear a series of words, one every thirty seconds. Each word, or an association elicited from that word, was to be incorporated into their freewriting (pausing and editing discouraged). Once again, students were asked to focus on a particular image and mentally chant their thesis mantra. Again, students reported experiencing insight and, later, a greater interest in the writing of their essay.

Conclusion

This essay suggests that a better understanding of the human brain’s functions could productively lead to a partnership between cognitive neuroscience and composition studies, particularly in the use of fMRI to study the relationship between meditation activities and writing upon FYC students.

Regardless of particular pedagogical and personal beliefs, instructors should at the very least take a closer look at the role meditation can play, and how much emphasis we

place on it while teaching the process of writing. Students' experiences in our classrooms become the tools they carry with them when they leave, fundamentally shaping their work in subsequent classes and, to some extent, their interaction with the world at large. As communication becomes ever more complex, curricula designed to match this complexity will benefit the student the most. As skilled labor is increasingly outsourced, the majority of professional jobs are now based on forming well-considered ideas. Paradoxically, acquainting students with stillness and with accessible methods of meditation will prove most useful to them in preparation for a world that demands them to reach insight quickly and consistently, to think on their feet, and to take ideas off the top of their heads.



Works Cited

- Austin, J.H. *Zen and the Brain*. Cambridge: MIT Press, 1988. Print.
- Bowden, Edward M., M. Jung-Beeman, J. Fleck, and John Kounios. "New Approaches to Demystifying Insight." *TRENDS in Cognitive Sciences*. 9.7 (2005): 323-328. Print.
- Chi, R.P., and A.W. Snyder. "Facilitate Insight by Non-Invasive Brain Stimulation." *PLOSone*. 6.2. (2011): n. pag. Web. 25 October 2012.
- Csikszentmihály, Mihaly. *Finding Flow: The Psychology of Engagement with Everyday Life*. New York: Harper Collins. 1997. Print.
- . (2004, February). Flow, the Secret to Happiness. [Video file]. Web. 7 September 2013. Retrieved from <www.ted.com/talks/mihaly_csikszentmihaly_on_flow.html>.
- Freeman, Margaret H. "The Aesthetics of Human Experience: Minding, Metaphor, and Icon in Poetic Expression." *Poetics Today*. Volume 32.4 (2011): 717-752. Print.
- Gierland, John. "Go With the Flow." *Wired Magazine*. 4.9. New York: Conde Nast, September 1996: Print.
- Goldberg, Ilan I., Michal Harel, and Rafael Malach. "When the Brain Loses Its Self: Prefrontal Inactivation during Sensorimotor Processing" *Neuron*. 50.2 (2006): 329-339. Print.
- Limb, Charles J., and Allen R. Braun. "Neural Substrates of Spontaneous Musical Performance: A Study of Jazz Improvisation." *PLOSone*. 3.2. (2008): n. pag. Web. 30 October 2012.
- Limb, Charles. (2010, November). "Your Brain on Improv" [Video file]. Web. 7 September 2013. <www.ted.com/talks/charles_limb_your_brain_on_improv.html>
- Liu, Siyan, Ho Ming Chow, Yisheng Xu, Michael G. Erkkinen, Katherine E. Swett, Michael W. Eagle, Daniel A. Rizik-Baer, and Allen R. Braun. "Neural Correlates of Lyrical Improvisation: An fMRI Study of Freestyle Rap." *Scientific Reports*. (2012) n. pag. Web. 25 November 2012.
- May, Meredith. "Stanford Studies Monks' Meditation, Compassion." *San Francisco Chronicle*. 8 July 2012. Print.
- Moffett, James., "Writing, Inner Speech, and Meditation." *College English*. 44.3 (1982): 231-246. Print.
- Nakamura, Jeanne, and Mihaly Csikszentmihály. "The Concept of Flow." *Handbook of Positive Psychology*. Snyder, CR, and S. Lopez (Eds.). New York: Oxford University

Press, 2005. 89-105. Print.

Ohlsson, Stellen. "Information-processing Explanations of Insight and Related Phenomena." Ed. M. Keane and K. Gilhooley. *Advances in the Psychology of Thinking*. London: Harvester Wheatsheaf, 1992. 1-44. Print.

Ritskes, Rients, Merel Ritskes-Hoitinga, Hans Stødkilde-Jørgensen, Klaus Bærentsen, and Tue Hartman. "MRI Scanning during Zen Meditation: The Picture of Enlightenment." *Constructivism in the Human Sciences*. 8.1 (2003): 85-89. Print.

Suhor, Charles. "Surprised by Bird, Bard, and Bach: Language, Silence, and Transcendence." *The English Journal*. 80.2 (1991): 21-26. Print.

Wallas, Graham. *The Art of Thought*. New York: Harcourt, Brace and Company, 1926. Print.