THE MOST DANGEROUS CREATIVITY STUDY: FLUENCY, TIMED WRITING, CREATIVE PRESS, AND CHALLENGING STUDENTS TO ENGAGE FLOW

by

BRIAN P. O'SHEA

(Under the Direction of Bonnie Cramond)

ABSTRACT

This study addressed how environmental press might enhance the creative thinking skill of fluency in timed journal writing. Further, this study investigated whether Flow state could be induced through the use of a gamified online writing app which forced participants on continually generate text for a specified time. Participants were divided into two treatment groups, one which wrote using a gamified writing app, and one which simply typed journals without the app. Each group was asked to write timed daily journals, and a word count was done to determine the effect of the writing app on verbal and ideational fluency. It was found that when provided timed open journal writing opportunities, participants generated similarly greater numbers of words and ideas regardless of app use. Students who used the writing app tended to self-report better attitudes about writing and higher self-reported levels of creativity than those who did not.

INDEX WORDS: Creativity, Fluency, Flow, Timed writing, Gamification

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BRIAN P. O'SHEA

B.A., Wofford College, 2002

M.A., Middlebury College, 2008

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BRIAN P. O'SHEA

Major Professor:	Bonnie Cramond
Committee:	Melisa Cahnmann-Taylor
	Tarek C. Grantham
	Nancy F. Knapp

Electronic Version Approved:

Suzanne Barbour

Dean of the Graduate School

The University of Georgia

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DEDICATION

For Elkin, whose love strengthens and drives me, propelling me through this life and all the others we will spend together. Without you, I could not have done any of this, my beetle bride.

And for Mom, who I'm sure is proud of me, and would crown me for taking so long. I miss you.

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This research project has been the product of many years of frustration, false starts, disappoint*ment*, disappoint*ing*, and feelings of fraudulence and inadequacy. It has also been an exercise in humility, resilience, hard work, dedication, and challenging my own demons and self-doubt head on. This, of course, never something that one does by oneself, and I have been blessed a thousand times over with a cast nobody (let alone a [not so] humble doc student) deserves.

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I love you mostest.

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CHAPTER ONE

Introduction

> *Csikszentmihalyi can help our students experience the existential difference between consuming and making, between the shopping mall and the blank page. The mall offers unnumbered products, experiences, and emotions to consume -- none of which requires a spark of creative spirit or effort. The mall says, "You can relax. I have everything. Everything depends on me." But the destructive subtext is "You are nothing." On the other hand, working on a difficult writing project is anxiety-producing. "You better worry," says the blank white page. "I have nothing. Everything depends on you." But the constructive subtext is "You are everything."*
>
> - Gina Briefs-Elgin "Happiness and the Blank Page: Csikszentmihalyi's Flow in the Writing Classroom"

As my current school's writing center director, I am responsible for developing events that enhance the writing process for students and provide support for the unique needs of high school writers. In October of 2017, we hosted a "College Essay Writing Night" for seniors who were having difficulty composing their responses to the application prompts from various colleges, the Common Application, and the Coalition Application. After the typical rah-rah, the "You can do it" speech, a YouTube video or two, and unpacking the various prompts, we ate pizza and had writing time for all the students. As they composed, I circulated among the twenty or so students, stopping here and there to give a "That's interesting" or a "Hm. I like what you did here" or a "You might want to slow down this writing a little and do a bit more showing with this text." When I got to Xavier[1], a slight, talkative young man with a personality as loud as the boisterous chatter that crossed his lips, I found a student staring at a blank Pages document, jaw slack, eyes glazed over.

[1] This name, as all others in this document aside from my own, has been changed to protect the identity and confidentiality of participants.

"What are you thinking?" I asked, already sure of the answer.

"Mr. O'Shea, I just don't know what to write."

"Which prompt are you doing?"

"This one about having to pick myself up after something bad happened."

"Yeah, you're talking about resilience. That's a good one. Colleges like to know that you're not going to quit if you have a hard time with something."

"I know."

"What are you going to write about?"

"I don't know. I already told you that."

"Well, have you ever had to pick yourself up?"

"I had to this one time at the state track meet when I tripped over one of the hurdles and fell. But I don't know if that's what this means."

"No, no, you're right on track. That's a good one." I didn't bother mentioning how perfect the metaphor was; the kid needed to start writing. "You had to finish, right?"

"Yeah."

"I think that's a perfect one about picking yourself up and not quitting. Why don't you start there and write about that?"

"Okay."

Two minutes later, I rotated back over to Xavier's station, where he was once again zombified in the face of the desktop machine. Clearly, Houston had a problem.

"What's going on? Why's your page still blank?"

"I just don't know how to get started with this, Mr. O'Shea."

"Just like we talked about. Just write the story of hurdle falling story you talked about."

"Like what, just 'This is the time I had to pick myself up' and go from there?"

"Well, maybe slow it down a bit. Just describe the experience. You know, like you're telling a story. Start with how it feels when you're running and what you're thinking, go through the fall and why you got up, and just go from there. Think about the videos and the tips."

"But how do I start the idea, and how am I supposed to keep that going for a whole essay?"

I had to get this kid writing something -- anything at this point -- in order to generate some kind of useful text he might be able eventually to use in producing an application essay. I had no grades to hold over him, no token reward since I'd already given out the pizza, and no time left in the increasingly dwindling workshop to map this out with a graphic organizer.

A piece of devilry would have to suffice.

"Close that blank page. Open Firefox. Go to themostdangerouswritingapp.com. Click on that pencil next to the minutes and make sure the circle is around three. Click start writing. Now type 'hello' and wait." The look of horror on Xavier's face five seconds later when his text disappeared, the screen turned red, and a big "You Failed" popped up was priceless.

The premise of "The Most Dangerous Writing App" is relatively simple: users of the web-based writing app are asked to set a specific amount of writing time (three minutes to an hour) or a word count goal (75-1,667) and to type continuously for that amount of time or word generation. Should the typist stop typing for more than five seconds, all work to that point will be deleted, the screen will turn red, and a "You Failed" message will display in the typing field. In addition, continuing to hit delete without generating any new content will result in a deletion

of all constructed content. All in all, it's the hesitant writer's worst nightmare and the slow writing generator's arch enemy.

"Now, start with what's going on in your head when you're running hurdles, then keep writing. And don't stop; if you do, you'll lose it."

"But what if I can't think of anything."

"Keep writing."

"You mean I'll lose it?"

"Keep writing."

"I have to keep typing for all that time?"

"Keep writing," I said, and walked away chuckling.

I ambled back over five minutes later to find Xavier still clacking away on the keyboard, leaning in toward the screen, an almost aggressive stare having replaced the blank looks of ten minutes ago. I told him to stop and read.

"But I don't want to lose it; I think it's good."

"Don't worry, you're good on time. Trust me. Just read me what you have."

I can't recall exactly what Xavier had written, but I vividly remember the complexity of the piece he had started. It began with an internal monologue of running cadence, described the kinesthetic experiences of hurdling, shifted into narrative, and progressed through the painful, slow-motion, "oh no!" experience of the trip and fall over a hurdle. It could have been the opening to the final draft of a short story in the creative writing class. It could have been the first page of a published novel.

"Now that -- THAT'S -- a piece of writing."

"I know. I just had to keep going, and eventually, it just came out that way."

And he smiled.

Xavier had experienced something that Csikszentmihalyi (1990) calls Flow. Put clinically, Flow could be best described as the optimal experience of a task. It might further be explained as the moment when an individual is fully immersed and invested in an activity or process with no outside distractions interfering with the cognitive demands of the task. Brought down to the most basic definition, Flow is best understood as the moment a person loses all outside distraction and "gets lost" in the process and practice of an activity.

Xavier's experience at our college essay night workshop led me to experiment with The Most Dangerous Writing App in my own English classes. Before incorporating this app into my classroom practice, I (like many high school English teachers) typically gave students a broad journal topic, told them to write for five minutes, and watched them jot down two sentences before staring off into space. The bored, disengaged ethic of the assignment was palpable, and the "journal" turned out to be less "generate writing" and more "sit quiet for a couple minutes and hope Mr. O doesn't pick me, and even if he does, I'll just make it up on the spot."

The day after the college essay workshop, I watched my own English 101 students doodle and text after being assigned a five-minute journal to write about their favorite fairy tale. It was enough already; I was finished with this lack of engagement. I wanted my students to feel some Flow with their writing. I wanted them to feel the experience of creation and of getting lost in the process and practice of generating and crafting text. This was the point at which I said "Okay, stop. Hang on a second. I want all of you to write for the whole time, so here's what I'll do: I'll give you a shorter time if you agree to write the entire time. I'll even give you a bit of *motivation*," making sure I emphasized the last word with air quotes. I gave my students the same instructions I gave Xavier on college essay night, and watched them work

furiously to beat the app. I saw a few students fail, get mad, and restart to try and beat the clock. I saw the aggressive typing face. I saw writing. I saw engaged authors. Hallelujah.

After the requisite 3-5 minutes (just to make sure that students had run out the clock on the app), they shared some of their writing on the topic. Without fail, everyone had more. Then I threw out a question: *What did you think about using the app?*

Answers ranged all over the map, from "I thought it was stressful" to "It was kind of fun." When I followed up with "Did it help you get into the writing at all? Was it easier to write?" students responded with anything from "I was so worried about losing my work that I just kept typing" to "At first it was hard, but once I just started typing, the writing became easier; I could just keep putting ideas down." Some students even indicated that they tried to find innovative ways to get around the constraints of the app by manipulating their typing and "producing" text for the requisite time. "I just started hitting things on the keyboard to keep going," said one student.

Across the board, students noted that they tended to keep writing (or at least do "writing activity") for the entire time rather than just write a short burst and wait for the rest of the journaling session to finish. This informal result led me to ask myself whether The Most Dangerous Writing App – or a similar gamified writing app – could push students to generate greater amounts of text in their timed journal writing. I also wondered whether the writing they produced generated a greater number of ideas, if that writing went into greater depth than writing without the app, and if students could let go of self-censorship and get themselves lost in the activity – the "Flow" – of text generation if they were pressured to keep writing without stopping. In short, the question was: can a gamified writing app as a part of the classroom

environment be a tool to increase verbal and ideational fluency in students and have them attain Flow?

Statement of the Issues

As an English teacher, I have experienced varying degrees of success with engaging students in writing. Some students find writing an inborn process that allows them the opportunity to demonstrate knowledge in ways a standardized or multiple-choice test cannot. Others, of course, dread the notion that they must produce text -- on topic text at that -- that fills the dreaded three-to-five-page standard short essay. *You want a thousand words?* they ask, incredulous. *You want ten pages or something? You trying to kill me? That's too long, Mr. O'Shea! How am I supposed write that much about something?* My favorite moment of exasperation, of course, is *How am I supposed to B.S. that much? Do you understand how many ideas I need for three pages?*

At the theoretical level, writing intuitively seems to be one of the purest forms of creativity in a student's core curriculum. In nearly all its forms, written work (whether narrative or analytical) requires the construction of new and useful products based on the synthesis of several complex cognitive processes. For example, Torrance and Jeffrey (1999) described writing as the outcome of "the complex interplay of several different sub-processes or functions (content generation, content organization, lexicalisation, transcription, and reading)" (p. 1). Segments of Torrance's Minnesota Test of Creative Thinking (1962) and Torrance Test of Creative Thinking (1966) revolve around writing narratives, scenario responses, and titles. Csikszentmihalyi specifically categorized writing as a creative endeavor when he said:

> The point of writing is to *create* information, not simply to pass it along . . . It is the slow, organically growing process of thought involved in writing that lets the ideas emerge in

> the first place . . . writing gives the mind a disciplined means of expression. It allows one to record events and experiences so that they can be easily recalled and relived in the future. It is a way to analyze and understand experiences, a self-communication that brings order to them . . . writing becomes a therapy for shaping some order among the confusion of feelings . . . writers can experience flow [by] creating worlds of words in which they can act with abandon . . . when writing is used to control experience, without letting it control the mind, it is a tool of infinite subtlety and rich rewards. (1990, p. 131-132)

All this is to say that writing is an activity which engages and interweaves many essential cognitive processes: comprehension, recall, analysis, and ultimately synthesis and creation. Moreover, writing represent the ultimate locus of control for students; the page is where their ideas and voice are the only entities in the universe of the written word.

In the non-theoretical daily grind of the schoolhouse, however, many students view their writing in composition courses as a chore to be stricken from the to-do list of their daily tasks rather than a process of creation. This is more than my own 13-years long compilation of anecdotal observation in the English classes I teach; student attitudes toward writing are less than enthusiastic. Although Briefs-Elgin (1997) explained that "we don't need surveys to tell us that many students don't enjoy writing . . . because writing can be a laborious task involving complex performances and -- worse -- riddled with unknowns" (p. 71), she did note that on a survey of preference:

> writing a five-page paper came out first on only 17 of the 71 surveys. Painting five rooms beat writing a five-page paper 33 times. Digging a ditch beat writing a five-page

> paper 28 times, and at least 10 students chose the root canal over the five-page paper. (p. 71)

The joke "prefer having a root canal" nearly writes itself here, but the larger issue remains: many students don't like to write. Many students find writing hard. Many students find writing a task that does not come easily. Many students don't feel like it's a "thing" they can get "into." Supporting this notion is the latest writing attitudes survey from the 2011 administration of the National Assessment of Educational Progress in which 56% of eighth grade and 57% of twelfth grade students said they either "dislike" or "strongly dislike" writing (NAEP, 2012). In short, writing is not an enjoyable, creative activity; when in the clutches of school and curriculum, it is a decidedly dreaded and uncreative endeavor.

Students want control, ownership, and motivations that allow them to optimize their experience – conditions Csikszentmihalyi (1990) associated with "Flow" – with their writing. Jeffery and Wilcox (2014) explained that students felt positive about writing that allowed for openness, engagement, and subjectivity, and felt negative about writing which was rigid and based merely on regurgitation of information. This finding reinforces Knudson's (1993) discovery that attitudes toward writing become increasingly negative for students between grades 1 and 11. This steady rise in negative attitude toward writing likely has a connection to writing as a series of skills aimed at conformity of structure and style. Similarly, Tunks (2010) documented an increase in negative attitudes toward writing in elementary school students when they were taught writing skills in large part to prepare for a state standardized assessment of academic writing skill. Oddly enough, Knudson (1993) found that high school seniors' attitudes toward writing reversed negative trends. She presented possible explanations in noting that these older students:

> may be developing understanding of themselves as writers as well as understanding of writing tasks from the time they enter school through the early adolescent years. It is also possible that Grade 12 students are more positive because less capable, and presumably less positive, students have already dropped out of school. (p. 592)

One possible explanation she overlooked is that seniors are largely free from the constraints of standardized writing examinations; they are often able to generate and experiment with a wide range of ideas and language in writing assignments.

Standardization, and the constraint and conformity measured by standardized tests, has incrementally taken over much of the educational landscape. Since the pre-Civil War era, and reaching across American educational history to today, theorists, practitioners, and (most influentially) politicians have sought to "disrupt" education by making easily scored psychometrics the linchpin of "good" teaching and learning (Reese, 2013). This rise in standardized assessments as the method of measuring student achievement and success (pre-dating, but definitely including the educational landscape since the institution of the No Child Left Behind Act of 2002) not only seems to influence student attitudes toward writing; writing quality and achievement suffer under a standardized test-driven (not to be confused with standards-driven) educational Zeitgeist. Kohn (2000) explained his issues with standardized test writing assessments clearly and bluntly when he said these "tests" of writing:

> require students to analyze a dull chunk of text, cough up obscure facts, or produce cogent opinions on command about some bland topic -- hardly an authentic assessment of meaningful learning. What's more, these questions are often scored on the basis of imitating a contrived model (such as cookie-cutter five paragraph essay) rather than

> tapping real communication or thinking skills. Preparing kids to turn out high-scoring essays can *inhibit* the quality of their writing. (p. 12)

The drive to teach students the skills needed to turn out high "achieving" scores on these assessments as rewards for conformity hurts the underlying skills and quality of writing and negatively impacts already-declining attitudes toward writing (Kohn, 2000).

This decline in quality is well documented as far back as the 1970s. NAEP writing data from the 1960s and 1970s helped support a common belief (sparked by a 1975 *Newsweek* cover proclaiming to explain "Why Johnny Can't Write") that writing scores were on the decline (Bereiter & Scardamalia, 1986). Stedman and Kaestel (1987) noted the stagnation in student performance on standardized tests of writing. Clark (1980) explained that students writing for "success" on standardized writing assessments faced difficulties in communicating once presented with the real-life quality expectations of written work. While NAEP writing scores between 1998 and 2007 remained relatively stable, there was a significant rise in the number of students scoring "Below Basic" on the 2011 administration (NAEP, 2008; NAEP, 2012). And disturbingly enough, Singleton-Jackson, Lumsden, and Newsom (2009) discovered that even graduate students did not score significantly higher on the SAT II writing exam than college-bound high school seniors, leading them to conclude that declines in writing ability are not limited to K-12 education.

At the same time that writing achievement has declined, a marked decline in creative thinking has been documented in today's educational climate. For example, Kim (2010) made clear that while creative thinking behaviors in young children are mostly influenced by home environments, clear and statistically significant drops in overall performance on the Torrance Tests of Creative Thinking (TTCT) in school-aged children mirrored a change in school

environments since the 1990s. Specifically, Kim blamed a "decline in creative thinking" on "some change stifling children's creative thinking in schools" (p. 293). She further noted an "increased emphasis on standardized testing may have shifted the emphasis in schools toward drill exercises and rote learning, and away from critical, creative thinking" (p. 293). Ultimately, she believed that "[t]he high-stakes testing environment has led to the elimination of content areas and activities . . . which leaves little room for imagination" (p. 293). In other words, a system of education which values standardization and conformity of structure has quantifiable negative impacts on the creative thinking abilities of school-aged children. Teachers have identified factors such as lack of time, timed testing, a culture of authoritarian control, large amounts of paced curriculum, and assignments based on drills and worksheets as factors which inhibit creativity in the classroom (Flieth, 2000). Students have noted that creativity has been perceived as disruptive behavior to be disciplined (Flieth, 2000), and Kim and Hull (2012) found that high school dropouts who show high levels of creative personality traits (such as extreme extroversion or introversion) and score well on creative thinking assessments quit school at least in part because school environments required collectivist and conformist thinking which the students found frustrating.

Responses to the popularly-labeled "Creativity Crisis" further evaluated how environments as defined above inhibit creative output. Treffinger (2012) felt the crisis went beyond the trend of score declines Kim unpacked, and were directly related to:

> continuing and inappropriate over-emphasis on high-stakes testing . . . misuse of "standards" to drive instruction to the lowest levels of knowledge and recall without attention to creativity, innovation, and open-ended problem solving . . . narrow focus in professional development on skills and strategies that promote enhanced test performance

> rather than building expertise . . . [and] an overall failure to inspire schools and communities to strive for a loftier vision and build awareness and support for creative learning. (p. 12)

Runco (2015) noted how creative potential is "being relegated, or even stifled . . . in the educational system, or at least those parts of it that require standardization and accountability" (p. 4). He further added that the connectivity of social networks (a true reality influencing the daily environment of public high schools) encourages individuals to post collectivist and conformist thought designed to elicit "likes" and "upvotes" as extrinsic rewards, rather than original thought and intrinsically motivated content (2015).

An intuitive understanding of standardization in schools would note that achievement is based upon the practice of forcing students to conform to the nature and needs of standardized testing. Sternberg (2016) went so far as to say that higher achievements on testing are the result of continued practice on such assessments. But Sternberg went further, noting that the outcomes and products of creative individuals are more valuable to world problem-solving and advancing civilization than performance on a typical machine-scored bubble test. And it is this practice of creativity which Sternberg valued that can similarly promise results in our increasingly standardized schooling. Reisman, Floyd, and Torrance (1981) found that students who score well on tests of divergent thinking – specifically the Thinking Creatively in Action and Movement test - achieve higher on academic readiness tests. Hicks (1980) discovered a correlation between students who were taught creative thinking skills and high performance on standardized reading achievement tests. Several studies have found positive correlations between scores on creativity measures and levels of academic achievement (Edwards & Tyler, 1965; Feldhusen et al., 1971; Hansenne & LeGrande, 2012; Niaz et al., 2000). Gajda,

Karwowski, and Beghetto's (2017) meta-analysis of 120 studies evaluating the relationship between creativity and academic achievement found positive correlations, taking particular note of higher correlations with creativity and standardized achievement measures. Powers and Kaufman (2004) even found slight correlations with creativity scores and achievement on the GRE. This data would seem to fly in the face of those who would value continued "skill and drill" as the way of fostering higher achievement on standardized testing. Rather than more test prep, then, a move away from the standardized mindset of schools appears to be both an alternative method of ensuring success on standardized tests and a means of ensuring that students are taught valuable (and adaptive) skills needed for the problems of the world beyond the schoolhouse.

Although a basic underlying understanding of logic requires acknowledging that "correlation does not equal causation," it is not too far a stretch to conclude that a climate and culture of standardized testing that encourages – even champions – conformity, convergent thinking, and strict adherence to basic skills and principles is likely to quash creative thinking processes despite their promise in producing academic achievement. This squelching of creative and divergent thinking, designed to enhance achievement, is actually a detriment to increasing standardized scores. By extension, original writing (the product of several creative processes) is a victim of scholastic environments which praise convergence and squelch creativity. It is also a reality of public schools that standardized testing and assessment is not leaving the environment anytime soon (as billion-dollar industries are not likely to voluntarily extricate themselves from their profit market). The challenge for researchers and educators, then, is to find a way to have students generate non-standardized writing in a way that enhances creative thinking and optimal engagement.

Definition of Terms

For the purposes of this study, an understanding of several key words and phrases is necessary. While these terms may have many denotations, their specific connotative meanings in this study are part of the key to understanding and interpreting the findings of the study.

This study is an attempt to further the literature in the study of creativity. Creativity itself is a difficult concept to quantify and define. Since student creativity is at the heart of this study, a working definition of creativity for this study is necessary. Here, creativity means the act of using creative thinking skills and strategies to produce original solutions or products. In conjunction with this working definition of creativity, the term creative thinking refers to cognitive processing which resists convergent, conformist, or close-ended solutions. The specific creative thinking skills assessed by the creative thinking test used in this study included flexibility, the ability to think of many different ideas. The review of literature includes an in-depth discussion of creativity and creative thinking which supports these operational definitions.

Since the participants in this study were all high school seniors, the terms participant, student, and senior are all used interchangeably. In particular, student and senior are terms used to humanize the voices the data represents.

Writing activities were a large part of the data collected in this study. Several terms associated with writing should be clear. The term timed writing means any narrative, essay, or journal writing that is produced with a time limit or constraint. Journals are low-stakes prompted writing activities used as a way of informally introducing or evaluating course content. Building on this idea, the term open-ended journals refers to journal responses which allows the writer any leeway s/he wants to address a journal prompt. This is different from freewriting, which is an

activity in which the writer does not respond to a prompt, but rather chooses all topics and content s/he creates.

The application of the treatment was a manipulation of students' environment. Environment, however, need not only apply to external factors; in the case of this study, environment does not only refer to *physical space*, but is more appropriately defined by the *social*, *emotional*, and *psychological* parameters established within a defined community. This relates to Rhodes' (1961) definition of "press," which he says is "the relationship between people and their environment" (p. 308). Given the working definition of environment above, and given that much creativity research recognizes a similar standard, Rhodes' "press" will be used interchangeably with "environment."

The term fluency has specific meanings in creativity research. Guilford (1973) explained that fluency could be defined as "the ability to think of many ideas; many solutions to a problem" (p. 2). For this study, two types of fluency have been evaluated. Verbal fluency refers to the number of unique words a respondent produces in an activity; Ideational fluency refers to the number of unique idea units a respondent produces in an activity. For the purposes of this study, a word count minus word garbles (including repeated or randomly typed text) was the calculation for verbal fluency. Ideational fluency was counted as the number of unique idea units produced in a written response. Criteria for calculating both verbal and ideational fluency are discussed in Chapter 3. These definitions are consistent with working definitions used for the Torrance Tests of Creative Thinking (TTCT) (Torrance, 1966).

Csikszentmihalyi (1990) described Flow as a state of optimal experience in which individuals are free to engage in an activity without distraction from outside forces. Since Flow

refers specifically to an individual's state of mind during a task, the word "Flow" and the phrase "Flow state" are used interchangeably in this study.

Purpose of the Study

The purpose of this study was to determine whether creative press could influence creative fluency. Specifically, it looked at whether low-stakes timed journal writing as a daily classroom practice affected the amount of text and number of ideas students generated. It also evaluated whether using an online writing application that required the continual generation of text drove students to let go of self-censorship in their timed writing. The questions that guided the research study were:

1. Does student use of a gamified online writing app (specifically "The Most Dangerous Writing App" or "MDWA") for daily low stakes open-journal writing significantly increase the number of words and ideas on an imaginative story task as compared to those written by students who do not use a gamified writing app for daily open-journal writing?
2. Does daily timed open-journal writing influence student attitudes toward writing and creativity? Does the application of a gamified writing app to timed open-journal writing make a difference in these attitudes?
3. How do students who write daily open-ended journals describe their experiences of their writing? Are the described experiences different for students who use a gamified writing app and those who do not? Do these experiences connect with Flow theory?

Significance of the Study

The information gained from this study has the potential to further inform the study of creativity and creative production. First, it evaluates the efficacy of using time pressure to

increase creative fluency. This not only may inform the literature on the teachability of creative thinking skills but also can directly lead to the development of classroom practices which enhance student creativity.

In addition, the activities in this study were designed to have students "let go" of their inner editor/censor and achieve Flow during their timed writing. Teaching students to achieve this optimal experience in limited-time scenarios has the potential to increase both the quantity and quality of writing output. Since this study makes use of an online application specifically designed to pressure users into Flow state, it contributes to the literature describing how digital applications facilitate cognition.

Finally, this study quantifies the effect creative press has on hardwiring creative thinking processes in students. If this is the case, creative thinking tasks similar to the activities of the study can be designed to enhance creativity across the curriculum.

CHAPTER TWO

Review of the Literature

> *I felt that from that day onwards a new world of delights and sufferings had opened for him – the world of art; it seemed as though I had been prying into something which no-one ever has the right to see, the birth of the mysterious flower of poetry. I felt both fear and joy, like a treasure seeker who should see a flower upon a fern; I was joyful because suddenly, quite unexpectedly, the philosopher's stone which I had been seeking in vain for two years was revealed to me – the art of teaching how to express thought; I felt fear because that are called forth new demands, a whole world of desires which were not consonant with the environment in which the pupils lived, as it seemed to me in the first moment. There was no mistaking it. It was not chance but conscious creativity.*
>
> – Leo Tolstoy, "Who Should Learn to Write from Whom?"

It is a truth universally acknowledged that a teacher in possession of a creative student must be in want of ways to facilitate the growth of that student's creative abilities. This truth is so well fixed in the minds of educators that this student becomes the focus and pivot point of how the teacher approaches the daily learning tasks of the classroom. This student's presence then forces educators to see curriculum as a vehicle for all students (not just the creative one) to exercise and display their creative abilities. Or so one might think.

It turns out that schools are places where the value placed on standardized test achievement (which measures convergence and conformity and eschews creative thinking) has led to actual declines in creative thinking abilities of American students (Kim, 2010). The value of such tests of convergent thinking is so high that they comprise a large percentage of school report card ratings. These values, which have major implications for school status and funding, can't help but seep into the practices of the typical American classroom. And why shouldn't it?

The most important thing a student can do is perform well on a standardized test in order to solidify the school's reputation. In a standardized world where convergence is king, an educator might even ask *What is the value of enhancing creativity by providing a creative environment for my students?*

In "An Analysis of Creativity," Rhodes defined and highlighted what have become contemporarily known as the "4 Ps" of creativity: person, product, process, and press (1961). Of particular note is Rhode's evaluation of "press," or "the relationship between people and their environment" (1961, p. 308). Specifically, Rhodes said:

> Creative production is the outcome of certain kinds of forces playing upon certain kinds of individuals . . . A person forms ideas in response to tissue needs, sensations, perceptions, and imagination . . . Each idea that emerges reflects uniquely upon the originator's self, his sensory equipment, his mentality, his value systems, and his conditions to the everyday experiences of life. (1961, p 308)

The working hypothesis of this study was that an environment which fostered creative production in the form of daily, timed, low-stakes journal writing would lead to higher levels of creative fluency in student writing. Further, it was believed that the elimination of "down time" for students and gamifying the process of this daily writing activity would increase verbal and ideational fluency. Additionally, it was thought that the intersection of gamification and time constraint would facilitate student engagement of Flow. Ultimately, it was thought that using the course environment to change daily classroom activities into a creative challenge would enhance the creative environment, which in turn would leads to increases in students' creative fluency.

To that end, this review of literature covers ground which supports the argument that creative fluency and the ability to engage Flow are directly related to the environmental

pressures created in a classroom. Manipulating that environment through the use of timed writing, as well as forcing students to eliminate down time by challenging them with a gamified online writing application, was evaluated in the study. For this reason, it is important to understand student attitudes about timed writing and the efficacy of gamified apps in the building of cognitive and creative skill.

Ultimately, it is essential that educators understand creativity as a production process. Enhancing fluency and Flow through the application of environmental elements which foster creative thinking benefits students both in the classroom and beyond school years.

Creative Thinking and Creativity

Guilford's 1950 presidential address to the American Psychological Association advocated researchers to "discover the creative promise of our youth . . . [and] promote the development of creative personalities" (p. 445). In making such a call, Guilford ostensibly argued for a pedagogical environment in which the fruits of creativity are cultivated through nurturing the cognitive processes of creative thinking. These processes include divergent thinking activities, which Guilford (1973) labeled as flexibility, fluency, originality, and elaboration (among others). These divergent thinking activities in turn lead to creative ideation, a practice quantified through Simonton's parameters of "the idea's initial probability; the idea's final utility; [and] the prior knowledge of the . . . utility" (2016, p. 4). Ultimately, the intersection of creative thinking activity (or creative cognition) and ideation leads to the production of original products, or "artifacts of thought" (Rhodes, 1961, p. 309) that demonstrate non-standardized, nonconformist responses to problems presented to the individual.

If educators were to take Guilford's pronouncements and encouragement seriously, then it was crucial to have research and development in several vital domains: first, creativity needed

to be defined and quantified into processes that could be pedagogically engaged and grown. Second, researchers and practitioners in education needed to develop means and methods by which they might optimize students' environments for creative thinking and production. Third, educators needed to allow students opportunities in content and coursework to practice creative thinking and put that thinking to work in the solving of problems or the meeting of challenges. These three prongs – definition, development, and practice – needed to then be rigorously evaluated and assessed in order to determine the efficacy of press and practice in increasing creative thinking among students.

Process-Production.

More importantly, teaching practitioners needed to understand the importance of viewing creativity as a process-production cycle rather than as simply a set of personality traits. After all, most foundational definitions of creativity emphasize the production of unique and useful artifacts over personality and attitude: Historical definitions of creativity – from Aristotle to Galton – required creativity to be exercised and demonstrated in order for it to be recognized (Rothenberg & Hausman, 1971). Creativity researchers doing empirical work had product production at the heart of their working definitions (Bleedhorn, 2003; Cropley, 2001; Glük, Ernst & Unger, 2002; Kirschenbaum, 1989; Puccio, Treffinger & Talbot, 1995; Torrance & Torrance, 1971; Vervalin, 1971). And while multiple studies evaluated creativity as a process of idea generation and experimentation in response to problems (Hennessey, 1994; Kaufman et al., 2008), the very idea that process is "measurable" seems to argue for an understanding of process *as* product. All this is to say that the place where creativity is truly demonstrated is in the production of some new item or way of thinking.

Construction of concrete or intellectual artifacts in response to challenges, prompts, problems or difficulties is the natural manifestation of creativity in educational contexts. For example, Torrance (1962) defined creative thinking "as the process of sensing gaps or disturbing, missing elements; forming ideas or hypotheses concerning them; testing these hypotheses; and communicating the results, possibly modifying and retesting the hypotheses" (p. 16). This definition posits that creative thinking arises from a process of theory-building; active, real world testing of theory; evaluating results of testing; and revising theories for future exploration. Applied to a classroom, this definition might be practically envisioned as a space in which students have access to attitudes (emanating from a professional educator) and tools (including classroom supplies and task vehicles) that allow for cognitive experimentation. This experimental environment would encourage unique ideas without the restrictions of convention, conformity, or correctness. And while certain parameters for idea generation would be needed (the use of written language or a specific scientific experimental protocol, for example), the process of thinking of new ideas, testing the new thoughts, and responding to results without censorship would ultimately encourage students to seek creative solutions to academic challenges.

In the classroom, student responses to content are the vehicle for such demonstration. Torrance sought to measure the ability of students to practice such process-product oriented creative thinking in his "Imaginative Story Task" on the Minnesota Tests of Creative Thinking (Torrance, 1962). In this task, Torrance asked participants to choose from a list of ten unusual story premises (as well as an open or free-write option), and then "write the most interesting and exciting story you can think of" (1962, p. 247). In conjunction with the novelty of seemingly absurdist premises, Torrance instructed participants to ignore convention and experiment with as

many different ideas as they could possibly develop (1962). Further, he offered two key boundaries: the response must use written language, and the response must be produced within a ten-minute timed setting. The values dictated in the "Imaginative Story Task" prompt reflect Torrance's notion that production in the form of writing is a natural conveyance method of creative thinking processes. Further, specific instructions which clearly asked participants to value production and execution of unique ideas and eschew convention, conformity, and standardization demonstrated a freedom for creative thinking which might easily be translated to the classroom. Finally, the setting of a rules and boundaries for creative production offered respondents restraints which gave their responses focus, drive, and practicality an otherwise unbounded prompt would not.

Ultimately, creativity, especially when it comes to the everyday process of the classroom, relies upon production. While there are those who would qualify and define creativity as a set of personality traits (Csikszentmihalyi, 1996; Smith & Fäldt, 1999), assessments of these personality traits are based upon production (including both articulated thoughts and concrete artifacts). In looking toward production models of creativity and past definitions that emphasize personality, educators allow themselves to create an environment in which all students can demonstrate creativity as part of an ongoing production of work. Rather than dividing up and segregating creative students from uncreative students, the classroom teacher who appreciates creativity as a demonstrative act values the divergent thinking capacity and capability of all students.

Press and Creative Environment.

Rhodes (1961) was careful not to limit his understanding and explanation of the creative environment. His definition of press (included above) does not limit creative responses to only

physical environments. While, yes, students most assuredly a respond to physical (or "tissue") needs, creative responses also arise from the social, emotional, psychological, and pedagogical factors in a given classroom. In considering this, it would be wise to consider the myriad ways in which press might be shaped and molded to best foster and nurture creative output.

In his discussion of stress (as perceived by individuals), Runco (2007) noted that social and environmental factors - which neatly fold into Rhodes's definition of "press," - were not the only potential "stressors"; "social and situational factors," like peer pressure to conform to social norms or social media platforms that encourage users to create content for as many so-called "likes" as possible, are also elements of press (p. 163). In addition, Skaggs (2016) explained that press - both the forum and rules of play for any given environment – provides constraint for the creative process and may either enhance or hinder individuals' ability to produce creative products.

The literature correlating classroom environment and student outcomes is quite robust. Environment has been found to directly impact student success and engagement (Fraser & Fisher, 1982; McArthur, 2015; McRobbie & Fraser, 1993; Shernof et al., 2017; Sommer, 1965; Tas, 2016). And while certainly not a primary indicator of the rigor or fullness of the scientific literature investigating how classroom environment impacts student achievement, a UGA Libraries search and Google Scholar search using the terms "classroom environment" and "student performance" yielded 17,935 and 2.32 million article results respectively. A search using the same terms with the Institute of Educational Sciences database ERIC listed 3,090 results. Suffice it to say, the environment of a classroom is a core component of student learning, and how an educator constructs the classroom environment inevitably leads students to develop particular response patterns to course content. Put another way, students perform based

on the expectations of the environment, and this environment is the result of physical, social, emotional, psychological, and pedagogical structures in place. And if this is generally accepted knowledge in the educational literature, it is reasonable to assume that environment designed to foster creativity would have the same positive relationship with creative output.

The immediate impact of a creative environment for the classroom is twofold: it enhances the creative thinking of students (Davis, 1991; Feldhusen & Treffinger, 1980), and it facilitates higher academic achievement (Torrance, 1981). Such environments ultimately produce students who are more stimulated, engaged, and responsive to classroom content (Suciu, 2014). Beyond the schoolhouse, though, there are long-term benefits from fostering and nurturing creativity in students: creators and innovators who shape the future of economic growth and development are nurtured in creative classrooms (Vantassel-Baska, 2016). Additionally, students who are exposed to healthy creative environments will be able to independently seek out physically and psychologically healthy creative environments and endeavors later in life (Cramond & Connell, 2009; Kelemen 2017).

Amabile (1983) described the ideal environments creative individuals seek out. Specifically, her analysis of researchers, bankers, and railroad employees found that there were nine traits that promote creativity and nine that inhibit creativity. The optimal creative environment included traits which allowed for autonomy for the individual to problem solve in non-convergent ways, encouragement and enthusiasm for new ideas, challenges that represented novel or engaging problems, and pressure to accomplish important things. Creativity inhibiting environments, on the other hand, were characterized by constraint of how individuals tackled problem solving, critical evaluation not geared toward growth, time pressure fueled by an unreasonable amount of work, and a culture of stagnation. It should be noted that “time

pressure" (in the category of inhibition) is associated with the assignment and completion of an entire project. In contrast, timed writing functions as a challenge and constraint designed to foster creative processes.

While Amabile did argue that constraint in dictating problem solving methods could inhibit creative thinking, there does appear to be an important role for constraint in focusing and sharpening creative thinking. Haught (2015) explained that constraints "govern the generation of ideas, and they provide criteria for the evaluation of ideas. Without constraints, there is no creativity" (p. 166). This notion correlates with the findings of Andrews and Farris (1972) that time pressure enhanced production and fostered innovation. They did note, though, that when pressure was "markedly out of line with the pressure desired . . . performance was likely to suffer (Andrews & Farris, 1972, p. 198). In directing and enhancing classroom creativity, educators must carefully construct environments which adequately constrain and push students to develop creative solutions, while at the same time limiting "out of line" pressure that can squelch creative output. More succinctly, teachers and other classroom practitioners can foster creativity by making use of Johnson-Laird's (1988) apropos (if macabre) murder analogy: they must provide the motive, means, and opportunity for creative processing. The introduction of a game-like challenge as press seems a balance between providing constraint for writers while also alleviating the risk of "out of line" pressure.

Fluency.

To many, the term "fluency" is the degree to which a person exhibits mastery and comfort with a skill or knowledge base. Often, it is associated with how proficient a non-native speaker is with an acquired language, the fluidity of an aloud reading voice, or the depth to which a person can explain difficult concepts to a content novice. In creativity studies, however,

"Fluency" is a measurement of the opportunity for original and innovative output. Guilford (1973) explained that "Fluency" was a core component of divergent thinking, defined as "the ability to think of many ideas; many solutions to a problem" (p. 2). Torrance (1962) argued that "Fluency" is a key aspect of creative thinking that should be measured in an overall assessment of creative thinking ability. He specified that it was "the ability to produce a variety of ideas or hypotheses concerning possible solutions to problems" (1963, p. 95). Although not sufficient to denote creativity, Runco (2007) explained that fluency is a foundational element of the "numerous and varied" responses required for divergent thinking (p. 9). Eysenck (2003) argued that solutions to novel problems must arise from a wide pool of ideas and associations related to the problem. This ability to generate many ideas satisfies the creative individual's need to construct, analyze, and assess the "remedies and solutions" to problems and issues (Torrance, 1963, p. 95). Thus, although fluency is not the sole indicator of creative thinking, it is a necessary skill for creative thinking and problem solving.

While it is not sufficient to meet most definitions of creativity, fluency does have a relationship to the divergent thinking trait many believe to be the *sine qua non* of creativity: originality. Fluency and originality have a positive correlation when they are measured as distinct processes (Duman & Dunbar, 2014). Silvia (2008) even found that the relationship between fluency and originality correlated at nearly r=.9. Hovecar (1979) even found that fluency was a confounding factor when evaluating the originality of ideas on tests of divergent thinking, going so far as to say that separating originality scores from fluency scores removes the reliability of originality scores. This is not to say that fluency is the only measurable characteristic which should be considered with originality. Runco and Albert (1985) found that fluency was not necessarily associated with originality in populations of gifted students.

Regardless of its interconnectedness or confounding nature in regard to originality, ideational fluency is a key component of creative thinking because it offers greater *opportunity* for original thought. With a larger number of ideas comes the greater chance that an idea will be original. Runco (1986) even found that researchers noted higher levels of originality original thinking ideation lists. The obvious takeaway is that when an individual generates a larger number of ideas, common or unoriginal responses will eventually be discarded, and original ideas will become necessary. The more ideas an individual generates (higher fluency) makes the exhaustion of common or convergent ideas or solutions – and the occurrence of original ideas – more likely.

But is fluency teachable? And even if it is, are there practical benefits for teaching such a skill to school children? Guilford (1973) instructed teachers to enhance fluency by specifically asking students to generate as many ideas as possible when considering alternative uses for common objects. Torrance (1963) found that students produced more ideas when they were given guided practice in generating ideas, provided environments in which they competed for the greatest number of ideas, and were allowed to practice ideation without judgement. And Benedek, Fink, and Neubauer (2006) found that ideational fluency could be trained and enhanced through a regimen of practice targeted at the specific skills of idea generation. The practical impact of teaching students techniques to enhance ideational fluency goes beyond increased scores on creative thinking metrics, though. Torrance (1963) discovered that teachers who used fluency in the approaches to teaching problem solving had students who "showed significant growth in creative writing, whereas the pupils of those teachers . . . [who did not] actually showed a slight decrement between the pre-and post-test of creative writing" (p. 32). In other words, students who were trained to produce a great number of ideas were able to put their

training into practice when given the task of producing novel and original written material. Alarmingly, those students who did not receive such instruction and practice not only failed to grow in their creative output, but actually regressed in their ability to produce unique and innovative written content. Teachers' ability to demonstrate fluency in the classroom -- to come up with many ideas and hypotheses regarding the improvement of achievement and classroom relationships -- was closely associated with higher student academic achievement as well (Torrance, 1963). This outcome is likely the product of students' learning to tackle issues and problems based on the model the teacher presented; when students saw that their instructor was willing to come up with and try many innovative ideas in teaching and managing the class (and keep trying new ideas when old ones did not or stopped working), they were likely to use the same approach to tackle academic content difficulties. The sticktoitiveness of this problem-solving orientation in which fluency plays a vital role is connected to student achievement and success in schools.

These findings have been replicated and have many practical applications. Sun et al. (2016) specifically correlated training in creative thinking and long-term increases in fluency. Additionally, Kurtzberg and Reale (1999) found that teaching students ideational fluency using a curriculum that required such skills resulted in significantly higher fluency scores on an assessment of creative thinking. They addressed criticisms that they were "teaching to the test" by arguing that teaching skills (whether tested or not) "and applying them to the curriculum is practiced routinely by good teachers" (1999, p. 206). Kim, Chung, and Yu (2013) discovered that a properly constructed program in which students were given instruction on the vital problem-solving skill of fluency produced significantly stronger fluency scores in a test-

retest of creative thinking ability. Fluency is a teachable creative thinking skill, and that skill has a practical impact on the ability to produce and enhance the quality of creative products.

Flow and Conditions for Flow

In evaluating the attainment of ideal performance and experience of tasks, Csikszentmihalyi identified a state of optimal experience he termed "Flow." He described and defined the Flow experience as:

> Situations in which attention can be freely invested to achieve a person's goals, because there is no disorder to straighten out, no threat for the self to defend against . . . it is the opposite of psychic entropy -- a fact sometimes called negentropy-- and those who attain it develop a stronger, more confident self, because more of their psychic energy has been invested successfully in goals they themselves had chosen to pursue . . . we are in control of our psychic energy, and everything we do adds order to consciousness. (1990, p. 40)

Put another way, "Flow State" (a term Csikszentmihalyi coined to reflect how individuals described optimal experience as "floating" or "in the flow") occurs in individuals when they are free to work to the best of their abilities on a task free from distraction or pressure from forces outside the prescriptions of the task.

The achievement of "Flow State" (or "Flow" for short) arises from various conditions. Csikszentmihalyi noted the potential for spontaneous generation environments that foster comfort and good-natured interaction. These occasions however, he noted, were rare, and not likely to arise by chance or coincidence (1990). By contrast, "Flow" could be induced externally through structured activity or internally though self-motivated self-actualization. (Csikszentmihalyi, 1990, p. 71). Optimal Flow experiences are characterized by a series of rules for an activity, an experience a person is to have through the activity, and a

learning outcome from participating in the activity. Csikszentmihalyi explicated these design elements with examples of sport and physical exertion (a logical analogy given the categories). For example, a young soccer player needs to learn skills (rules) in order to engage in competition (experience) and ultimately attain higher levels of skill and have a greater understanding of the self as a player (discovery). It bears noting, however, that each of these domains can be engaged in some kind of "pure" psychic way. For example, a student who is learning new skills and concepts in a class must have conditions which allow for high levels of engagement and involvement (rules). In the discomfort of skill attainment, the student will be off balance or experience cognitive vertigo as a consequence of moving beyond previously mastered, more comfortable skill sets (experience). As a result of the learning experience, the student will have higher levels of performance, a more complex understanding of him or herself as a learner, and an appreciation for how growth and mastery will work in future endeavors. It is even likely that the newly acquired skills can be put to use in the student's creative enterprises (discovery).

Writing challenges appear to be ideal fodder for game-like structures to engage students in Flow. Torrance's (1962) "Imaginative Story Task" provides specific rules for engagement, gives participants an activity which both challenges them and potentially places them out of "comfort zones" with scenarios, and ultimately produces outcomes which can be measured and evaluated for how well participants have understood divergent thinking processes (however intuitively). Csikszentmihalyi himself even highlighted the natural use of writing as an activity of Flow because (when done well) it is a fundamentally immersive experience (1990). All the requisite conditions for a designed Flow experience exist in writing: a set of rules (especially the "discipline" of writing), an activity which is an intellectual challenge and allows for the

engagement of an unbalanced world, and a product which allows the writer to discover and uncover even subconscious ideas about the self or the world. These conditions, when structured within a timed, playful activity (a writing "game") create an environmental factor -- a "press" -- which can activate writers' Flow state.

Self-Censorship and Squelching

Self-censorship (for the purposes of this study) is an individual's holding back of an idea. This working definition arises from Bar-Tal's (2017) assertion that self-censorship is "the act of intentionally and voluntarily withholding information from others in the absence of formal obstacles" (p. 41). Using this as the starting point, it is logical to assume that self-censorship is an inhibitor to fluency.

Self-censorship arises from anxieties associated with notions of audience judgement. Jay and Brooks (2004) noted that college students who believed their writing would be read by peers self-censored at high rates compared to those who believed only a supervising instructor would read journals. Detert and Edmonson (2011) quantified the fears and anxieties associated with speaking up in the workplace with the judgements cast by coworkers and bosses. This squelching of ideas driven by anxiety will, by definition, limit the number of ideas generated by those in a workplace which is rife with the environmental stressor of judgement. Cook and Heilman (2013) posited that self-censorship nearly always has some element of public pressure to adhere to conventional or conformist thinking. Pressure to conform to convention ultimately limits the fluency of ideas and will inhibit any potential Flow experience because the anxiety of the environment will not allow the individual to "let go" in his or her problem-solving ideation.

These definitions are echoed in creativity literature regarding the squelching of creative thinking and activity in the schoolhouse. Iverson's (1982) commentary on classroom culture

focused directly on a culture which actively discourages creative thinking. She specifically noted that much schoolhouse work short changes openness and ambiguity in favor of linear, logical, conventional thinking. Such an environment creates a setting in which "children's flexibility of thought and action is severely limited, and little creativity exists . . . [it is] industry at the expense of fresh initiative and creativity" (p. 694). Kim (2010) blamed a "decline in creative thinking" on "some change stifling children's creative thinking in schools" (p. 293). She further noted an "increased emphasis on standardized testing may have shifted the emphasis in schools toward drill exercises and rote learning, and away from critical, creative thinking" (p. 293). Ultimately, she believed that "the high-stakes testing environment has led to the elimination of content areas and activities . . . which leaves little room for imagination" (2010, p. 293). In other words, a system of education which values standardization and conformity of structure and thought not only flies in the face of Guilford's call to action and recommendation for the American educational infrastructure, but also has quantifiable negative impacts on the creative thinking abilities of school-aged children. With this clear convergence of self-censorship and anti-creative environmental stressors, it is reasonable to propose that a press which keeps students from thinking too much about the consequences of their output would enhance creative fluency.

Timed Writing, Fluency, and Flow

Writing appears to be a natural medium for activating and assessing creative thinking. Torrance and Jeffrey (1999) noted that writing is the outcome of a complicated interplay between many complex cognitive processes. Their further explanation of the writing process (a concept which mirrors the element of "process" in creativity theory) as a cycle of planning written work, translating the plans into actual sentence, and then reviewing the work for

success in execution and possible revision bears a striking resemblance to the Torrance and Torrance (1971) cycle of production, testing, and implementation. Torrance (1970) noted that writing enhanced the demonstration of creative thinking properties. He explained that in the demonstration of many creative thinking skills, complex structural and emotional communication like surprise endings, dramatic plot twists, and humor occur. These sophisticated elements emerge from a writing process which is rife with many ideas from which the most original and fitting ones can be selected for inclusion.

Ideational Fluency and Successful Writing.

Successful writing is in part based upon a composer's ability to generate a great number of ideas upon which he or she may then elaborate. The cognitive processes of flexibility and fluency - core components of creative thinking measures - are also fundamental components of successful, high-level writers (Ransdell & Levy, 1999). This success appears to occur regardless of writing purpose. Fürst et al. (2017) discovered that high rates of fluency were correlated to some of the highest quality original creative writing. Tezak (2015) discovered that in the production of creative writing, language concerns (such as grammar) were secondary concerns to the communication of many unique and interesting ideas and concepts. This relationship between quality and fluency need not be limited to "creative" writing, though. Pegram (2006) noted that writing propositions and proposals is an exercise in engaging both process and product in a blend of written commentary. He further noted, "A good proposal is inventive and innovative. It looks at what is possible - a new approach to fixing a problem" (Pegram, 2006, p. 20). Put another way, the written proposal is a form of creating concrete original thought buttressed by fluency in ideation and word generation. It is only after the fluent ideation that the

elaboration on a topic may take place. This is supported by the notion that creative thinking is positively influenced by large amounts of time spent writing, regardless of type (Wang, 2012).

Timed Writing and Increasing Fluency.

Students have a variety of responses to the constraint of having their writing bound by a time limit. In many cases, however, the pressure to continually produce text enhances the fluency and originality of written responses. As a corollary, other measurable creative thinking traits like flexibility and elaboration benefit from the press addition of time limitation. Some researchers have commented on increased quality when fluency is high. While not a focus of this study, it may bear further investigation at a later time.

Alvarez (1983) explained that his success in encouraging students with special needs to develop more fluency and creativity in their writing was predicated on timing writing and developing an internal competitive drive to generate (p. 160). In short, the classroom practice of encouraging students to generate text (regardless of adherence to convention or conforming to a prompt) created enthusiasm for writing where no such orientation previously existed.

Fluency and Flow in writing require a continuous generation of text and ideas. To interrupt content production is akin to squelching the cognitive processes which allow writers to meet and surpass the expectations of written work. Stopping the writing process in the midst of creating content puts stops ideational fluency and puts the brakes on Flow state by eliminating freedom from restriction in idea generation. The process of revision in timed writing, for example, appears to be a practice which squelches fluency and Flow, leading to a decrease in the quality of an overall piece. Worden's (2009) analysis of pre-writing and revision in college level timed writing assignments found seemingly counterintuitive results: students who revised more had lower quality essays. Specifically, she discovered that students who had a greater number of

revisions and changes in their writing samples, markers which clearly imply that idea generation and optimal experience had stopped in favor of conforming to conventional writing practices, had lower pass rates and lower overall quality of work than those students who did not revise their writing under the same conditions (Worden, 2009). In other words, in timed scenarios, students who choose to interrupt the fluency and Flow of ideas to rework thoughts under the pressure of time appear to be damaging the quality of their writing. This appears to be consistent with the work of Albertson and Marwitz (2001), who argued that students whose timed writing can be influenced by the possibility of personal revision (either in content or topic) underperform in the execution of their written product, and Simmons (2009), who explained that real-world rhetorical composition often has little time for in-process revision (a reality which ought to be reflected in the timed writing of secondary school). Almond et al.'s (2012) pilot study of keystroke data on a timed writing assessment found that individuals who scored high on the assessment had extended periods of time with typing bursts, and most of their pauses were between sentences and paragraphs. Low-scoring individuals, however, had much lower time of typing bursts, and had significantly more in-word pauses associated with difficulties in basic writing processes such as spelling. This data confirmed the hypothesis that successful writers took short breaks not to revise and edit previously written work, but rather to generate future words, phrases, sentences, paragraphs, and idea threads.

Apps and Writing Skill Development

An emerging literature on the uses of digital technology on literacy practices shows that the use of apps to support instruction have positive impacts on the quality and complexity of student writing skills. Neumann (2016) found that students who used touch-based writing apps at home had greater text awareness and greater emergent literacy skills. Hojeij and Hurley's

(2017) study of university students documented positive feelings toward the writing process when guided by apps specifically designed for organization, production, feedback, and publication. While not a replacement for expert classroom instruction in writing practice, participants' experiences organizing, developing, and receiving peer feedback on writing were generally positive so long as they were "convinced that the application is purposeful and efficient" (2017, p. 4). Castek and Beach (2013) discovered that when instructors effectively use digital app traits to have students organize and annotate course content, students show a greater mastery of content literacy skills. Kervin and Mantei (2016) described a third-grade student who was able to use a variety of digital drafting, composition, and publication apps (including Poplet, PuppetPals, instaGrok, Book Creator, Gami, and iBooks) to create a series of original, unique narrative responses to a classroom project. They found that their case study supported the hypothesis that when authors have the appropriate tools and applications at their disposal, they are able to design and construct texts which optimize their ability to match their output with their creative visions.

The use of digital tools and applications moves beyond their usefulness as a tool; when specifically designed to target cognitive processes, they are also a potential springboard for improvement. Ewoldt (2018) identified four digital writing apps which she hypothesized would assist learning disabled (LD) students with the complex tasks of organizing and executing expository paragraphs. She claimed that "Simple Mind, Mind Plus, Phraseology, and The Writer's Diet Test . . . support students by directing focus to higher-order writing skills" (2018, p. 319). While her evaluation of these tools provides no empirical study data on the efficacy of these claims, her conclusions arise from an analysis of the tools' functions and their compatibility with documented successful teaching strategies of LD students.

Other analyses and studies show that digital writing tools positively impact the practice and production of writing. Batty's (2014) analysis of screenplay writing apps led him to conclude that digital writing apps allowed writers to produce, capture, assess, and shape their creative ideas and products in "quick and adaptable ways" (p. 126). Interactive texting apps like WhatsApp were found to generate a variety of writing styles from the same users depending on the audiences the app provided (Menguel-Andres, Roig-Vila & Vasquez-Cano, 2015). The common thread with the success of these digital apps, though, is rooted in the understanding that the tools must be specifically designed to enhance the targeted cognitive process.

Gamification and Skill Building

In many cases, these apps present a challenge or competition for the user, turning the educational content into a kind of challenge or game. This "gamification" is based on the concept that designing content in "game-ish" ways for non-game contexts enhances the participant's connection to the non-game material (Deterding et al., 2011). It is important to note here that "gamification" is not the same as "learning games"; Kapp explains that "[g]ame-based learning uses an actual game to teach knowledge and skills . . . Gamification, on the other hand, only uses a few game elements" (p. 44). In conjunction with this understanding is Hamari, Koivisto, and Sara's (2014) notion that "motivational forces" in the form of points, leaderboards, feedback, and badges leads to specific psychological and behavioral outcomes, including learning. They did, however, note that games themselves do not create the psychological and behavioral outcomes, but that "the role of the context being gamified" is an essential factor to consider (p. 5). In essence, gamification does not recreate a task as a game, but rather weaves in elements of gaming in order to provide a continued motivation for production (which might alternatively be labeled "work fluency").

Chen, Carger, and Smith (2017) found that game-ish writing apps enabled ELL students to write more in-depth narrative pieces when compared to a hand-written sample on the same topic. They noted that "By comparing the ELLs' pre-and-post essays, the language production, support/elaboration, and organization dimensions showed great improvement; while the focus dimension remained the same" (p. 34). Cordero et al.'s (2018) experiment with a writing app discovered that the use of a multi-modal touch screen app enabled third grade students to demonstrate complex cognitive processes in their own original writing. In seeking to have students construct their own narratives in response to a story and drawing activity, the researchers designed a scaffolding application for use on digital tablets that ultimately asked third grade students to write their own original products. Their investigation found that students who used the app moved beyond simple declarative reading reports and engaged a myriad of writing topics and styles (Cordero et al., p. 170). In addition, the interactive nature of the app encouraged students to exploit the digital features (including image manipulation and movement, click-and-drag items, and game-like engagement with the pictures in the study app) as a means of co-constructing original texts (Cordero et al., 2018). These findings indicated that the targeted design of digital apps could produce growth in the production of new and original creative products.

Other analyses and studies show that digitally gamifying writing positively impacts the practice and production of writing. Tantawi, Sadaf, and AlHumaid (2016) found that dental students whose course writing was done inside the parameters of a gamification (specifically, creating a scenario in which students were writing, reviewing, providing feedback, and revising based on a journal-publication gaming structure) significantly improved the perception and quality of student writing. But can that target also include Flow?

Gamification and Flow.

At best, Flow is a difficult concept to quantify; it is typically described through lived experience. The conditions and outcomes of Flow state noted above are often closely associated with the constructs of games. Gamification's ability to condition and induce, then, would seem to be a fruitful subject for investigation. Brühlmann (2018) explained how the key components of gamification and the core characteristics of Flow intersected. He explained that "motivation . . . might determine the optimal design" of a gamified environment (p. 23). Hamari and Koivisto (2014) learned that students who achieved Flow state in gamified content reached Flow by way of challenge-skill balance, clear goals and control, and a strong motivation to succeed. Sillaots (2014) discovered that when university students' methods courses were restructured into a gamified environment, they achieved high levels of Flow characteristics. Hamari et al. (2016) found that game challenges not only facilitated immersion and flow in students, but that such engagement in Flow state increased learning outcomes. In evaluating both qualitative and quantitative data, Hung et al.'s (2015) analysis of students in a gamified environment found higher engagement and success than those in a non-gamed environment.

It would seem, then, that a gaming or gamified environment, when predicated upon the design to facilitate optimal experience for students, can push motivated students to Flow state.

Conclusion

Creative thinking is a cognitive process demonstrated by the production of many different responses to a challenge or problem. It is vital that educators understand the definitions and manifestations of creativity in order to create the conditions under which their students' creativity may thrive. In doing so, it is essential that instructors take advantage of the tools and technologies which can give students access to platforms which can teach and enhance creative

thinking. By providing technologies which are readily available to their student writers, teachers can create conditions under which students can quash self-censorship and truly optimize the experience of generating ideas. To do so will ultimately drive students toward "letting go" in their writing and engaging in Flow. By extension, students will generate more ideas and have a breadth of ideation from which they may choose for further exploration.

CHAPTER 3

Methods

Though this be madness, yet there is method in't.

- William Shakespeare, *Hamlet*

The follow-up explanations model, a variant on the sequential explanatory model of study, was used in this study. This method was chosen in order to gain a robust and thorough insight into the effects of daily timed journal writing on students' creative fluency, as well as to assess both the statistical and practical impact of a gamified online writing application (or app) on ideational and verbal fluency in timed, low-stakes journal writing. The question of the participants' experience of Flow was also assessed in this multiple methods design.

A researcher using the sequential explanatory model initially collects quantitative data. This quantitative collection is supplemented with a qualitative inquiry into the study questions (Cresswell et al., 2003). In the follow-up explanations model, a researcher analyzes quantitative data, then interviews participants who can explain both expected and unexpected results (Clark & Cresswell, 2007). The primary collection and analysis of data in this study was quantitative. This data assessed attitudes about writing, creativity, and Flow experiences, as well as identified the effects of using a gamified writing application on creative fluency. This data included word counts, idea unit counts, survey data, and standardized creative thinking measures. After collection and initial evaluation of data, selected participants were interviewed to explain results from initial evaluations of the data and feelings about the creativity, Flow, and study activities.

Research Questions

The research questions examined in this study focused on the whether the creative thinking trait of fluency, the ability to generate many ideas, could be enhanced through daily timed writing and environmental pressure. Additionally, research questions examined in this study focused on how individuals experience creativity and Flow, and if those experiences were impacted at all by the journal writing activity of the study. Specifically, the research questions were:

1. Does student use of a gamified online writing app (specifically "The Most Dangerous Writing App" or "MDWA") for daily low stakes open-journal writing significantly increase the number of words and ideas on an imaginative story task as compared to those written by students who do not use a gamified writing app for daily open-journal writing?
2. Does daily timed open-journal writing influence student attitudes toward writing and creativity? Does the application of a gamified writing app to timed open-journal writing make a difference in these attitudes?
3. How do students who write daily open-ended journals describe their experiences of writing? Are the described experiences different for students who use a gamified writing app and those who do not? Do these experiences connect with Flow theory?

Question 1 was evaluated using quantifiable metrics, including word counts from the timed journals as calculated by the researcher. An analysis comparing the two treatment groups showed any statistically significant difference on how the number of words and ideas generated (the markers for verbal and ideational fluency, respectively) was affected by the use of the gamified writing app. Question 2 was evaluated by analyzing data gathered from a pre/post

survey on participant attitudes toward writing and creativity. Data from this survey were also used to evaluate Question 3. In addition to the survey data, questions 2 and 3 were further explored through participant interviews that addressed these topics.

Participants

Participants in this study were recruited from the school where the researcher was employed as an instructor. Participants were not members of the researcher's current classes, and their interaction with the researcher was limited to only the activities that were part of the data collection process.

Site.

The site for this research project was a large public high school in the suburbs of a large city in the American Southeast. This site's population currently fluctuates between 1,900 and 2,000 students. Demographically, the school's district has approximately 18,000 students comprised of 54% Caucasian, 35% African-American, 6% Hispanic, 1.5% Asian, 1.5% Native American, and 2% other ethnicity. In addition, 52% of students district-wide receive free or reduced-price meals. This site is appropriate because it offers a cross-section of demographically diverse students. This diversity assists in any possible generalizable findings of the study.

Students.

Participants in this study were high school students enrolled in an English 101 dual credit course. The course was divided into two separate classes. One class consisted of 18 students and met during the first period of the day (beginning at 8:28 AM). This class was the experimental group which used The Most Dangerous Writing App, and 11 participants came from this class. The other class had 28 total students and met during the third period of the day (beginning at 12:03 PM). This class was the control, and the 25 participants completed their

daily journal writing with only the instruction to write for the entirety of the journaling time. Each class lasted approximately 90 minutes. Which was the experimental and which the control?

All students were high school seniors who had completed the required sequence of English courses a year early. Aside from the age cohort and early completion similarities among students in these courses, participants were similar in various other ways:

Students self-selected into the dual credit program as a way of obtaining guaranteed college credit (assuming the course was successfully completed) in the state's university system. All students were eligible to receive the state academic achievement scholarship. In order to receive this scholarship, the students met two of the three following criteria:

1. Students had a cumulative grade point average of 3.0 or better on the statewide uniform grading scale.
2. Students scored 1100 on the SAT or an equivalent 24 on the ACT (all students took the ACT in March of their junior year as part of a district-wide assessment program).
3. Students ranked in the top 30% of their high school class.

Although the majority of the students in the English 101 dual credit course were bound for a four-year college or university, several students considered joining the military or attending a two-year college following graduation.

Students in the English 101 class also had experience with advanced coursework. The majority of students self-selected into English 101 after having completed at least one Advanced Placement or International Baccalaureate English course. Additionally, many students continued advanced coursework in other subject areas, including psychology, hard sciences, criminal justice, foreign language, and mathematics.

Participants.

Participants in the study came from two sections of a college level dual credit English 101 course. The classes were first and third period. The first period class was a class of 18 students, predominantly female, and majority white. The third period class was a class of 28, also predominantly female and majority white. Of these possible participant pools, 11 students from the first period class and 25 students from the third period class returned their parental permission forms to allow student participation in the study. For journal word and idea unit counts, 10 participant students' journals from each class were evaluated. One participant in the first period class was resistant to many study activities, scoring zeroes on nearly half of the 20 possible journals. This participant was the only such participant in the participant pool. For this reason, this participant's data was removed from the word and idea count evaluation because this student scored many zeroes, disproportionately affecting any statistically measurable outcomes. In order to balance the data as much as possible, 10 student participants were chosen from the 25 who returned parental permission forms from the third period class. The students were chosen with the intent of mirroring the demographics of the ten participants from the first period class as closely as possible. The participant demographics for the word and idea unit count evaluations are given in Table 1.

The two classes into which the participants were placed were largely similar. Although the classes did not necessarily reflect the larger district demographics, the sample classes largely reflected one another in gender and racial/ethnic background. Because of all the prerequisites required for enrollment and the randomization of course assignment, there is no reason to believe that there were significant practical differences between the two sections of the English 101 dual credit classes. To account for any small differences in demographics, academic background,

academic ability, or other potentially confounding factors between the two classes, specific descriptive data of participants were recorded at the beginning of the study period. Table 1 describes this demographic data for word and idea count participants from each of the courses. The first block class was assigned daily timed journals using The Most Dangerous Writing App (described below), while the third block class was assigned the same daily journals with the instruction to write for the entire timed journal assignment.

Course.

Participants were twelfth grade students in an English 101 dual credit course. This meant that students taking the course were receiving official university credit and hours in addition to high school credit. The course was taught as a university-level general education requirement. Students were exposed to high-level literature and were expected to write sophisticated analytical analyses in which they connected to real-world issues. Appendix A gives a course description, learning goals and objectives, and student expectations for the English 101 course.

Since this was an official college course as well as a high school course, students' grades affected both their high school grade point average and potentially their university-level GPA (depending on individual university credit acceptance policies). In order to offer university-level courses at the high school at an affordable rate, students were able to use state-funded academic scholarships as long as they maintained good grades. Grades in the course affected eligibility for continued receipt of the state scholarship when enrolling at an in-state college or university full time.

Instructor.

Participants were exposed to the same instructor and course content during the study. Students were taught by Mr. John Revelation, a veteran teacher at the high school. Mr.

Table 1

Word and idea unit count participant demographics

Class period	n	Male	Female	African American	Caucasian	Hispanic	Asian/Pacific Islander	Other	Free and Reduced Meals
1st	10	2	8	2	8	0	0	0	1
2nd	10	2	8	2	7	1	0	0	1

Revelation was in his early-to-mid fifties and came to teaching as a career change after working in both business and religious professions. He attended public state universities and a seminary in the American Southwest. Among his degrees is a Master of Arts in English from a local liberal arts university. In addition to the English 101 course, Mr. Revelation taught the English IV, English V, and Theory of Knowledge classes in the school's International Baccalaureate program. During the study, he was serving as the high school's Teacher of the Year.

Teaching Style.

Mr. Revelation's teaching style could best be described as open. Typically, his classes were discussion based. He used student responses as the basis for further analytical questioning of literary and global topics. His approach to teaching was mild-mannered; often, he was described by students and colleagues alike as "laid back" and "go with the flow." Not only did his students respect his attitude and approach to the classroom, but also, they found him and his classroom warm and inviting.

Classroom environment.

Mr. Revelation's classroom might be described as "hip." He had old library tables arranged in seminar style in place of the traditional rows of desks and the room was decorated with a variety of clever and "punny" literary posters. He had a wide collection of bobblehead dolls on display, ranging from Shakespeare to Dr. Who to caricatures Mr. Revelation himself. In addition, he always had a variety of music playing, with Vivaldi, White Stripes, and even the occasional Kendrick Lamar track in the rotation. During lunch period, students from his many different classes – and even students from classes he had taught years ago – met and ate over interesting conversations and quality music. Mr. Revelation, often in the center of the discussions, engaged with students on topics of the day. Mr. Revelation had been known to hold

meetings after hours at a local coffee shop and bakery in order to best serve both the needs and the time demands of his students.

Mr. Revelation's class assessment strategies.

Mr. Revelation's assessment of student knowledge in all courses was based on essay writing and creative product design, even in courses with school-based standardized multiple-choice common assessments. He eschewed multiple choice testing to assess course content mastery, and instead required students to write essay responses to in-depth which required sophisticated analysis of language and literature. His reasoning was that students should use the declarative knowledge of the texts they read to analyze larger themes and ideas. In addition to requiring students to demonstrate knowledge through non-convergent means, he allowed students to revise essays (even test essays) multiple times in an effort to have students attain mastery. In short, Mr. Revelation's classroom and assessment methods were purposefully constructed to drive students toward mastery of content and literacy skills rather than to have them conform to single "right" answers.

Measurement and Data Collection Tools

A variety of measurement and data collection tools were used in this study. The methods and tools are described below.

Attitudes Pre/Post Survey.

A survey of student attitudes about writing, their beliefs about their creativity and creative abilities, and their ideas about Flow was given to all participants at the beginning and end of the study period. The survey consisted of 16 Likert scale questions and three open-response questions. This survey was given online using a Google forms survey. In order to avoid any possible response bias in the second administration of the survey, questions were

edited between the beginning and end of the study period. Questions covered the same content and themes but were worded differently so that students would not potentially be influenced by prior responses they had provided. Questions for the Likert scale survey and open-ended questions are given in Appendix B.

The Most Dangerous Writing App.

"The Most Dangerous Writing App" is an online writing tool to which all participants in the study had access. The online application (or app) is free online and is available at themostdangerouswritingapp.com. Since all students in the study had individual laptops available to them during the school day, all students were able to engage with the core activity of the study, namely, timed writing. Because there was no cost associated with the online app, and all students were able to access the app online, it was an appropriate tool for this study.

The premise of "The Most Dangerous Writing App" is relatively simple: participants were asked to set a timer for a specific amount of time and type continuously for that amount of time. Should the typist stop typing for more than five seconds, all work to that point would be deleted. In addition, continuing to hit delete without generating any new content would result in a deletion of all constructed content. The designer of the app described the process as follows:

> The Most Dangerous Writing App is designed to shut down your inner editor and get you into a state of flow. If you stop typing for more than five seconds, all progress will be lost. After typing without interruption for the length of your session, you'll be able to save your work. (Ebert)

This challenge to continue typing is a form of gamification. The outcome of continued typing does not necessarily represent a "win" for the user, but the motivation to keep typing for the entire pre-set time (much like needing to complete a level on a timed video game like Super

Mario Brothers) clearly meets Hamari, Koivisto, and Sara's (2014) understanding that motivational game-ish forces produce desired behaviors.

Similar apps were available through Apple's App Store, (specifically one called "Flowstate") with the built-in advantage that participants can directly save their work in the app. However, the cost of the app was nearly ten dollars, and the relatively small convenience benefits were not equivalent to the ease of access and use of the free online app.

Survey and Journal Collection Site.

The study site was in a school district which had significant technological resources. In addition to having a one-to-one laptop program, the district had also heavily invested in a learning management system (or LMS) called Canvas. Canvas allows instructional users to set up individual "classes" and invite members to be "students," "teachers," "teaching assistants," and "observers." When published, the course was only available to the publisher and those who had been invited to join the course. This allowed for the secure creation and transmission of data within the confines of the study, as only the publisher of the course has password-protected access to all student submissions.

Word Counter.

Word counts were done using the online application called Word Counter. This application gives many descriptive statistics on a passage including number of words, number of unique words, and number of sentences. It also provides multiple metrics on readability, reading level, and keyword density, which may be of interest in future studies.

Interviews.

Since interviewing participants is essential to understanding "concept of culture . . . memories, experiences and understandings" of life events as they relate to the participant's world

view, interviews were a vital part of this study (Glesne, 2011, p.103). These interviews inform the quantitative data and provide human voice and analysis to the findings of quantitative analysis.

I conducted a series of post-study semi-structured interviews, all approximately 30 minutes in time. These interviews took place in the days after the study period, when the activities of the study were still fresh in the minds of the participants. The classroom instruction of students was obviously the priority of the school day; so, interviews took the form of either an on-campus lunch interview or an interview during the school's scheduled Response to Intervention (RTI) time during the middle of the day. Students interviewed during the RTI time were those who were not required to attend RTI sessions; and as such, there was no loss of instructional time for these students. The interviews were recorded, transcribed, and kept confidential through password protection on all files. Students answered questions about their attitudes on writing, their views of creativity, the activities of the study, and how they may have experienced Flow. Appendix C is an interview protocol for these interviews.

Artifacts.

Bowen (2009) noted how the inclusion of artifacts in a study can assist in the triangulation of data. In addition to pre/post survey data, quantitative analysis of timed writing journals, interview data from semi-structured interviews, observational notes, and researcher reflections, the researcher also collected the current course syllabus for the English 101 course.

Procedures and Data Collection

Before students began treatment, they completed a short survey about writing, creativity, and Flow. Students were then given a short writing task based on Torrance's (1962) Imaginative Story Task at the beginning of the study period as the first daily writing activity. Students typed

their responses to the prompt directly into the Canvas data collection site. They were given a ten-minute response time for the prompt. These prompt responses were scored for verbal fluency (number of words) and ideational fluency (number of unique idea units). Word counts were calculated using Word Counter. In order to ensure that word count measures were related to the task participants were given, each response was also read at the time of word count and had "garbles" eliminated. Hunt (1965) defined garbles as groups of letters or words which make no sense given the context of the assignment. For this activity, garbles included repetitive text and randomly typed text. Ideational fluency was measured as the number of unique idea units produced in the written text. I read each response and counted the number of unique idea units as a record of ideational fluency. Unique ideas were tallied by identifying one of several grammatical or narrative elements:

1. The introduction of a new or unique character, person, speaker, or persona in the text
2. The change in scene, setting, or time in the text
3. The use of a unique action verb as a protagonistic or antagonistic move in the text
4. Items in serial lists that shifted categories (i.e. the phrase "buying bananas, granola bars, and cereal" in a serial list could both be categorized as the single "groceries," while "spending my time walking on the beach, sailing, and coaching volleyball" would be noted as three unique ideas)
5. Ideas linked by a contrasting conjunction (i.e., "but" or "yet")

Each student's verbal and ideational fluency scores were recorded on a spreadsheet. A second administration of the Imaginative Story task took place during the last week of the study. The same verbal and ideational fluency analyses were done on this response as in the first prompt. A comparison between the means of verbal fluency was done using a two-sample t-test.

A comparison between the means of ideational fluency was similarly evaluated using a two-sample t-test. This evaluation determined the statistical significance of any differences in verbal and/or ideational fluency pre/post journal writing treatments.

All students in Mr. Revelation's English 101 courses participated in daily open-ended journal writing as part of regular classroom activity. Each day's journal writing period was preceded by a short stimulus (e.g., a short poem read aloud, a short video, a song) connected to the timed journal students completed. Specific journal topics were generated with the help of Mr. Revelation so that he could connect the day's writing to the content of the day's class. Appendix D provides a list of journal topics for each day during the study period. Each journal topic was read aloud to students before their writing period. In addition, students could read along with the prompt on the Canvas page for the journal entries. The journal topic was also projected onto a digital whiteboard.

Each section of Mr. Revelation's English 101 class was assigned a different journal writing treatment. The first period class did a daily timed open-journal writing task making use of "The Most Dangerous Writing App." His third period class completed a daily timed open journal writing task using a digital format (either typing in Microsoft Word or directly into the data-gathering Canvas section. Student comfort determined which typing platform was used). Each prompt ended with the following instruction:

> The goal is not to create 100% unity in your writing; it's to generate as many ideas as possible. Please, take off your self-censor and your filter; there are no "right" answers to this journal prompt. Just keep as many ideas flowing onto your page as possible. Let the ideas move from your brain to your fingertips without stopping to edit; let it rip.

> In your writing, you should feel free to talk about as many ideas as you like. Your writing does not have to be nonfiction, and there is no limit to the directions you can take or the number of ideas you generate. You may write in any style and be as open and creative as you like. Try to take off any filter or think time and just generate writing on the topic. If you need to, you can retype text you have already written.
>
> Your challenge is to write for the whole five minutes.

Students in the treatment group using The Most Dangerous Writing App occasionally "failed" the journal time. In that case, students reported their "failure" on the entry and a zero-word count was recorded for that day's journal. While this zero affected the mean word counts and standard deviations of word counts (since these two figures are not resistant to outlying scores), the data did encourage questions about why participants struggled to continually generate text, even when given instruction and permission to retype ideas if necessary. Students who were absent for a day did not have a score recorded for that day's journal. Those "empty" scores were eliminated from the statistical analysis on the grounds that "absence" was not the same as "not generating text."

Journal responses were collected daily throughout the study period. The first five journal entries were timed at three minutes each to get the students used to the daily writing task. Journal entries six through twenty were timed at five minutes each to allow students the possibility of generating more words and ideas. Each participant's journal entry was copied and pasted into Word Counter for a daily word count. These word counts were the data used as the verbal fluency scores. I read one selected journal from each week of the study and counted the number of unique ideas present in the entries as a way of identifying ideational fluency. The ideas from Thursday journal entries from ten students in each participant group were counted.

Ten of the 11 participants in the MDWA group had their ideational fluency evaluated. One participant was taken out of this evaluation because he had multiple failed attempts within the journals selected (the only participant in this group to do so). In order to match the ideational fluency count, ten students from the NMDWA class were chosen to reflect the demographics of the MDWA class as closely as possible. Table 1 provides the demographics of the participants in the word and idea unit counts. Thursday entries were chosen because students were used to the routine of the weekly writing by that point in the week but were not distracted by the events (upcoming weekend events, football games, and pep rallies) Friday school days had. During the second week of the study, the Wednesday journal entry was used for the idea unit count because a severe weather event cancelled school was highly anticipated (and distracting) on Thursday and cancelled school on Friday. Additionally, the Wednesday entry from the last week of the study was evaluated for ideational fluency because that Thursday's prompt time was used for the second administration of the Imaginative Story Task. The same criteria listed above in the Imaginative Story Task idea unit counts was used for journal idea unit counts.

After the study period, six students were chosen for a thirty-minute interview. Three interview participants were chosen from each section of the dual credit course. The interviewees were selected based on the verbal and ideational fluency scores on the initial Imaginative Story task. From the entire participant pool of each class, the individual with the highest combined verbal and ideational fluency score, the lowest combined score, and the median combined score was interviewed. This selection of students was important because it represented a cross-section of the hard, quantitative data collected and analyzed, specifically verbal and ideational fluency (and the underlying assumption that fluency levels are an indicator of opportunity for creative thinking and Flow state). Since the interview was focused on how the activities of the study

influenced fluency, attitudes toward writing, and how assignment press might push students to Flow state, the cross-section of student achievement on the initial imaginative story task was vital. This spectrum informed how the daily writing treatments affected attitudes regarding writing, creativity, and Flow across the spectrum of creative fluency achievement.

Data Analysis.

Multiple methods research requires both a quantitative and qualitative approach to data analysis. The following methods were used to collect data.

Quantitative.

The timed writing journals students produced over the course of the study were evaluated for verbal and ideational fluency. The daily verbal fluency counts were charted on a scatter plot, and a line of best fit was calculated for each class. A correlation coefficient was calculated for each mean group. The weekly ideational fluency counts were also charted on a scatter plot, and a line of best fit was calculated for each class. A correlation coefficient was calculated for each mean group.

Scores for student pre/post surveys were collected and aggregated. Word and idea count means were collected from ten students in each treatment group.. Five journals were selected for idea counts. Class average word counts were used for inter-class comparisons. These means, while not resistant to outlying scores, gave a snapshot of how the treatment group as a whole responded to a given journal prompt.

Qualitative.

Interviews were conducted in the days following the study period. Audio of the interviews was collected using the iPhone's audio recording hardware. Interviews were password secured, encrypted, and stored in the researcher's personal computing audio

software. In addition, each interview was backed up on the researcher's computer using Audacity software recording during each session and was similarly encoded and stored. All field notes taken during interviews and observations were typed up by the researcher and included a short memoing at the end of each set of recorded data. Memoing was done using The Most Dangerous Writing App as a means of experiencing the conditions of the participants.

Product, in the form of journal responses were collected as well. At the end of each writing session, students were asked to save all work product in a word processing file and upload the product into an assignment in the researcher's independent Canvas course section. Students only had access to their own work in this private Canvas course, and were not able to share work they produced unless done so outside the parameters of this study.

All field notes and transcripts were labeled with a detailed record of time, place, setting, and notation of specific circumstances. In addition, all such observations were labeled with transcriber information, including date, time, and special circumstances of such transcription. All re-identification data of participants was removed from products analyzed, and when appropriate, participants were given pseudonyms sufficiently different from their own names to maintain confidentiality.

Interviews were transcribed, analyzed, and coded to mark language associated with fluency, creative thinking, and Flow. This coding acted as a means of identifying and evaluating themes in the experiences of participants (Glesne, 2011). Patton (2002) noted that inductive and deductive analysis are often paired in research. He explained that "Some evaluation or research questions may be determined deductively, while others are left sufficiently open to permit inductive analysis" (p. 56). It is important to acknowledge that interview questions arose from a deductive perspective. Certain processes and terms had specific definitions and meanings, and

thus asked respondents to provide "pigeon holed" data (that is, responses which were limited by the nature of the question and did not allow for wide expansion or exploration of the topic). However, the interview questions (See Appendix C for interview protocol) asked participants to think and evaluate their own experiences, thus opening up the data to an inductive analysis and interpretation.

In the analysis of interviews and journals, themes and ideas emerged that either moved beyond the specific data for which I was looking or informed the quantitative data in surprising or unexpected ways. For this reason, these data helped shape explanations of quantitative results. An inductive approach to analysis, where the specific cases of the individuals were evaluated to provide clarity and coherence to an overall experience, enhanced the "story" of the quantitative data collected.

Ethical Considerations

It was important to consider any potential ethical issues arising in this study. For this reason, several steps were taken in order to ensure that safe and ethical practices were in place for this study. All participants turned in signed parental permission before participating in the research activities of this study. Gaining parent permission for participation in the study represented a challenge. Many students continually "forgot" their permission forms multiple days in a row. In addition, many parents agreed to participation in the activities of the study, but not to the interview portion of the study. The limited nature of the interview portion of the study is designed to be flexible to this potential issue. While there were no requests to do so, any parents who wanted to discuss potential issues, or would like a hard copy of the study parameters, would have been were to be provided with paper copies upon request.

Confidentiality of both the students and the school were an important issue. The researcher made every effort to de-identify and make confidential all participants and locations. All data from participant interviews were de-identified and/or given appropriate pseudonyms as necessary. All numerical and quantitative data from testing was scrubbed of identifying data in reporting.

Students' class time was limited and precious, and was therefore an issue to be carefully considered, especially in the qualitative aspects of this research. All journaling activities were folded into the daily instructional content of the class so as to avoid interruption of curriculum delivery. I, the researcher, conducted interviews during non-instructional time, including "brown bag" interviews during lunch time and during "free time" structured within the school day (release time, unstructured RTI time, etc.).

Conclusion

Using a variant of the sequential explanatory model of multiple methods inquiry was the most effective and thorough method of collecting and evaluating the data of this study. The statistical data revealed trends in how students grew (or stagnated) in verbal and ideational fluency as a result of writing daily timed journals. A statistical analysis of word counts, idea counts, and aggregates of "attitudes" surveys showed whether the use of a gamified writing app influenced the number of words and ideas students generated.

Conducting, coding, and analyzing interviews was a key part of evaluating the findings of this study. Participants were able to provide full, thoughtful responses to questions regarding creativity and how they experienced Flow. In addition, they were able to provide feedback on the experience of timed writing, and how being timed influenced their ability to generate ideas and engage Flow. Additionally, those students who used "The Most Dangerous Writing App"

were able to talk about the added pressure of being forced to generate text, and how that press helped (or inhibited) fluency and Flow. This qualitative aspect both provided the human voice to the participants' experience and allowed the practical effects of the treatment to be articulated by the students who engaged in the study activities.

This multiple methods approach allowed for the deepest understanding of the study data and its practical effects. Quantitative data illustrated the effects of the treatments of the study. Qualitative data explained the effects of the study treatments. Combined, the multiple methods of this study allowed for the evaluation of the research questions in a robust and thorough manner.

CHAPTER 4

Results and Findings

> *Talking about pedagogy, thinking about it critically, is not the intellectual work that most folks think is hip and cool . . . Most of us are not inclined to see discussion of pedagogy as central to our academic work and intellectual growth, or the practice of teaching as work that enhances and enriches scholarship. Yet it has been the mutual interplay of thinking, writing and sharing ideas as an intellectual and teacher that creates whatever insights are in my work.*
>
> --bell hooks, *Teaching to Transgress*

The multiple methods nature of this study led to findings which both quantified answers to the research questions and provided a human voice behind the data. The quantitative data provided a numerical understanding of the impact of timed, low-stakes journal writing on students' verbal fluency. Additionally, this analysis evaluated the degree to which the use of a gamified writing app as the method of daily journal writing, impacted verbal fluency. The qualitative data, gathered in the form of interviews and journal analysis, grounded the statistical data in the practical outcomes of daily student journal writing. In addition, it allowed participants to explain their feelings about creativity and Flow, and how the activities of this study activated (or inhibited) these processes. This analysis provided depth and understanding of the impact of both the journal writing and the use of the gamified writing app. The quantitative results and qualitative findings reported in this chapter present a robust picture of the impact that daily, low-stakes journal writing and use of a gamified writing app had on creative thinking, and how participants defined and viewed creativity and flow.

Research Questions

The research questions examined in this study focused on whether the creative thinking trait of fluency, the ability to generate many ideas, could be enhanced through daily timed writing and

environmental pressure. Additionally, research questions examined in this study focused on how individuals experienced creativity and Flow, and if those experiences were impacted at all by the journal writing activity of the study. Specifically, the research questions were as follows:

1. Does student use of a gamified online writing app (specifically "The Most Dangerous Writing App" or "MDWA") for daily low stakes open-journal writing significantly increase the number of words and ideas on an imaginative story task as compared to those written by students who do not use a gamified writing app for daily open-journal writing?
2. Does daily timed open-journal writing influence student attitudes toward writing and creativity? Does the application of a gamified writing app to timed open-journal writing make a difference in these attitudes?
3. How do students who write daily open-ended journals describe their experiences of writing? Are the described experiences different for students who use a gamified writing app and those who do not? Do these experiences connect with Flow theory?

Question 1 Results

Question 1 was answered by counting the number of original words in the daily journal entries students completed during the study period and the number of unique idea units generated in the Wednesday or Thursday journal for ten participants in each class. One participant from the MDWA class was eliminated from the word and idea unit count because the participant had multiple zero scores (the only participant to do so on the selected journals). Ten students from the NMDWA class were chosen to match the remaining demographics of the MDWA class. The word and idea unit count participants' demographics were noted in Table 1 in Chapter 3. Each class, both the one using the gamified online writing application The Most Dangerous Writing

App (MDWA) and the one only typing daily timed journals (NMDWA), submitted their journal entries to the learning management system site designed for the study. A daily word count of the journals using an online word counting application supplied the hard number data used for statistical analysis. I calculated the total number of words each participant wrote during the study period, the total number of words written by each participant class, the mean number of words each participant wrote for each journal, and the mean number of words for each journal in each class. Table 2 gives the mean number of words for each journal by treatment group.

Ideas were counted in in journals 3, 7, 11, 15, and 19 for ten participants in each class. The goal of counting ideas was to determine whether ideational fluency was impacted by the use of the online writing app. The student whose data was excised in the class that used the online writing app had three zero scores in the five selected journals. His journals were the only ones of that participant pool to have zero scores on the selected journals. Since the ideational fluency was dramatically impacted by this score, and since these zeros had a dramatic effect on the overall means of idea counts, his idea unit count scores were removed from the analysis of ideational fluency. Table 3 gives the mean number of idea units for each journal by treatment group.

Intra-class comparisons.

The 10 participants in the class that conducted daily journal writing without the use of The Most Dangerous Writing App (NMDWA) (n=10) had a total word count of 24,733 words. The average of the individual word count totals was 2,473.3 words for all entries during the study period, and the total mean number of words per journal entry was 132.306 words with a standard deviation of 25.6. When the mean number of words for each individual journal was plotted on a scatterplot, a clear positive correlation between the journal number and the mean

number of words the class produced emerged. The line of best fit for this scatterplot (y=97.04+3.36x) indicated a moderate to strong linear Pearson's correlation between the journal number and the number of words the class averaged for the journal of r=.703, significant at p<.01. Figure 1 shows the scatterplot along with the calculated line of best fit for the mean number of words for each journal for the NMDWA class.

The ten NMDWA participants whose idea counts were measured produced a total of 539 idea units. Individuals averaged 10.945 idea units per journal for the five selected journals. When selected journals (N=5) were averaged, the mean idea count for selected journals was 11.244 ideas per journal. The standard deviation for all selected entries was 2.815 idea units. When the mean number of idea units for each selected journal was plotted on a scatterplot, a moderate positive correlation of r=.55 emerged. The line of best fit (y=8.55=.24x) confirmed this moderate correlation. This correlation, however, was not found to be significant, as p=.337. This led me to accept the null hypothesis that there was no statistically significant difference in idea unit counts as the number of journals got higher. Figure 3 shows the scatterplot along with the calculated line of best fit for the mean number of idea units for each selected journal for the NMDWA class.

The ten participants whose word counts were analyzed that used The Most Dangerous Writing App (MDWA) for daily timed journal writing (n=10) produced a total of 25,561 words during the study period. Individual students averaged approximately 2,556.1 words for all 20 journals. When all attempts for journal entries were averaged, the mean word count for journals was 167.065 words per journal. The standard deviation for all recorded entries was 32.522 words. When the mean number of words for each individual journal was plotted on a scatterplot, a clear positive correlation between the journal number and the mean number of words the class

produced for the journal emerged. In other words, as the study progressed and students continued daily writing of journals, students on average produced more words per journal. For the averages of the MDWA, the line of best fit (y=1.33e2+3.13x) indicated a moderate linear Pearson's correlation of r=.57, significant at p<.01. Figure 2 shows the scatterplot along with the calculated line of best fit for the mean number of words for each journal for the MDWA class.

The ten MDWA participants whose idea counts were measured produced a total of 452 idea units. Individuals averaged 10.41 idea units per journal for the five selected journals. When selected journals (N=5) were averaged, the mean idea count for selected journals was 10.685 ideas per journal. The standard deviation for all selected entries was 5.791 idea units. When the mean number of idea units for each selected journal was plotted on a scatterplot, a moderate positive correlation of r=.402 emerged. The line of best fit (y=7.99=.17x) confirmed this moderate correlation. This correlation, however, was not found to be significant, as p=.502. This led me to accept the null hypothesis that there was no statistically significant difference in idea unit counts as the number of journals got higher. Figure 4 shows the scatterplot along with the calculated line of best fit for the mean number of idea units for each selected journal for the MDWA class.

Table 2

Mean Words Each Journal (by Treatment Group)

Journal Topic	Minutes	M MDWA (n=10)	M Non-MDWA (n=10)
Fantasy squashed by reality	3	113.25	97.111
Writing an anonymous love note	3	137	77.3
Something you thought was important that didn't have much meaning	3	140.667	100
What you would buy if you could buy anything	3	90.8	84.867
Describe the strangest thing you've seen.	3	119.9	114
Last Drink Bird Head	5	180.625	136.222
"But it turned out that they were lying to me the whole time."	5	208.429	165.222
"Nobody has ever loved me as much as I loved them."	5	216.875	156.3
Relationship between love and war	5	154.333	123.556
The things you carry	5	180.286	124.2
America	5	181.875	140.5
Myths and martyrs out of murderers	5	161.125	115.9
The end of the world	5	186.9	145
Getting lost	5	169.571	166.1
When I'm 42	5	163.571	145.5
Taking risks	5	176.667	114.714

Do-overs	5	160.571	167.333
Creepy scene	5	192.25	165.556
When things were “better”	5	201.75	146.2
Journeys	5	182.286	160.556

Table 3

Mean Idea Units for Selected Journals (by Treatment Group)

Journal Topic	Minutes	M MDWA (n=10)	M Non-MDWA (n=10)
Something you thought was important that didn't have much meaning	3	7.8	6.333
"But it turned out that they were lying to me the whole time."	5	12.875	13.333
America	5	9	12.778
When I'm 42	5	9.25	11.778
When things were "better"	5	14.5	12

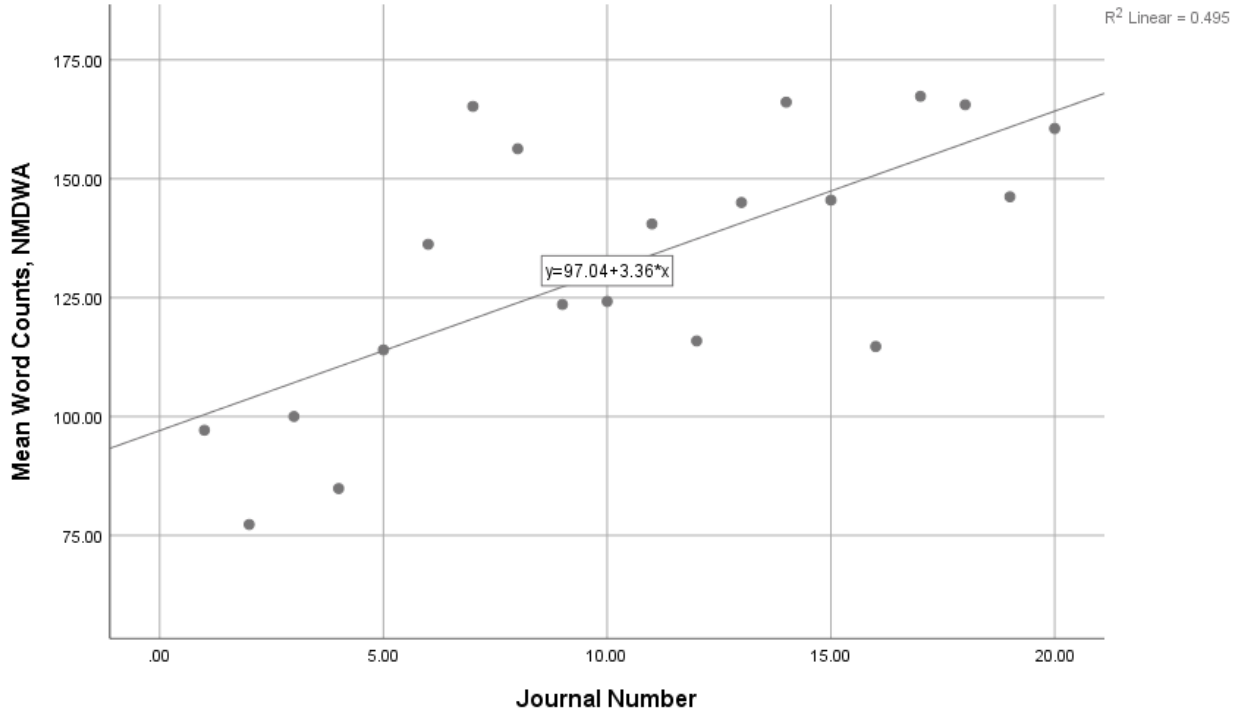

Figure 1. Scatterplot and line of best fit for mean word counts for non-MDWA class.

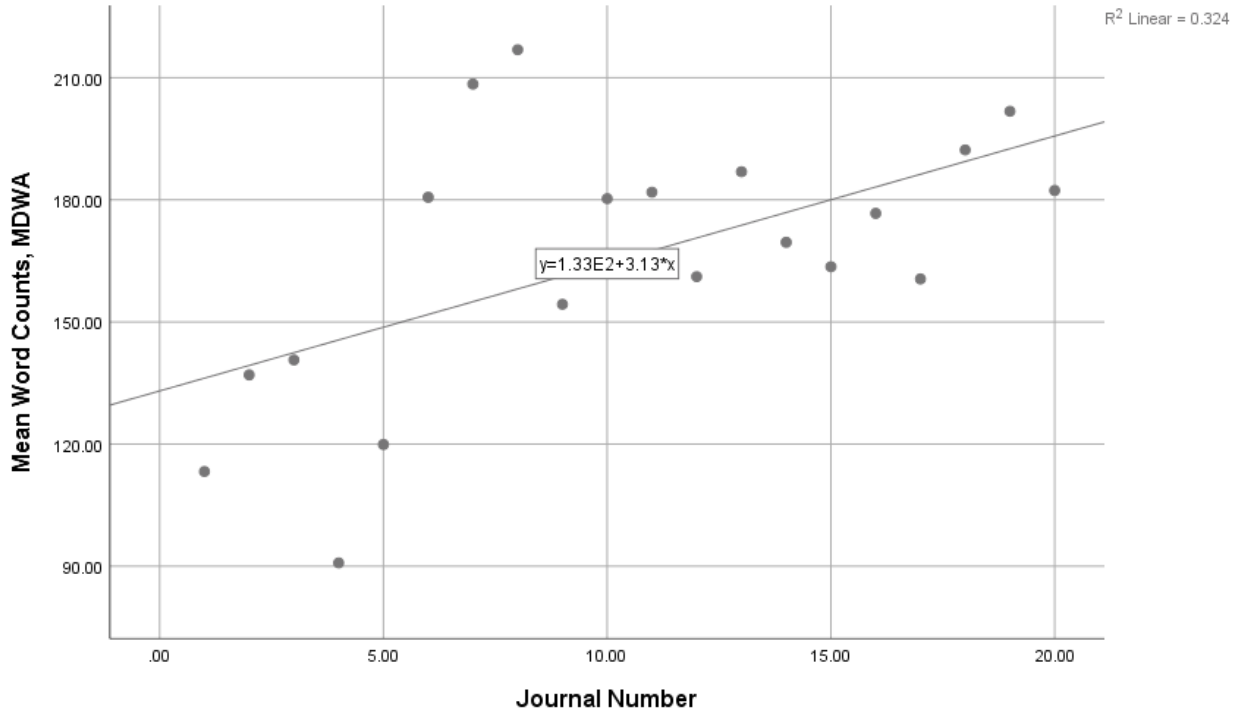

Figure 2. Scatterplot and line of best fit for mean word counts for MDWA class sample.

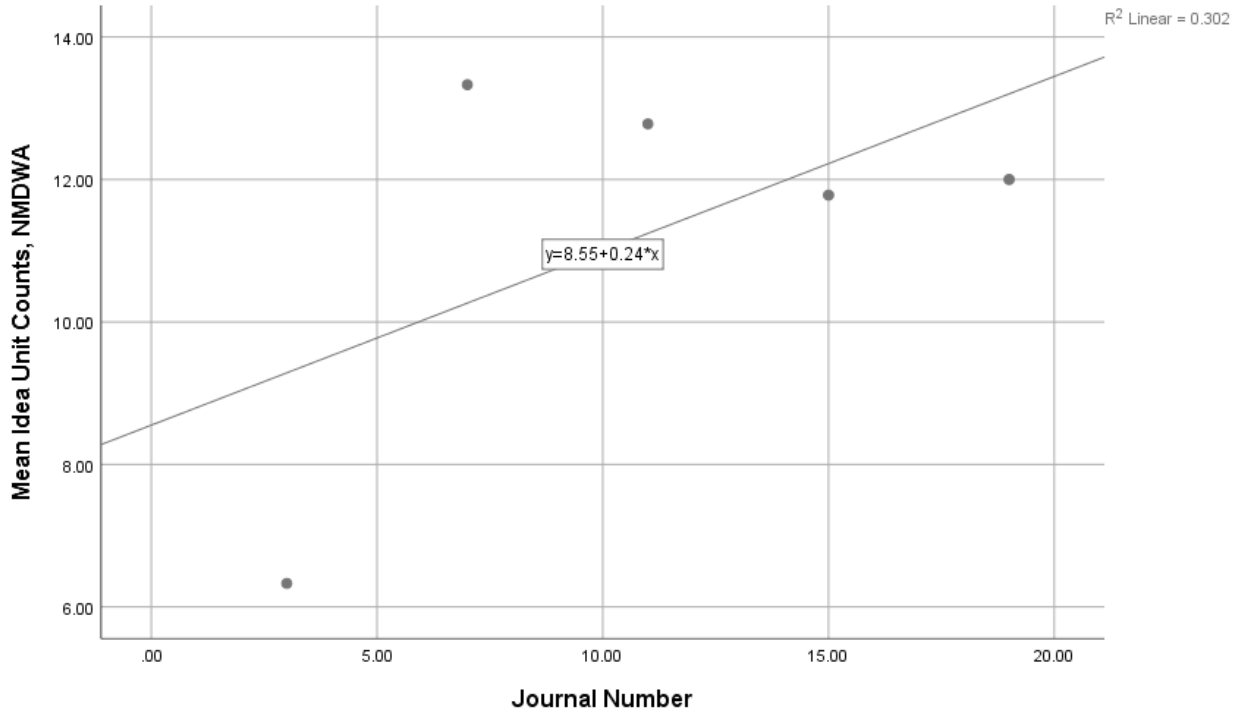

Figure 3. Scatterplot and line of best fit for mean idea unit counts for NMDWA class.

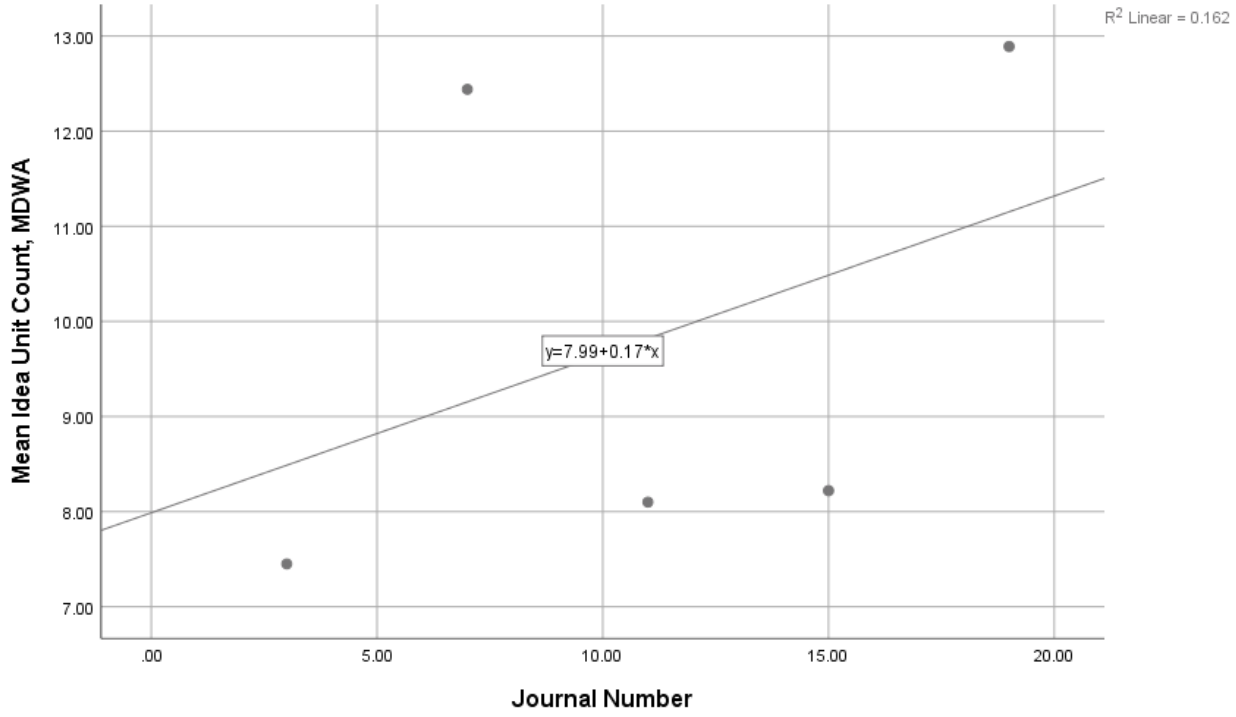

Figure 4. Scatterplot and line of best fit for mean idea unit counts for MDWA class.

Inter-class comparisons.

In order to determine whether the use of The Most Dangerous Writing App had a significant effect on the number of words produced on timed journals, samples (MDWA n=10; NMDWA n=10) were compared by a paired samples t-test using each class's mean for each of the twenty individual journals. For each journal entry, each class mean number of words produced was calculated and

compared using a paired samples t-test, the null hypothesis being that the rate of growth for MDWA students and NMDWA students had no significant difference, and the alpha hypothesis that MDWA students' growth > NMDWA students' growth at α=.05. When the means of journal entry word counts from the MDWA and NMDWA sample for each journal entry was compared, both groups showed growth in the mean number of words produced as the number of journal entries increased. A paired samples correlation between the two treatment groups showed a correlation of $r = .765$ with a significance of $p < .001$. The t-test comparing the means of these two groups showed a mean difference of 33.632 words per journal with a standard deviation of 21.197. A two tailed test of significance in difference with $df = 19$ showed a significance of $p<.001$. When figured as a 1-tailed test to determine positive growth only, the significance remained $p < .001$. These results met the projected significance level of $\alpha = .05$, and lead to accepting the alpha hypothesis MDWA Word Count Growth > NMDWA Word Count Growth.

In order to determine whether the use of The Most Dangerous Writing App had a significant effect on the number of ideas produced on timed journals, sample populations (MDWA n=10; NMDWA n=10) were compared by a paired samples t-test using each class's

mean for each of the five selected journals. For each journal entry, each class mean number of idea units produced was calculated and compared using a paired samples t-test, the null hypothesis being that the rate of growth for MDWA students and NMDWA students had no significant difference, and the alpha hypothesis that the MDWA students' growth in idea units > NMDWA students' growth in idea units at α=.05. When the means of the selected journal entries (N=5) idea unit counts from the MDWA and NMDWA sample was compared, both groups showed growth in the mean number of ideas produced as the number of journal entries increased. A paired samples correlation between the two groups indicated a correlation of r=.54, though the correlation was found insignificant at p=.347. The t-test comparing the means of these two groups showed a mean difference of -1.424 idea units per journal with a standard deviation of 2.611. A two tailed test of significance in difference with df = 4 showed a significance of p=.290. When figured as a 1-tailed test to determine positive growth only, the significance remained p =.145. These results did not meet the projected significance level of α = .05 and led to accepting the null hypothesis MDWA Idea Unit Count Growth having no difference with NMDWA Idea Unit Count Growth.

Question 2 Results and Findings

Question 2 was evaluated using data from a pre/post study survey. Responses from these surveys was aggregated both from the entire participant population (N=36) and by participant class (MDWA n=11; NMDWA n=25). The survey data was further informed by data gained from participant interviews. The combination of these two sources of data provided a dynamic picture of attitudes toward writing and feelings about creativity.

Attitudes toward writing.

A definite shift in attitudes toward writing was detected in study participants. These changes in attitude were determined by both survey and interview findings.

Survey findings.

It was argued in the review of literature that student attitudes about writing reflected an antipathy toward the activity. Further, it was noted that students found school writing a decidedly uncreative endeavor. This attitude was reflected in participant classes' responses to the pre-study survey. The mean score of participants' responses (N=36) to the prompt "I enjoy writing," where 1=strongly disagree and 5=strongly agree was 2.69. The class which used The Most Dangerous Writing App (MDWA) for its daily journal writing activities (n=11) averaged a score of 3.33 on the question, whereas the class not using MDWA (n=25) averaged a score of 2.48. Additionally, exactly 50% of all survey respondents (n=18) either disagreed or strongly disagreed, with the highest number of respondents (n=10) disagreeing. Only 12 survey respondents, or 37%, said they agreed or strongly agreed that they enjoyed writing. Nearly three times as many students reported strongly disagreeing with the prompt "I enjoy writing" (n=8) as strongly agreeing with the statement (n=3). Were there differences in the two groups on this?

These attitudes showed some shifting in the post-study survey. For the post survey, all but one participant was present for the administration of the questionnaire. One participant was absent from the MDWA class. Mean response to the prompt "I like writing" (N=35) was 3.00, with the MDWA class (n=10) averaging 3.56 and the non-MDWA (n=25) class averaging 2.77. The largest shift in attitude reflected in the post-study survey indicated a decline in antipathy toward writing. In the second administration of the attitudes survey, only 10 respondents total, or 28.6% of students, disagreed or strongly disagreed with the idea that they

enjoyed writing, while more students (11, or 31.4%) said they agreed or strongly agreed with the idea that they enjoyed writing.

Participant products.

An interesting finding arose from the artifacts of the study, specifically the student writing. As the length of the study increased, students began to do some interesting experiments with perspective, genre, and tapping into emotional content. A typical entry from the first journal assignment[2] – a topic in which students described a time when fantasy came crashing down on reality – came from Bart, a baseball player from the NMDWA class:

> I'm going to be completely honest I have no idea what to write about. The whole fantasy thing has me really confused but I assume because it's related to araby it means that it's related to lust for a girl. I haven't really had this fantasy about anyone in particular other than zoning off and day dreaming but I don't remember what those were. I'm sure I have imagined a life or date with someone at some point but I cannot point out a particular time.

Windsor from the MDWA class had a similarly directly descriptive entry:

> A time when fantasy got squashed by anxiety and reality was the prom for a first thing. I had always imagined a realy cool thing that was super fun and you went with alll your friends and you had a great time, but in reality I didnt have a great time, and I only really went with a couple, and only took pictures with one other friend. It didnt live up to my expectation I had for it, especially the preplanning which was very hectic, and I had never imagined that you would have to buy and plan so much as my friends and I had to. There have been lots of times where I had a kind of experience where I had a fantasy of how

[2] This journal entry, as all entries in this document, appear as they were written unless edited for de-identification. All grammatical and spelling mistakes are [sic].

> something was gonna be and axiety and reality kind of hit it and ruined it, but I cant think of really good examples.

While both of these entries directly address the topic and expand upon concrete ideas, they also lack ideational fluency and originality. Both indicate a censorship of ideas, as both entries limit themselves through a version of "I can't think of anything else." This sentence appears to indicate a concern with the "correctness" of ideas in the journal response and communicated concern about conforming to the norms of the prompt. In addition, these entries tended to be short (it was the fourth lowest mean for both classes) and didn't generally engage alternate narrative perspectives (third person or a "non-journaler" voice), narrative threads, or non-prose genres.

By the end of the study, these same participants were able to write on prompts with greater depth and originality. Bart's entry for Journal 18 – "Write the creepiest scene you can imagine" – had the following opening:

> Saturday night i was sitting at home downstairs by myself. my parents and brother were out so i was home alone. i was watching TV when i heard knocking on my window. s paused my show and listened for a second. i disregarded it and turned my show back on. two minutes later the same knocking happened again. this time i knew i wasn't hearing things. i turned off the TV and listened very closely. the knocking happened two more times. by now i was very creeped out and concerned so i went to the safe and . . .

This particular text has some text features that are remarkably different from his first entry. First, there is the obvious narrative voice. While the narrator is still first person (a convention of journal writing), the story develops more fictive elements, including narrative pace and cadence, exposition in the form of background and setting-building, and a sequence of events that follows

the early structure of Freytag's dramatic structure diagram. Additionally, it is clear that the expression of the ideas had become more important than "correctness." Abandonment of basic conventions (the decapitalization of "I," for example) and not correcting careless typing errors (the substitution of an "s" for the word "a"), and a lack of punctuation indicates that the expression of the idea became more important than the conventions of typical written work.

Windsor's Journal 18 showed a different type of growth. Her entry built upon a that day's reading (Joyce Carol Oates's "Where are You Going? Where Have You Been?") but took on the persona of the story's villain (a middle-aged male). Her truly dark entry began:

> There she was just sitting there in the middle of the room. You can tell she is starting to get nervous, a little panicked even. She didnt even know, she just thought this was going to be nice, maybe even fun. But how can i know exactly what was going on in her mind to make her come here, I just know that I did whatever I could to convince her. She doesnt even know who I am yet, doesnt know what I am capable of, what I can do . . .

This entry again shows a lack of concern with convention, conformity, and correctness. The occasional lack of correct capitalization and the missing apostrophes show a desire to get ideas out at the expense of convention. More interesting about this piece, though, is the play with perspective Windsor engages. She purposely chose to construct a fictive male narrator (or, in this case, build an internal monologue of Oates's Arnold Friend that is not present in her short story) and build a dynamic thought process that is at once both reflective and narrative. At the same time, her narrator is able to evaluate and narrate the focus of his attention. This "reaching out" into the psyche of a third person (Windsor being the first, her narrator being the second, her narrator's focus being the third) shows a layering of emotional awareness not present in her first entry. Additionally, Windsor made a point of reaching out to the audience as a means of

including feelings of dread and creepiness in the reader, a highly experimental (her prior English teachers had dissuaded the use of the second person address) move that many professional writers are shy of making.

One interesting evolution in student writing was the evolution of narrative building. The "Last Drink Bird Head" prompt (the prompt gave the participants the four words last, drink, bird, and head and had them respond how they would) provided several interesting examples. Some of Gail's (MDWA) entry ran as follows:

> But when she took Fido, I knew that I had messed up. Fido was our pet Mcaw, a bright orange bird with a little green patch of feathers on his back. He liked to mimic tunes that I would hum to him and he was the best pal I could have ever asked for. My girlfriend and I had bought him to celebrate our 5 year anniversary, which now seems like so many wasted years. I miss that bird so much. I miss him more than I miss her. In the big picture, she didn't mean nearly as much to me as that bird did and my heart is breaking without my dear Fido flapping his wings beside me. I miss him pooping on my shoulder and eating crackers out of my palm. That night I had the worst headache I've ever experienced as I sat on the curb and longed for my dear bird. My head was pounding and my eyes were filled with sticky tears.

This entry explored the psyche of a male narrator (written by a female student) who was dealing with the loss of multiple relationships. Additionally, there was the unexpected turn of "Fido" (traditionally a dog's name) being a pet parrot the narrator loved. The entry evaluated the worth of different relationships (person-person vs. person-pet), and satirized the trope of "missing all the little things" often found in the cliché of breakup language.

Lisa (NMDWA) took a different tactic on the same journal entry and wrote in verse:

It was the last time I'd sleep in that room.

It was the last time I'd have to have a curfew.

It was the last time my mother would make me breakfast.

It was the last time I would live here.

It started off with milk to drink.

It was followed by many juice boxes.

After that, I drank sodas.

What will I drink now?

Not only did this entry play with the typical genre of classroom timed journal writing (opting for verse over prose), but this piece plays with time, place, and memory. The speaker of this poem was both looking backwards through his or her life and looking forward to a future where these moments will be part of future reflections. All these reflections, however, were literally in the future of Lisa, who would not be leaving home for college until eleven months after this entry was constructed.

Lisa was not the only student to construct poems, nor was poetry on in the purview of the NMDWA class. Callie's response to the "This is America" journal prompt resulted in the following poem:

America to me is many things,

Things both good and bad.

America is multicultural

But at the same time,

Many parts of the American population

Seem to shun it.

America is Patriotic,

But sometimes, America and

Americans tend to blur the lines of

Patriotism and extremist like nationalism.

America is a place where people are free to

Choose what and who they worship

Choose who they want to represent them

Choose how they view the world

And choose when, where, and how

They shall express those views.

But, America also can become hostile

In the face of simple disagreement

With the world, and amongst themselves

America is a vast landscape of many different

Terrains, animals, and people.

But, sometimes we let borders separate us,

Not just physically, but as a collective people

That should work together, and work to live in harmony.

This poem, written with the pressure to continuously generate text, was at once both political and personal, both patriotic and critical, both topical and evergreen. It addressed the contemporary issues facing the United States often seen on news programs ("extremism" and references to national border controversies) while at the same time alluding to the aspirational vision of

America found in The Declaration of Independence. In short, it addressed a broad scope of complex issues using a genre of writing not of the "journal" style.

Student journals were littered with interesting shifts in perspective, experimentation with genre, and narrative stretching. One student chose to use each of his journal entries as a platform to create stories with the same characters and settings. This student even used fantastical elements (a flying tiger; anthropomorphized animals; fairy-tale like settings) in constructing an entire universe for his characters. In what could only be called an act of collusion, this universe even spilled over to several of Bart's journal entries. Viewing the world through unique eyes (dogs were particularly popular narrators), tackling identity issues (one student in the MDWA class wrote many entries revolving around gender identity, gender fluidity, and transitioning from female to male; several entries involved individuals navigating the daily life of non-cis sexuality), and taking the opportunity to write about difficulties, struggles, and anxieties were all foci in the journal responses.

Nathaniel's (NMDWA) "Last Drink Bird Head" entry captures the spirit of much of the writing. When asked about this entry, he said that he just wanted to see if he could write a backwards story that made sense and could become clearer as he continued writing, noting that the journal and the low stakes gave him the opportunity to create the following in the span of five minutes:

> Last. Drink. Bird. Head. The backwards story.
>
> **LAST** but not least, the man ran away. He didn't want the woman to find out the intentions he had with her. His judgment was weak and his brain was not thinking. Just because he wanted to do unmoral activities with a married woman does not mean he must be killed.

DRINK, too much he had, time and time again. His thoughts were unclear and his mind was out of order. He went up to the woman of his dreams at the party, decided to tell her he wanted sex, but chickened out. So he told his friend, who went up to the lady and was about to tell her the news.

BIRD, Larry, was his name. He was invited to a party. He's never been to one and always wanted to attend. So, without consulting with his self-conscious, he went on, hoping and praying that he may run into Julie... or joan... or Jeanie... whatever her name was, the married woman he met the day before.

HEAD over heels is the way he felt after talking one sentence to her. He was at the super market and saw a lady in need. He only saw from behind, and when he approached her and saw her face, instantly he knew that he wanted to be with her. I was hoping one day he'll get his shot with her.

Participant interview findings.

Melonie, a participant from the study in the class which did not use The Most Dangerous Writing App, explained some general feelings behind this data. Melonie was a particularly strong communicator who was the consummate high school politician: she was bold, direct, unafraid of pithy comments, and thoughtful about how experiences for herself differed from others' experiences. In one open-ended survey response, Melonie explained that writing could be particularly frustrating when writer's block interrupted the generation of ideas in her writing. But beyond her own frustrations with writing, she noted that writing in general seemed to be an activity and skill her age cohort peers did not appreciate. In a post-study interview, she explained "I don't think people in this generation like to write at all . . . in their free time." In particular, Melonie bemoaned a lack of choice in school writing, which ultimately led to

dissatisfaction with the process. In particular, she explained that school writing often lacked interest and passion, and when "you don't feel passionate about your writing, it's not gonna be as in depth or as good as it would be if you did care about the topic."

Melonie also gave voice to some of the shift in attitude during the study. She explained that even though English isn't some peoples' "thing," the daily journaling led people to the experience of enjoying (or at least not hating) writing and viewing it as a building block of other writing activities. She said that people began to see the journals with a growth mindset rather than as simply a passionless classroom task, noting:

> Some people, their writing improves over time because if you have, like, a crappy journal entry one time, and then you're like, "Oh well, I mean, maybe this will help me." Some people see it as helpful to them in the future, so they'll take advantage of the time they have to write.

Hans from the NMDWA class, a tuba player in the marching band who was eager to talk about as many ideas as possible in our interview, qualified his personal experience with daily journal writing in similar terms:

> Well, for me it was, in the beginning it was just like, eh, this is just gonna be another little task we'll have to do, it's just gonna, it's just gonna take up time. But as we started doing them and doing them, the prompts got more interesting and related to what we were doing. It became interesting and . . . depending on what we're reading, I'd be like "I wonder what the prompt is for today? I hope it's good."

In short, the journal writing became a vehicle for self-improvement, and students felt the activity provided the platform for improved quantity and quality of thinking. Students seemed to discover that the more writing they did, the easier it got to generate ideas and to get "into" the

writing. It was an experience they moved toward as they continued their regimen of daily timed journal writing.

Another participant who was interviewed, Randy, explained how his own attitudes toward writing shifted in relation to his school years. Randy was a quiet, thoughtful student in the class using "The Most Dangerous Writing App." He considered what he would say before blurting out responses during the interview. During one moment of quiet reflection before answering a question, he happened upon an interesting phenomenon in his attitude toward writing: as a young child, he said that he enjoyed writing and completing stories for himself. As he got older, he explained, he enjoyed it less and less. While he was quick to say that it was likely due to "enjoyment in other things more so than writing," he briefly noted a correlation with his school years:

> When I was younger, I used to be into it [writing]. I actually wrote a small story for myself. But then as my education increased, I actually didn't like writing as much. So, I actually stopped. But I'm actually enjoying it more now.

When asked about why he had a renewed interest in writing, Randy said that it had to do with a newfound freedom with it. He had recently discovered that writing, when it was free from restrictions and judgement, allowed him the opportunity to release emotion and not worry about others' opinions. Two things are interesting about this response: first, Randy's school writing during his senior year (the time period of this study) was free from the constrained and conformist regime of standardized curriculum and testing so omnipresent in schools. Standardization tends to squelch enjoyment of creative endeavors such as writing in favor of conformity to convergent interpretations of learned material (Flieth, 2000; Kim, 2010; Kim & Hull, 2012; Runco, 2015; Treffinger, 2012). Without the pressure of standardization, and with

the added pressure of freedom to create as he wished, Randy re-engaged with a lost love. Second, it should be noted that Randy found "The Most Dangerous Writing App" a vehicle through which he could tap into the true joy of his writing. In the post-study survey, Randy said that the use of the writing app made his writing feel "free in a sense." When asked about this in his interview, he explained that the practice of daily writing trained his mind to be able to produce ideas on command. Further, "The Most Dangerous Writing App" allowed him to let go of worries surrounding formulaic and prescriptive writing mechanics. He talked about the evolution of his feelings on the app:

> At first it was more difficult cause you were on that time constraint and you had to continuously make ideas. But now I think it actually made it easier because of the time constraint . . . because you're not looking to be, like perfectly correct. You're just letting it go.

Frank was a student who was obviously resistant toward writing. Not only was Frank consistently the lowest word-generating student in the class using The Most Dangerous Writing App, at times his performance on the journal writing also seemed actively apathetic. Over the course of the twenty journals, he produced 130 fewer words than any other participant in his class with a total word count of 1511. Only 3 students total produced a lower word count (one of whom missed 13 journals). He averaged 79.53 words per journal across the entire study period, and once the journal time bumped up from three minutes to five minutes, his average dropped off precipitously (from a mean of 149.16 words per journal to a mean of 56.29 words per journal). This drop can be accounted for by nine "0" scores in the five-minute journals (with the "0" scores filtered out, his average in the five-minute journals jumped to 157.6 words per journal). His pre-study survey responses indicated a general distaste for writing. He strongly

disagreed with the idea of "enjoying" writing, and strongly agreed that he preferred assignments which did not require a lot of writing. Additionally, he voiced an anger toward writing in his open-ended survey response, particularly when it came to writing constrained by time limits. In his post-study interview, Frank was blunt when asked about his attitudes toward writing. "It's not that fun," he said. He was quick to follow up his response with an interesting qualifier, though: "It depends on the topic." When asked to elaborate, Frank said that topics that came from school were neither interesting nor engaging, while writing about personal topics in which he was free to explore his own interests could even be "fun sometimes." As for the drop-off in his word counts and the "0" scores, he explained that he would often fail the journal writing because he was worried about understanding the topic and writing text that was considered "correct" for the prompt, despite directions that there was no "right" answer for the journal prompt. He also noted that the time pressure of having to continuously generate text made the writing harder because it didn't seem he was able to engage in the writing without thinking about the prompts and producing a unified response while maintaining text production. He also felt that the topics were difficult to write about because he could not relate to them. When asked what changes he would make in order to ensure more students using the writing app would successfully complete journals, he suggested (with a bit of a smirk on his face) that "the topics: make 'em more related to the age of the kids that are actually doing it."

Although student responses generally reflected that they did not consider writing to be a preferred activity, the responses to the survey indicated that the importance of writing was not lost on them. The mean response to the prompt "Writing is a skill people will need throughout their lives, regardless of what they do" was 4.13. 83% of students (n=35) agreed or strongly agreed with the need for people to retain lifelong writing skills, while only 1 student disagreed

and 1 student strongly disagreed with writing being a lifelong skill. 76% of survey participants either disagreed or strongly disagreed that "People do not need to write much after they graduate from school," a prompt which had a mean score of 2.11. While four respondents agreed with the statement, none strongly agreed.

Attitudes and definitions of creativity.

Participants also indicated that their ideas of creativity changed during the course of the study. Through survey data and participant interviews, it was clear that there were shifts in how students viewed both creativity as a whole and their own creativity.

Survey findings.

Participants in this study believed that creativity was something important. When asked on the pre-study survey whether creativity was "overrated," respondents overwhelmingly disagreed. The aggregate average score on the question where 1=strongly disagree and 5=strongly agree was 2.19. The non-MDWA class found creativity slightly more overrated, averaging 2.37 as opposed to the MDWA's average of 1.67. In addition, only four total respondents (11%) agreed with the sentiment, and none agreed strongly. The correlating post-survey question showed a slight uptick in averages, with an aggregate of 2.25, a non-MDWA class average of 2.45, and an MDWA class average of 1.78. Still, only five total respondents agreed with the statement (14.2%), and none strongly agreed.

Additionally, many students believe themselves to be creative. On the pre-study survey, the aggregate average score on the prompt "I think I am a creative person" where 1=strongly disagree and 5=strongly agree was 3.06. The non-MDWA class self-reported being creative at a lower rate, averaging 2.78. The MDWA's class reported at a higher rate with an average of 3.89. The correlating post-survey question showed a significant uptick in averages, with an aggregate

of 3.58, a non-MDWA class average of 3.36, and an MDWA class average of 4.11. It is clear that over the course of the study, self-views of creativity went up across the board, even as view of its importance remained relatively stable.

One argument raised in the review of literature for this study was that creativity requires production, what Rhodes (1961) labeled "artifacts of thought" (p. 301). It appeared that participants, though they were not steeped in the theory and literature of creativity, intuitively understood this to be part of the process. In the surveys administered before and after the study period (N=36 and N=35, respectively), many participants referred to the most creative things they did as the construction of new and original products. Products ranged from paintings and other visual art to creative writing pieces. Many participants noted their affinity for performing music, both as singers and instrument players. In addition, several participants explained in the survey that they enjoyed process-oriented creative activities, such as working on cars with a parent, painting a room, or coaching middle-schoolers. Interestingly, several students noted in the pre-study survey that they enjoyed writing. In several cases, students said they wrote in pursuit of a larger artifact: two students explained that they wrote scripts or scenes in order to be able to film them at a later time, and one student explained that she wrote out plans for routines with her color guard (a dance-based section of the school marching band) performances. In addition to activities listed in the pre and post surveys, students who were interviewed at the end of the study put a clear distinction on what makes an activity creative.

Creativity and the environment.

Participants appeared to instinctively connect creativity and the ability to engage Flow with the environment. Specifically, the students in this study seemed to prize specific characteristics in their environment, most importantly freedom.

Freedom

Almost without fail, participants who were interviewed explained that "freedom" was essential to any creative endeavor. Windsor, an interviewee who said she wrote scripts, shot short movies, and designed geocaching activities for her friends, explained in detail the need for freedom in being creative. She went into specifics, explaining that doing creative things feels good:

> cause there's not really a limit on what you can think of at the moment, so you know, you just kind of have the freedom to kind of take it in whatever direction you want . . . some of the other things you have to do, you don't have the choice like you have when you're doing something creative. You're kind of confined to whatever you're doing.

In fact, Windsor believed that the crux of creating an environment more conducive to creativity was to get rid of as many restrictions and rules as possible. She even explained that she didn't think school a place which fostered creativity because "being confined . . . kind of effects, like, the atmosphere you're in." This kind of environment led her to express feelings of being trapped by the constraining and conformist environment practiced at school (noting specifically assignments which require regurgitation of declarative knowledge and what she believed to be an extreme and restrictive dress code). She explained the confined and constrained nature of the academic and psychological environment made her feel imprisoned or confined, saying "if you can't feel like . . . you can think of different things, then you feel like you can't really get out of it."

Participants indicated that creativity was most closely associated with the production of artifacts. These artifacts ideally were developed in environments free from constraint and standardization and offered freedom of responses to stimuli. In addition, these creative products arose from processes that allowed students the opportunity to explore many possible responses to

problems. Randy explained that making artifacts was an essential aspect of being creative. He defined creativity as taking "the ideas in your head and making them physical." More than that, though, he believed that the physical item produced had to be the result of a process of struggle and achievement. He explained the process as "thinking about how everything gets put together. . . and then in the end, it's like, relief and satisfaction."

Question 3

Question 3 was evaluated using data from a pre/post study survey. Responses from these surveys were aggregated from both the entire participant population (N=36) and by each participant class (MDWA n=11; NMDWA=25). The survey data were further informed by data gained from participant interviews. The combination of these two sources of data provided a dynamic picture of participant experiences of Flow.

Experiences of Flow.

Survey responses.

Flow has been described in its operational definition as the optimum experience of an activity that allows an individual to focus solely on the task at hand (Csikszentmihalyi, 1990). Participants were asked about their ability to engage in optimum experience on the study pre/post survey. One of the questions asked about students' feelings about getting "wrapped up" in activities outside of school, and one question asked about getting "wrapped up" in activities for school. On the pre-study survey prompt "I can get wrapped up in things, but almost never things I do for school," where 1=strongly disagree and 5=strongly agree, the average score for all participants (N=36) was 3.111. The mean score for participants in the NMDWA class was 3, and the mean for the MDWA class was 3.444. In the corresponding post-study survey prompt "I can get wrapped up or lost in doing things, but almost never when those things are for school,"

where 1=strongly disagree and 5=strongly agree, the average score for all participants (N=35) was 3.16. While there was an increase in the aggregate mean for the NMDWA participants (3.273), there was a marked decrease in the MDWA class (3).

For the pre-study prompt "I can sometimes get wrapped up in my work for school" where 1=strongly disagree and 5=strongly agree, participants indicated an even stronger agreement. The total participant mean was 3.472, with the NMDWA class averaging 3.37 and the MDWA class averaging 3.778. On the corresponding post-study survey prompt, there were slight drops in the respective means, with the total participant average at 3.452, the NMDWA average at 3.364, and the MDWA average at 3.667.

Participant interviews.

Participant interviews, however, revealed some intuitively nuanced views of Flow beyond the mere measure of engagement in activities or schoolwork. Windsor explained that Flow had an element of continuity to it. She explained that one of the things that was often frustrating about writing is that the rules and structures got in the way of her being able to "make it sound nice and keep it going." She explained experiences that cause Flow, unlike other tasks which required close adherence to rules and strictures, make you feel "like you're not thinking about all the other stuff, and you're not really focused on one thing, but your mind's just kind of open." She also noted that the Flow experience didn't require as much focus and attention, explaining that it was mostly "trying to let go with what else is on your mind . . . and just focusing on what you're doing, but at the same time not really focusing on anything."

Simone, a student from the NMDWA class explained a similar notion of the stripping away of distractions. She described her place of Flow as feeling like "I'm lost in my own thoughts." She also noted a sense of continuity, explaining that "I can keep going; there's no

distractions, I fully focus on what's in front of me and I get a lot done in short amount of time." Frank indicated that time feels compressed when he's Flowing, and that he feels emotionally empowered "like nothing's gonna get in my way or put me down." Melonie noted that focus was key, but that focus was singular. She explained:

> You're not really thinking about anything else except the object that you're doing. It's like kicking the soccer ball or in tennis, just focusing on keeping the ball in the court and stuff. You're not thinking about any extra things that are happening in your life. It's just in that moment you're only concerned about one thing.

Environment needed for Flow was a recurring theme in the interviews. Simone explained a really specific environment needed for her to get to a place of Flow with her writing:

> For me to write something really good, I have to be comfy, in my bed, in my pajamas, maybe, like, a coffee or something . . . a comfortable setting and a place that you're normally in. Then I feel like you could create some really good ideas.

Hans said that Flow was a feeling of connectedness between actions. He qualified it as a feeling that:

> For me when it's flowing, everything sort of like just comes natural and it just, like, it's just smooth connection from what we're doing, from point to point to point to point to point, and you can just like, you're writing you can just like write like a paragraph, paragraph, paragraph, paragraph, but nonstop, like, you're not stopping, you just know exactly what's going through your head, and you just get it all together.

He explained that the most important environmental factor for engaging Flow was practice. He noted specifically that coaching and practice were needed to "push" individuals into flow.

Ultimately, students reported that Flow was something they found themselves engaged in at relatively high rates. Flow was associated with feelings of focus and of being lost in the moment. Flow could be found in comfortable environments in which they were able to practice a particular skill.

CHAPTER 5

Discussions and Conclusions

> *I visited your old school recently . . . Mrs. Duncan, although young enough to have taught many more years, also retired. While she saw some value in the curriculum changes mandated by the city recently, in the end she couldn't live with them. The new curriculum requires teachers in underperforming schools to follow a regimen – exactly this many minutes for group reading, exactly this many minutes for responses, and so on. She said it took the joy and creativity out of teaching for her. (She also said a program like mine wouldn't be possible in the school today; there just wouldn't be time.). Although Mrs. Duncan felt that the new curriculum would help more children learn to read and write, she knew they'd end up hating school because the process was so boring.*
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> - Sam Swope, I Am A Pencil

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Standardization, convergence, and conformity are omnipresent in the contemporary schoolhouse. The purposes for many activities -- reading, completing math problems, learning historical facts, and science literacy -- seem to serve the ultimate purpose of performing well on a series of standardized assessments.

The purpose of this follow-up explanations multiple methods study was to evaluate how different treatments of timed daily journal writing affected the verbal and ideational fluency, attitudes toward writing and creativity, and described experiences of Flow of high school students. In the hopes of affecting the scope and direction of how educators can introduce environmental pressures in order to increase creative thinking in their students, I investigated the following questions:

1. Does student use of a gamified online writing app (specifically "The Most Dangerous Writing App" or "MDWA") for daily low stakes open-journal writing significantly increase the number of words and ideas on an imaginative story task as compared to

those written by students who do not use a gamified writing app for daily open-journal writing?

2. Does daily timed open-journal writing influence student attitudes toward writing and creativity? Does the application of a gamified writing app to timed open-journal writing make a difference in these attitudes?
3. How do students who write daily open-ended journals describe their experiences of their writing? Are the described experiences different for students who use a gamified writing app and those who do not? Do these experiences connect with Flow theory?

Two separate writing treatments were used on participants: one group was asked to write daily timed journals using a gamified writing app called The Most Dangerous Writing App. The other participant group was given the same daily timed journals with the instruction to "write for the entire time." After four weeks of this treatment, students were given the second half of a pre/post study survey measuring changes in verbal and ideational fluency. Additionally, students took a computerized test of creative thinking, and several participants were interviewed to give voice to their attitudes and feelings about writing, creativity, and Flow.

The working theory behind this study was that students, when provided with adequate and appropriate tools, environment, and instructions to continually produce text and ideas, would have significant changes in their attitudes toward writing, creative productivity, and achievement of Flow. In addition, requiring students to continually generate text within a timed format would increase the creative thinking skill of fluency (a necessary element of originality, what many consider the *sine qua non* of creativity) and would push them to release self-censorship and squelching behaviors, thus achieving Flow state with their timed writing. It was

also believed that students who were challenged to push themselves to generate text with a gamification of journal writing would increase their creative thinking skills, particularly fluency, become more positive in their views of writing, and would be more likely to recognize and engage their own Flow state.

Question 1

Verbal Fluency.

In response to research question 1, it was found that as students wrote more journals, they were able to consistently produce more words per journal. The moderate correlation between the journal number and a higher mean class word count for each class (r=.703 for NMDWA and r=.57 for MDWA) showed that the practice of timed writing with open responses facilitated verbal fluency. A paired samples correlation between 10-student samples from each class showed that both demonstrated similar growth during the study period. Mean word counts for each journal from the correlated across classes produced a moderately strong correlation of r=.765. It is reasonable to conclude from these results that when students participate in daily timed writing, regardless of the constraints of their method of text production, they will produce more text.

Ideational Fluency.

In response to research question 1, it was found that as students wrote more journals, they tended to produce more ideas per journal. The moderate correlation between the journal number and a higher mean class word count for each class (r=.55 for NMDWA and r=.402 for MDWA) showed that the practice of timed writing with open responses facilitated some increase in ideational fluency. This increase, however, was not found to be statistically significant in either case. A paired samples correlation between 10-student samples from each

class showed that both demonstrated similar growth during the study period. Mean word counts for each journal from the correlated across classes produced a moderately strong correlation of r=.54, though again, this result was not statistically significant. One potentially interesting avenue is the different of means between the two groups. MDWA averaged approximately one less idea per journal (from the selected sample) than the NMDWA group. Because the MDWA group did not have incubation time, they may not have had the opportunity to generate a number of ideas as a prewriting exercise. This result, while not found statistically significant at this time, may be an avenue for future research. However, at this time, it is reasonable to conclude from these results that while daily timed journal writing may help students generate ideas, there is no statistically significant impact on the number of (or fluency) of those ideas.

Gamification effects.

The major treatment factor at the center of question 1 was the use of a gamified writing app. It was thought that students who used The Most Dangerous Writing App as their vehicle for journal writing would grow verbal fluency at a higher rate than those who simply typed their journals with the instruction to write for the whole five minutes. These two treatment conditions could reasonably be said to be two very different writing environments. The app presented a writing environment for participants which required them to write continuously or risk losing all the text they had generated. The class not using the app could use their writing time as they saw fit (so long as it was doing writing activity). The writing environment could equally be referred to as the writing "press." Rhodes (1961) called "press" the interaction between a creator and the conditions of creation, and the creator's production in response to the interaction. In this case, there was a very particular difference in writing press for the two groups which, depending on how strongly successful task completion is valued, may have

significant impact. As discussed above, students who used "The Most Dangerous Writing App" were able to consistently generate more words, though the interclass comparison indicated that similar growth patterns were seen in those participants who did not use the writing app. More interestingly, those students who did not have the environmental stress of the gamified writing app appear to produce slightly more ideas in their timed journal writing. While not found significant at this time, the possibility exists that a slight amount of incubation time to generate ideas may have positive impact on ideational fluency.

Several students stated that they believed the gamified writing app had a positive impact on their verbal fluency. Several of those who did not use the app during the study said that they believed using the app would have enhanced their verbal fluency. One survey respondent explained that the best writing he ever did was using The Most Dangerous Writing App for class. Windsor from the MDWA class also said that her experience helped her write more. She believed that the need to generate texts, along with the instructions to let go and not worry about the constraints of formal writing, allowed her the freedom to generate text. And while there were those who didn't feel comfortable with the app, Hans seemed to have wished that he had used the app because unlike him "they had that time constraint and so they're gonna be constantly typing typing typing typing, even if it doesn't make sense half the time, they're just gonna be writing words." That pressure, then, seemed to him to be a motivator for continuing to produce text. Even those who didn't like the app, like Frank, acknowledged its ability to inspire more verbal fluency. He explained that the app "definitely challenges them [students] to learn to be more creative and just write down what you feel instead of thinking about it and putting it into context." And Simone from the NMDWA group, who said that she would have hated using the app and would have probably just typed random words, acknowledged that such

writing might be useful for those going to college who needed to get into the habit of generating many ideas. That said, there are a number of potential confounding issues that may have influenced word counts beyond just the difference in journal-writing method.

Topics.

Several participants indicated that topics could definitely influence the number of words they would generate for a journal. When asked about the journals, and what they believe might be good changes in future iterations of the study, students had many different thoughts. Windsor from the MDWA class explained that she believed she would have written more and been more engaged with the topics if they had a stronger connection to the bigger papers that they were working on for the class. Frank from the MDWA class (who logged a total of nine zero-scores for the study) said that lack of interest in journal topics and general difficulty with topic comprehension made much of the writing difficult to achieve. Hans from the NMDWA class indicated that curiosity and excitement about the writing topics may have led him to write more than he would have in another daily writing scenario. Melonie from the NMDWA class believed there was a relationship between the topics she enjoyed or felt passionate about and the amount of text she generated. She explained in detail, saying "if you're not interested in the topic you're writing about, then you don't feel passionate about your writing, so it's not gonna be as in depth." While this overlaps with one of the findings regarding creativity (namely that students believe freedom of choice to be an essential factor in being creative), it bears mentioning because it is clear that students will generate more text when there is a connection, passion or interest in the topic or subject.

Genre of response.

The majority of responses to the journal topics were of the nonfiction variety. For most of the daily journals, students would type responses about themselves or their personal thoughts on a topic. There were several students, though, who responded with alternatives, such as poems or stories with a set of stock characters. One student, Ivan from the NMDWA class, wrote a series of short narratives involving the same characters and setting to every single journal response. Several students chose to write poems as part of (or as the whole of) their responses to journal prompts. These responses tended to depress word counts, as it seems that there was more incubation time needed for constructing these complex responses.

Many students took on personas for several responses; one student in the NMDWA class wrote through the eyes of a dog three times. Another female student once wrote from the perspective of a male high school football player who was struggling with gender identity issues. These "alternative view" journal responses raised word counts, as it seems students caught a creative moment inspired by the prompt or its accompanying stimuli, discussed below.

Non-MDWA press.

Some environmental factors found their way into the writing unexpectedly. Many of the students responded quite emotionally to the journal prompt that also included an infamous Nike commercial about taking risks. Several students went on rants about the politics of the commercial and spent time claiming that they would never buy Nike shoes again. In addition, students in the MDWA class would often reference the journal stimulus material in their writing. One student, Patricia, would often mention the song, video or poem that went along with the prompt. In particular, she would comment on whether she liked a stimulus and then note that she hated writing and was just trying to keep typing until the time was up. At one point during the last week of the study, she noted the time bar across the top of The Most

Dangerous Writing App. She wrote two sentences about this before drifting off into the last seconds of her writing.

During the second week of the study, a major weather event that was highly anticipated was a topic most of the students wrote about in journals. The anticipation of the weather event and the corresponding days off from school consumed the writing and tended to suppress word counts for that day.

Conclusions

It appears that daily low stakes timed journal writing provides a launching pad for an increase in verbal fluency. Participants wrote more words over the time of the study, producing more words per journal entry as they got into the habit of writing more journals. The question of whether the gamified writing app had influence on verbal fluency is not nearly as clear cut. Both classes appeared to grow in verbal fluency at the same rate. Additionally, there does not appear to be any statistically significant evidence that ideational fluency increased. That said, originality of journal responses did, on the surface, appear to increase. Further study of the component of originality would be fruitful.

Question 2

Student attitudes toward writing and creativity, the subject of research question 2, also changed significantly. It appears that as students engaged in more writing, they enjoyed the activity more. These results were conditioned upon asking participants to be more fluent with their writing and to let go of their self-censors. In this way they were able to let their words flow freely and without regard for convention or conformity.

Views of writing.

Survey data indicated that between the beginning and the end of the study, students had increased positive attitudes toward writing and journaling activities. In addition, participant interviews revealed an awareness of the importance of writing at advanced levels of academic work. All six interviewees said that they agreed that the writing activities of this study were something important to continue with future classes. While some particularly liked it for the connections to the literature in class, and some believed it helped them generate ideas for papers, nearly all said that they believed college writing (which they would be doing next year) would require the kind of critical and thoughtful reflection of the journal prompts. Several students in their post-study surveys said that they enjoyed the act of writing when given the opportunity to engage topics on their own terms. Indeed, as the study progressed, students generated more text in response to journal prompts because there was openness and a lack of constraint. Students felt comfortable revealing their creative endeavors, whether through narration, perspective shifting, or genre. In addition, leaving behind conventions allowed these students to focus on the production of content. While ideational fluency was not found to be statistically positively influenced by the journal-writing treatment, the variety of unique ideas amongst the participants may bear further study.

Quality of Journals.

One unexpected outcome of this study was the increase in overall quality and unique experimentation within the journals. Relatively soon after the beginning of the study, students in both treatment groups began experimenting with form, genre, perspective, characterization, and interpretation of the journal topics. Additionally, participants would make passionate political claims, describe their unique cultural perspectives unapologetically, and generate

content free from much of the pretention of convention. In some cases, this arose from a quashing of the self-censor, allowing the writers to freely produce ideas. In other cases, students found the openness of response and a lack of expectations of convergence allowed them to explore unique ways of thinking about course content. Not only were these prompts engaging for students (though some indicated they would prefer they more closely approach more formal written assignment), they seemed to affect the ways in which they thought about texts. Specifically, many took on unique views of literature though the journal writing, thus enhancing understandings of course content.

One sealing thought about the power of the journal writing came in the form of an email from Mr. Revelation, the teacher of the participant classes. One afternoon, he sent an email regarding the journals and how they were affecting course content. He wrote:

> While I am thinking about it, I want to thank you for the excellent writing prompts you are preparing for the students. They are fun or provocative or sometimes both, and they are enhancing the lessons. The students enjoy writing them, and by doing so I think we are giving them an opportunity to think more critically about the texts, and to consider deeper meanings/applications. I appreciate your efforts to produce these each day.
>
> With your permission I would like to maintain copies of these prompts for future use. I don't know if you are creating them in Canvas or if you have them prepared in some other form, but when it is all said and done, I would benefit from having these in my quiver to use with these same texts or others, or as independent practice.
>
> As for me, I found today's prompt, with the devastating "Zombie" soundtrack, to be particularly moving, and relevant not only to WBY's text but to our own times. To hell with the PLC agendas—this is the best of what we do.

Views of creativity.

Across the board, participants also reported higher beliefs in their own creativity and higher beliefs in creativity's importance. Findings in both survey and interview responses not only supported the notion that students intuitively understood themselves as creative, but also indicated an understanding that environment and freedom are key components in fostering creativity. They also believed that the production of unique and original artifacts was essential to the practice of being a creative person. Whether it was making Christmas gifts, writing and shooting short films, doing carpentry work, or completing projects with friends, participants seemed to articulate understandings and definitions of creativity which require concrete production (Runco & Jaeger, 2012; Rhodes, 1961; Simonton, 2016; Torrance, 1963). Particularly salient was the fact that a great many of the survey respondents in the post-study survey indicated that they believed writing to be the most creative thing that they do. Even when writing was not noted as a preferred activity, many of the journals indicated that there was a decidedly creative bent to the responses as the study period progressed. Students ultimately produced creative works like running narratives, fictive scenes, and point of view shifting. All this while producing larger numbers of words and ideas. These correlate with many of the key components of creative thinking, especially Guilford's (1973) elements of flexibility (as in the running narratives between journal entries), fluency (as in the increasing number of words) originality (as in the unique stories and points of view), and elaboration (where the continuing narrative and the increased numbers of words intersect).

Conclusions.

When students are asked to write in a low-stakes way, they are able to develop a habit of creation and fluency. By being asked to write for a certain amount of time each day, students

were able to push themselves into a creative space where they were able to experiment with different styles and perspectives of writing. Even the students who generally remained in the personal reflective journaling genre of writing were able to see the benefits and increasingly were connected to both classroom activities and their own creative thinking.

Question 3

The majority of student participants in this study reported having Flow experiences. In post study interviews, participants described the experience of Flow as feeling detached from the pressures of anything but the constraints of a particular activity. This is consistent with Csikszentmihalyi's (1990) description of optimal experience in which the stresses and concerns of other activities melt away and all the focus is on the activity.

Students who were interviewed explained that when they arrived at Flow in their writing, they were able to recognize that they were not constrained by correctness, appropriateness, or convention. They were able to focus on only producing ideas in writing within a specific time constraint. Interestingly, students who used The Most Dangerous Writing App explained that that the rules of the app (generate text or lose your work) gave them the permission and the freedom to let go of convention and simply generate text. While some students did explain that they did not like using the app, the fact that most students were able to generate significantly more text than their non-app counterparts argued for a deeper engagement and more optimized experiences in the MDWA class. Some students who did not use The Most Dangerous Writing App believed that using the app would cause them too much stress and would keep them from being able to effectively complete any journaling (let alone engaged in any kind of Flow experience). Others from the NMDWA class, however, believed that such an app would have

encouraged them to let go of convention and standardized thought more easily, and to get into the Flow of their writing more quickly.

Conclusions.

From reports of participants, it appears that the activity of timed writing with few stakes (that is, essentially having no real impact on grades) allows students the opportunity to engage in Flow. They reported getting lost in several of the prompts. Additionally, the concept of writing without the pressure of "correctness" or "properness" makes them more likely to let go of their writing inhibitions. In addition, having the pressure to continually write holds the possibility of "pushing" writers into Flow state with their activity. The confounding factor, however, seems to be generating enough interest or freedom to have students engage with timed writing in the first place.

Implications for Theory

Creativity theory.

Originality is broadly thought to be the *sine qua non* of creativity. There is much to be said for this notion. As Runco (2007) noted, originality is a necessary requirement for something to be creative, but it is not the only needed element. Creativity must move beyond original thought and into the construction of useful artifacts derived from those original ideas (Guilford, 1973; Runco & Jaeger, 2012; Simonton, 2016). This originality, and the kinetic forces that create new products, are often the brainchild of fluency. Fluency (the ability to generate many ideas) is highly correlated with originality (Duman & Dunbar, 2014; Silva, 2008), and the enhancement of the former process is likely to heighten the chances for the latter. In essence, the higher the number of ideas generated, the more likely an individual is to "strike gold" with an original idea.

Writing holds much of the same promise. Alvarez (1986) observed a trend in the writing of his students when he asked them to write continually in daily, low-stakes timed writing. Specifically, he found that they wrote more easily about a greater number of ideas as measured by the sheer number of words they were able to generate. In the present study, students were not only able to write more words per journal entry as the regimen of daily writing continued, but those who had a gamified writing press challenging them to produce more words and ideas were able to produce words at a greater rate (when unsuccessful journal attempts were filtered out) than were those without writing Press. The implication is that manipulating creative press can foster fluency in writers, and thus make them more open to the possibility of original ideas made manifest in their writing. In addition, such press removes the squelching elements of "proper" or "correct" writing, allowing students the opportunity to let loose with their ideas without constraint or conformity.

Writing theory.

The low-stakes timed writing participants engaged in during this study has some implications for writing and composition theory as well. It was noted in the review of literature that students who spent time revising during the act of writing often produced less writing and lower quality writing (Albertson & Marwitz, 2001; Almond et al., 2012; Worden, 2009). The writing press instituted in this study allowed many students to let go of the revision and self-editing process in their journal outputs. Whether being forced to generate text via a writing app or simply being given the direction to let go of the self-censor and forget about convention and unity, students ultimately produced more text the more practice they got with this low-stakes timed writing. The practice of doing this in low-stakes situations may have implications for

theories of revision in higher stakes timed writing scenarios, especially those which value original content and mastery of ideas over grammatical convention.

Implications for Practice.

It is reasonable to assume that there are a number of implications for practitioners to draw from this study. Teachers who value the generation of original content in their classes may well take advantage of a regimen of daily, timed, low-stakes writing as part of the curriculum. In addition, when asking students to generate ideas, they may directly instruct students to let go of convention and conformity and allow all ideas to be written down. By using an app which gamifies writing by challenging users to continually generate text, practitioners can have their students work in a medium which has the ability to "push" them into Flow state. Finally, by creating the press of habitual writing without constraint in a way which values generation of content, teachers will create an environment of freedom in which students may exercise their creative fluency and produce their own creative responses to curriculum.

While the literature on the connection between creative thinking and academic achievement is not conclusive, there does appear to be a correlation between performance on assessments of divergent thinking and schoolhouse achievement. The practice of daily open response timed journal writing free from conformity to convention gives students the freedom to generate text without the fear of "rightness." In fact, students in the study mostly indicated that they enjoyed the writing prompts and took the opportunity to experiment with style and genre. Such results have benefits for students both in academics (where they can come up with many solutions for potential academic issues) and beyond (Sternberg, 2016).

Recommendations for Research

Limitations of the study.

There were several limitations of this study. First and foremost, the sample sizes were small and unbalanced. Only 11 students used The Most Dangerous Writing App during the study, while 25 did not. This difference required me to identify a sample population within each group and make statistical comparisons on a non-normal scale. While the participants chosen for comparison closely reflected one another, a larger sample would make results and findings more generalizable.

In addition, the sample population was not particularly diverse, and was heavily female. Of the six interviewed participants, three were male and three were female, providing gender balance to the data. At least one interviewed student qualified for Free and Reduced Meals, but there was no ethnic diversity among this group.

As was mentioned in the discussion of fluency, originality is often considered the *sine qua non* of creativity. The focus of this study remained on fluency because the generation of text and ideas allows for the opportunity of originality. With that said, an evaluation of originality would provide further evidence regarding the efficacy of fluency as a kickstarter for originality in timed journal writing.

Finally, a higher-stakes timed writing assessment at the end of the study period would have evaluated how the increased fluency in low-stakes timed writing transferred to a more standardized style of writing with practical implications for the participants. Some evaluation of the originality of the resultant essays, as noted above, would have shown if there were differences in what many consider the critical element of creativity between the groups' productions.

Future directions.

This research allows for the possibility to open new directions in creativity and writing research. The effect of daily timed journal writing on student performance on higher stakes standardized writing assessments seems fertile. In addition, the use of writing apps that gamify writing in a number of ways, not merely forcing text generation, would serve as a springboard into enhancing creative thinking processes beyond fluency, perhaps flexibility and elaboration among them. In addition, the use of gamification in many performance tasks as a way of enhancing the creative environment of a classroom bears further investigation. Some of the limitations of this study are excellent avenues for further study: using an AP course for participants in a replication study would provide a built-in standardized writing assessment by which students' writing ability would be objectively evaluated and graded by assessors trained by the College Board.

Conclusion

The intersection of press, fluency, and Flow in the classroom is a vital area of investigation if classrooms are truly the crucibles of creativity, invention, innovation, and adaptation. An environment which allows students the freedom to engage and construct artifacts based on original ideas is essential for fostering a creative mindset. When students were provided this press in a relatively small way though daily timed low-stakes journal writing with no standardized or conventional requirements, they generated more text, saw themselves as more creative, developed more positive attitudes toward writing, and more often self-reported experiences of Flow state. If these significant results can be had through a minor manipulation of a classroom's press, then the implications for broader applications of creative press as a way to push students into creativity and Flow are great indeed

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APPENDIX A

COURSE SYLLABUS

ENGLISH 101: CRITICAL READING & COMPOSITION

Dual Credit: English 101 is a dual credit course offered in conjunction with the University of South Carolina at Lancaster and is subject to Rock Hill School District 3 Policies and USCL requirements. See the school website for complete dual credit policies, and the application.

Course Description: Students will receive instruction in strategies for critically reading and analyzing literature and non-literary texts, and will engage in structured, sustained practice in composing expository and analytical essays (from the course Catalog).
Prerequisites: Minimum 3.0 cumulative grade point average, high school Junior or Senior standing, completion of English I, II, III, and IV; submission of the completed dual-credit application and fees.

Required Textbook: The Norton Introduction to Literature (Portable Twelfth Edition); Kelly J. Mays, Editor.

Weblog: All relevant information (Course Map, digital texts, descriptions of assignments, rubrics, resources, links, class news, etc.) is available on-line at [website]. A link to the site is on
the Syllabus page in Canvas. Students may access online materials both at school and at home.

Course Map: Refer to the Course Map for the schedule of daily reading assignments and major assessment due dates. Students should print a copy of the Map for daily reference.

Assignments: Minor assessments (quizzes, blog posts, in-class writing exercises, etc.) count for 30% of the coursework grade, and Major assessments (papers) count for 70%, per RHSD3 policy. Major Assessments will

include two short papers (3-4 pages) in each quarter. In addition, a term paper (see below) will be averaged in at 20% of the final grade, in lieu of a formal, cumulative final exam.

Term Paper: Students will submit a literary research paper based on a work or works by a major American or British author. Students will consult with the teacher for approval concerning their choice of author, work(s), and topic. Note: modified papers submitted in previous coursework at NHS will not be accepted.

Scheduled research days will be set aside during the semester to work on the paper during class. See the Closet for more details.

Format for Written Work: All papers must be typed in Times New Roman 12-point font, double-spaced, with 1" margins, per MLA guidelines (8th ed.), and printed for submission in class on the scheduled due date.

Attendance: Per [school], absence from more than 10% of the scheduled class sessions (excused or unexcused) is considered excessive and will result in a grade penalty assigned by the instructor (in this case, ten points or one letter grade). In addition, the [high school] attendance policy remains in effect.

Miscellany:

§ Honor Code violations result in a referral and a zero on the assignment per NHS policy.

§ Retests on In-Class Essays are allowed only in "extreme" circumstances (per the dual credit policy).

§ Late work is not accepted without prior arrangement and/or with an excuse provided by a parent.

§ Students should bring their own paper, notebooks, binder, writing instruments, etc., to class each day.

§ Notebook computers are allowed for students to use as directed; personal electronic devices (phones, tablets, etc.) are not permitted unless otherwise directed by the Instructor.

§ The main rule for classroom conduct is that students must not disrupt the educational process.

§ All policies in the [school] Student Handbook will be followed in this class.

APPENDIX B

Creativity and Writing Attitudes Questions for Pre/Post Survey

Please share what you think about creativity and writing, in general and for yourself, by answering the questions below.

Questions about creativity are about any kind of creativity, not just writing. Questions about writing could apply to any kind of writing, including online writing or purely personal writing, not just school writing.

Scale Prompts

Respond to each of these questions by selecting a number from the scale. 1=Strongly Disagree, 5=Strongly Agree. There are no "right" or "wrong" answers, so respond with what you really think.

1. Coming up with ideas while writing can be really difficult.
2. People don't really need to write very much after they graduate from school.
3. I think I'm a pretty creative person.
4. I can get wrapped up in things, but almost never things I do for school.
5. Time limits can sometimes make me freeze.
6. Writing is a skill people will need throughout their lives, regardless of what they do.
7. I enjoy writing.
8. Having a deadline is good for me; the pressure makes me more productive.
9. I can sometimes get wrapped up in my work for school.

10. I prefer schoolwork that does not involve a lot of writing.
11. When I have to, I can come up with lots of ideas quickly.
12. Lots of my English teachers have asked me to write for five minutes during each class.
13. I'm kind of a "big picture" thinker; the details can come later, if at all.
14. I really hate pressure from deadlines; I like having lots of time to work.
15. I think creativity is overrated.
16. When I have to come up with an idea, I like a lot of time to think about it.
17. It's the details that make or break an idea.

Open-ended Questions

Please write a short response to each of these questions. There are no "right" or "wrong" answers and no required length, so just try to say what you really think.

1. What is the most creative thing you do? How do you feel about doing it?
2. Describe a time when you felt good about writing (or at least not so bad)
3. But even professional writers find writing frustrating at times. Describe some things that frustrate you about writing and why they are so frustrating.

APPENDIX C

Interview Guide/Protocol

The Most Dangerous Creativity Study:

Timed Writing, Press, and Challenging Students to Engage Flow

My name is Brian O'Shea, and I'm a doctoral candidate in the Gifted and Creative Education program at the University of Georgia's College of Education. I am conducting a research project for my dissertation, and I am interested in how press -- or environment -- influences creative thinking and "flow" experiences. From my own experience, I know that there are many ways environment and pressure can impact creative processes and products. I know that environments affect everyone differently, but I am curious if there are some pressures that can positively impact creative thinking across the board.

You have recently spent the last several weeks doing some timed open-ended journaling. The prompts you completed asked you to write continuously for a set amount of time. You may have even been asked to use a specific online writing tool - The Most Dangerous Writing App - for your responses. This experience gives you a unique perspective on how the pressure to continuously generate text relates to your ability to generate ideas and get into the "flow" or "zone" with your writing. I appreciate your willingness to spend some time talking with me about your experience to expand my understanding of how creative thinking and flow work in such an environment.

Before we get started, I want to remind you that anything you share with me will be kept confidential. As I put in the consent and assent forms, I will remove any and all data about you which may allow for re-identification. All data I collect and transcripts I make will be kept protected by password on an external hard drive, and will be destroyed after seven years. The data I collect will be used for my current study, but I may contact participants and their guardians if the data is to be used in a later project.

This interview will last approximately thirty minutes. While we will be talking about some activities you did in class, I want to reassure you that nothing you say in this interview will impact your school life in any way. You can feel free to skip any question you don't want to or don't feel comfortable answering, and please do not feel any pressure to share any information

you feel is too sensitive or private. Also, you can choose to end this interview at any time without any consequence.

During this interview, I may refer to your journals and/or something specific that you have written. If you need me to provide any further context, or if you need think time to remember specific things or events, feel free to ask.

Transition: I want to get started by asking a little about your experiences with writing.

Journaling/Writing background

1. How do you feel about writing?

a. Potential follow up: Why do you say (specific characteristic) ? Can you describe why you think that a little more?

2. Is there a kind of writing you do often?

a. Potential follow up: How often do you write (type of writing) ? Why do you write (type of writing) ?

3. Have you been asked to "write for five minutes" or write a daily journal in class before this class started writing every morning?

a. Follow up: How did you feel about those assignments?

b. Follow up 2: Did you generally use all the time in that writing? What did you do if you didn't?

Transition: One thing we're trying to do is figure out if this kind of writing is helpful for our classes, especially ones where students are getting prepared to go to college full time and will be doing a lot more writing.

Study Activities

1. What was the journaling like for people?

2. Do you think people thought using The Most Dangerous Writing App made the writing come out easier?

a. Potential follow up: Why do you say that?

3. Do you think the journaling is something that will help students write more in the future?

4. Should we do this again next year? If so, is there anything we should change about it?

Transition Question: What's one thing you really like to do? Do you ever find yourself getting so into it that you lose track of time?

Transition: Being so into that activity that you kind of lose track of time and your surroundings is part of something called "Flow." You may have even heard people talk about things just seeming to "flow" or being "in the zone." With the timed journal writing, we were trying to see if there was some kind of pressure we could create that would get people to let go of doing things "right" and just get into the flow of producing ideas. So I'm a little curious about how people flow.

Creativity and Flow

1. What does it feel like for you when you're flowing?

2. How do you think people best get to that place of flow?
a. Potential follow up: Can you help me understand what you mean by that?
3. Do you think we can do things at school to help people get to that place of flow?
. Potential follow up: Like what? Why would those things work?

Transition: I just have a couple more questions. I'm interested in creativity for a bunch of different reasons. Mostly, I think creativity is an important skill for people to have out in the rest of the world after they leave school. I know "creativity" is a word that has a lot of different meanings, but I'm really interested in what you think about it.

1. What are some of the creative things you do?
a. Follow up: What does it feel like when you are doing those things?
2. What is the difference between those creative things you do and other activities, chores or work you do?
. Follow up: Can you help me understand this difference more? What do you mean by . . .
3. What do you think students would suggest to teachers and principals to make school a more creative place?
. Follow up: Why do you think these suggestions would work?

Final Question: Is there anything that you'd like to share or talk about that you think we either haven't covered or that I've neglected to ask you?

Wrap up: Thank you for sharing your time, ideas and experiences with me today; I really appreciate the effort it takes to be reflective about your creative and flow processes. If you think of something you'd like to share in addition to what we've talked about here, or upon reflection you find you want to clarify something you've sed, feel free to contact me using the information I provided in the consent and assent forms. If I have any need for clarification or follow-up, may I contact you again?