

Understanding course content through letter writing: Do informal writing assignments improve grades?

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Using an experimental study design (N=41), we examined whether participation in an informal writing assignment, specifically writing a letter to a friend about course content, improved exam scores in an undergraduate child development course. Findings indicated that participating in the writing assignment significantly improved scores on an exam which included both a multiple-choice component and an essay. No effect emerged for a quiz that included only multiple-choice questions. These findings indicate that writing assignments that require students to summarise and paraphrase newly-learned material may improve performance on exams that have a written component to them.

Keywords: Writing assignments; metacognition; university students.

WRITING and critical thinking share many underlying cognitive functions including the use of language, goal directed thinking, planning, and evaluation (Bensley & Haynes, 1995). Several studies have noted that brief writing assignments (e.g. journal entries) can lead to increased understanding of material and improved performance on exams (see Cisero, 2006). For example, students who wrote about a topic discussed in class for five minutes performed better on factual and conceptual exam questions than students who thought about the same topic for five minutes (Drabick et al., 2007). Writing letters may support the development of specific learning mechanisms identified by information processing theorists such as increases in metacognition, cognitive self-regulation, memory strategies, and knowledge. The present investigation utilises an experimental design to assess whether and to what extent participation in a reflective writing activity (a brief informal assignment of writing a letter to a friend on a class concept) will improve student achievement.

Students can employ a variety of strategies to help them learn and remember new information. One such strategy is elaboration, which can include (among other things) paraphrasing and summarising

information. This strategy allows students to make connections between new information and existing knowledge (St Clair-Thompson, Overton & Botton, 2010), which can, therefore, help facilitate student learning and critical thinking skills.

Writing assignments can help students develop the critical thinking skills or metacognitive skills necessary for academic achievement. Writing assignments can serve this pedagogic function in a variety of ways. First, a journal entry or informal letter to a friend allows students to articulate his/her understanding of the material by using his/her own words to summarise and paraphrase new information and engage in self-explanation without the constraints of a formal assignment. Through this process alone, students are engaging in a series of cognitive strategies associated with learning such as rehearsal (repeating the information), organisation (writing a coherent letter that contains a beginning, a middle, and an end) and elaboration (relating information to their current knowledge set). Second, writing a letter creates an opportunity for students to evaluate, reflect upon, and internalise information presented in class and the text. Third, it creates a natural by-product: a clear, comprehensible study guide for an exam. These three effects on student

learning and achievement have been substantiated in opinion polls by both students and professors (Hettich, 1990). While there have been many studies on the importance of journal writing, relatively few studies have empirically tested the effectiveness of journal or summary writing on test performance (Cisero, 2006).

Several researchers have evaluated the effectiveness of journal writing as a learning tool and the results have been mixed. Conner-Greene (2000) examined the effect of journal writing on exam performance in a personality psychology course. Students were randomly assigned into one of three conditions: no journal writing assignment (control group), five journal writing assignments, or 15 journal writing assignments, across three consecutive semesters. Results showed that performance on exams was significantly higher in the journal writing conditions than in the control group; no differences emerged between the two journal writing conditions. Note that content of the journal was not examined, suggesting that the exercise in and of itself was effective. In a similar study, Cisero (2006) compared the exam scores of students in which journal writing was assigned for three successive college semesters, with the exam scores of students from the five previous semesters that did not have a journal writing requirement. Although significant differences in exam scores did not emerge between the two groups, the results indicate that the group with the journal writing assignment had significantly fewer students reporting Cs and Ds than the group with no journal writing assignment, across the three exams.

While previous research examining the effectiveness of informal writing assignments on student performance have benefited from large sample sizes, the use of *ex post facto* or quasi-experimental designs have threatened the internal validity of these studies. For example, comparing groups across semesters introduces a confound in that teachers often modify their courses as a result of strengths and weakness noted in the

previous semester. In addition, content may differ across semesters due to issues related to local history. The current study addresses these confounds by assigning treatment and control groups from the same class, thus groups are exposed to parallel content from the same instructor. For the current research, we utilised an experimental study design to examine whether an informal writing assignment – specifically, writing a letter to a friend about course content – improves exam scores in an undergraduate child development course. As such, we examined the following research questions:

Research Question 1: *Do students who participate in an informal writing assignment score significantly higher on a multiple-choice exam than students who did not participate in the assignment?*

Research Question 2: *Do students who participate in an informal writing assignment score significantly higher on a multiple choice and essay exam than students who did not participate in the assignment?*

Given that prior research suggests that writing may promote greater understanding of material and deeper processing of information, we hypothesised that students who wrote letters would earn higher scores on assessments, either multiple choice and or essay, than those who did not write letters.

Method

Participants

Participants were students from a large public university in California enrolled in a lower division child development course. Enrollment data indicates that the class comprised primarily females (86 per cent, $N=37$) and freshmen (70 per cent, $N=30$). As a result of students dropping/adding the class at a late date, the current results are based on 41 students who had the opportunity to complete all of the assignments. We did not collect any additional demographic data.

Design and procedure

As part of the course requirement, the instructor asked students to write three letters to a friend detailing course content. Specifically, the instructor asked students to discuss the most interesting concept they had learned in class since the last unit, and either: (a) explain the role of experience in development; or (b) discuss a key developmental process or principle. In addition, the instructor asked students, whenever possible, to define key terms and provide examples (see Appendix A for instructions). The instructor informed students that letters should be written informally as one would write a letter to a close friend or family member, and they would not be graded on grammar, spelling, etc. The instructor did not give students any feedback on their letters other than a check indicating they had completed the assignment. The letter requirement constituted two per cent of their grade and was met by students simply if they turned in three letters. The study was approved by the Institutional Review Board for human subjects' protection.

In order to evaluate the effect of the informal writing assignment on learning, all students were administered a pre-test in the

form of an online multiple-choice quiz at the end of the second week of class. We administered this pre-test quiz in order to: (a) obtain a baseline for each student's achievement level as we could not access overall college grade point average (GPA); (b) assess equality among experimental groups; and (c) control for pre-existing academic differences between students.

Following the pre-test, the instructor randomly assigned all enrolled students into one of two groups: Group 1 ($N=21$), the writing condition, was assigned to complete the writing task for units 3 to 5 of the course which covered physical, social, and cognitive development in infancy and toddlerhood, whereas Group 2 ($N=20$) served as the control group and did not write any letters. At the end of the fifth unit, we administered post-test 1 to all students in the form of a multiple-choice quiz assessing content from units 3 to 5 (see Table 1 for study time line). Note that both quizzes (the pre-test and post-test 1) were structured similarly and worth a maximum of 100 possible points, and each tested for basic knowledge and comprehension of key vocabulary terms and concepts associated with the corresponding units.

Table 1: Study timeline.

Week 2 Pre-test ^a : quiz 1 – MC	Week 3 Random assignment	Week 3–5 Writing treatment	Week 6 Post-test 1 ^b : quiz 2 – MC	Week 6–8 Writing treatment	Week 9 Post-test 2 ^c : midterm 1 – MC + E
	Group 1 $N=21$	X	$M=71.66$ $SD=22.21$	0	$M=74.95$ $SD=14.33$
	Group 2 $N=20$	0	$M=62.56$ $SD=25.52$	X	$M=78.09$ $SD=12.51$

Note: MC=multiple choice exam; E=essay questions.

^a Content for pre-test: theory, methods, prenatal development.

^b Content areas for post-test 1 (ages 0 to 2): conception, teratogens, brain development, breastfeeding, Piaget sensorimotor period, attachment, theories of language development, stages of language development.

^c Content areas for post-test 2 (ages 2 to 6): bullying and friendship, concrete operations, scaffolding and zone of proximal development, moral development, parenting styles, information processing theory (ages 2 to 6).

For counterbalancing purposes, the instructor repeated these procedures for the next set of units (6 to 8), however, Group 1 functioned as the control group, and Group 2 participated in the informal writing assignment group. The instructor then assessed students' knowledge and comprehension of the participant vis-à-vis post-test 2 (midterm exam), which consisted of multiple-choice questions and an essay. We used the essay portion of the exam to assess higher order cognitive thinking vis-à-vis evaluation and application of course content. A quiz is typically a lower stakes assessment than a midterm exam as it contributed fewer points towards the final grade. The midterm exam is administered mid-way through the semester and is worth the same number of points as the end of semester exam.

Results

Data analysis strategy

We ran preliminary correlations to assess the relationship between the pre-test and each of the post-tests. A strong correlation would suggest that in order to assess the unique effect of the treatment, it is necessary to partial out the effects of academic achievement or orientation, measured by proxy here as the grade on the pre-test. According to Dugard and Todman (1995), an ANCOVA is the most appropriate analysis for an experimental pre-test/post-test design, treating the pretest as a covariate rather than a variable of interest. As such, we conducted two ANCOVAs, one focusing on the effect of the writing assignment on post-test 1 (multiple choice quiz) and the second ANCOVA evaluating the effect of the writing assignment on post-test 2 (multiple choice and essay midterm exam). In each analysis we also controlled for total number of letters each participant in the writing group completed (range 0 to 3).

Preliminary analyses

A total of 41 students completed the pre-test ($M=79.34$ out of 100 possible points) with final scores ranging from 39 to 100 points. *T*-test analyses found no significant differences in pre-test scores between Group 1 ($M=80.80$, $SD=12.59$) and Group 2 ($M=77.95$, $SD=15.52$), suggesting that random assignment was successful. The average score for post-test 1 was 72.56, and the average score for post-test 2 was 76.60. The results also indicate a strong relationship between pre- and post-tests (pre-test/post-test 1: $r=.75$, $p=.01$; pre-test/post-test 2: $r=.70$, $p=.01$). A majority of students completed all three letter writing assignments (66 per cent).

Research Question 1: *Do students who participate in an informal writing assignment score significantly higher on a multiple-choice exam than students who did not participate in the assignment?*

For the first post-test (the multiple choice quiz), individuals in the writing treatment condition (adjusted means: $M=73.96$, $SE=2.56$) scored similarly to the control group ($M=71.61$, $SD=2.49$). Results from the ANCOVA revealed no significant differences between the two groups (see Table 2).

Research Question 2: *Do students who participate in an informal writing assignment score significantly higher on a multiple choice and essay exam than students who did not participate in the assignment?*

A moderate association emerged between the writing group and test scores when post-test 2 (the multiple choice and essay midterm) was the dependent variable (see Table 3). Specifically, respondents in the writing condition scored significantly higher (adjusted means: $M=80.03$, $SE=2.03$) than those in the control group (adjusted means: $M=72.71$, $SE=2.09$).

Table 2: Results of analysis of covariance assessing effects of letter writing assignment on a multiple choice and short essay midterm exam.

Source	Sum of Squares	df	Mean Square	F	partial η^2	p
Corrected model	5136.03 ^a	3	1712.01	14.03	.53	.00
Intercept	59.33	1	59.33	.49	.01	.49
Pre-test (Quiz 1)	4400.89	1	4400.49	36.05	.49	.00
Numbers of letters completed	.47	1	.47	.00	.00	.95
Experimental group	50.63	1	50.64	.42	.01	.52
Error	4516.63	37	122.07			
Total	226813.46	41				
Corrected total	9652.66	40				

Table 3: Results of analysis of covariance assessing effects of letter writing assignment on a multiple choice and short essay midterm exam, controlling for treatment exposure.

Source	Sum of Squares	df	Mean Square	F	partial η^2	p
Corrected model	4252.19 ^a	3	1417.39	17.40	.59	<.00
Intercept	13.54	1	13.54	.17	.00	.69
Pre-test (Quiz 1)	4162.64	1	4162.64	51.10	.58	<.00
Numbers of letters completed	442.55	1	442.55	5.43	.13	.02
Experimental group	480.47	1	480.47	5.89	.14	.02
Error	3014.00	37	81.46			
Total	246979.00	41				
Corrected total	7266.19	40				

Discussion

We investigated whether an informal writing assignment would increase college students’ performance on a multiple-choice exam as well as a multiple choice plus essay exam in a lower-division child development course. Although the writing group scored higher scores on the multiple-choice quiz than the control group, a statistically significant difference between the two groups emerged only for the midterm exam that contained *both* a multiple-choice section and a short-answer writing component.

An evaluation of the assignment indicated that a majority of students found the assignment too vague. Nonetheless, it is interesting that despite not knowing what

topics to focus their letters on (e.g. ‘Write about what you found most interesting’), students who were in the writing group performed significantly better on the midterm exam than those in the control group. Writing a letter to a friend may promote more effective learning of new material which in turn may translate into enhanced essay writing on tests. Perhaps by engaging and summarising new information using their own words (a type of elaborative learning strategy), students are more likely to develop a deeper understanding of these concepts. Additionally, through the assignment, students may have gained additional benefits such as increased metacognition about their own understanding of the topic,

writing practice, improved explanatory skills and/or increased confidence about writing (Connor-Greene, 2000). These are different skills than those needed to respond to multiple-choice questions, which often simply assess vocabulary and enlist students' recognition recall abilities.

Although much research has examined the effects of summarisation as a study technique, results have remained rather inconsistent (Cisero, 2006). Difficulty remains in trying to separate the effects of student effort and the summarisation study technique. In the current study, one proxy for student effort is number of letter writing assignments completed. When controlling for treatment intensity, the results of the writing treatment were statistically significant at $p=.02$. This provides additional support for the letter writing assignment as a promising effective learning strategy that can help improve academic performance. However, it also highlights the role of student motivation. A writing exercise can only be effective in increasing course performance if students make a conscientious effort to participate in reflective thinking (Cisero, 2006).

These preliminary findings, however, should be interpreted with caution. To begin with, it should be noted that the stakes are very different for a quiz than for a midterm. The results may indicate that letter writing may only be effective for high stakes assessments, regardless of form (e.g. multiple choice, essay). Additionally, the midterm exam (post-test 2) comprised both multiple choice (30 per cent) and essay (70 per cent), and unfortunately we were not able to separate out whether the effect of the letter writing condition differentially influenced the two different assessment formats as we did not collect this data. Of note, however, is an eight-point difference between groups; this suggests that the writing assignment is effective. Additional weaknesses include a study based on a modest sized sample.

Despite these limitations, the current study has significant implications for future

research as well as teaching practices. Specifically, studies should explore whether the summarisation skills the students have practiced could transfer as a study method for other subjects such as physics or math. It would be also interesting to assess the degree to which students change their study habits as a result of this activity. Future research would also benefit from a mixed methods study design in which the content of the letters can be examined and compared to assessment scores in order to assess how deeper processing of the material translates to greater understanding and comprehension of the material.

The main purpose of the described pedagogic practice is to facilitate learning. The results of the study suggest that it is a low stakes assignment with high reward. The exercise provides an opportunity for students to engage in reflection and analysis without the stress and anxiety of a formal, graded assignment. For busy teachers, grading this assignment entails a simple pass (completed) or fail (not completed), as well as an opportunity to quickly gauge a student's interest and understanding of the material. The assignment could also serve as a formative assessment that provides the opportunity for the student to assess their strengths and weaknesses around content knowledge.

The results from this study are promising and indicate that this elaborative learning assignment/strategy may facilitate increased performance on exams that contain both a multiple-choice and a written component. Thus, it is important that instructors be mindful of the structure of their classes (Zamboanga et al., 2007); in particular, there should be a pedagogical connection between the type of learning exercises (e.g. class exercises that capitalise on elaborative learning techniques) that students do in class and how instructors might evaluate students' performance (multiple-choice tests vs. essay examinations) in the class.

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Appendix A: Letter to a Friend

Background: Over the past week, you have learned about some critical concepts which provide a preliminary framework, or background, for a more comprehensive understanding of the field of child development. Now it is time to revisit some of those concepts in the form of a letter.

Assignment: Pick a person – a friend, a parent, or a sibling, to whom you will write a letter. Using your own language:

1. Discuss the most interesting thing that you have learned in class since the last quiz.
 - a. Be sure to define key terms and concepts for your reader.
 - b. Provide at least two examples (preferably research examples).
2. Explain a child development principle to your friend (e.g. Sensorimotor period, experience-expectant and dependant, attachment).
 - a. Be sure to define key terms and concepts for your reader.
 - b. Provide at least two examples (preferably research examples).

Don't worry about spelling or grammar. This is an opportunity to explain, in your own words, what you are learning in class to a good friend.

Requirements: This assignment must be typed. Focus on content and not length. Guidelines are AT LEAST one page double-spaced (12 pt Times New Roman font) and NO MORE THAN two pages.