The Effect of Journal Writing on Students’ Cognitive Critical Thinking Skills

A Quasi-Experimental Research on an English as a Foreign Language (EFL) Undergraduate Classroom in Egypt

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Abstract
Based on writing weekly academic journals and on Bloom’s (1984) taxonomy of cognitive critical thinking skills, this article reports on a quasi-experiment where journal writing was an additional task to an academic writing course. The experiment was carried out with first year university students (semester two) in one of the Egyptian private universities. Sixteen intermediate students represented the experimental group where weekly journals were a requirement; another seven students of the same level represented the control group that was taught exactly the same course and by the same instructor of the experimental group but with no journal writing. Pre and posttests were used to measure students’ critical thinking skills before and after the experiment respectively. Measuring critical thinking skills using the available critical thinking assessment tests was not suitable for the purpose of the experiment since the intended skills were those associated with Bloom’s taxonomy not just reasoning and logical thinking. Therefore, the researcher, following Bloom’s taxonomy of cognition and inspired by the available critical thinking assessment tests, designed her own critical thinking assessment tool. This tool is an attempt to make use of any available materials to create one’s own instrument that could serve in the learning process. The newly modified tool was used in the pre and posttests. Results indicated that journal writing had contributed strongly to the development of the cognitive critical thinking skills of the experimental group, which validates the new assessment tool and proposes a new technique of developing critical thinking skills in Egypt.

Keywords: Journal writing, Critical thinking skills, Cognition, Bloom’s taxonomy

1. Introduction
To the researcher’s knowledge, people working in Egyptian Higher Education do not ask students to write journals in the courses they teach nor do they focus on enhancing students’ critical thinking skills. Any methods that apply critical thinking skills on courses are just idiosyncratic attempts that are not generalized. The researcher herself had suffered from such a problem when she had to complete an online course (“Grammar for Teachers: Language Awareness”, 2013) where journal writing was one of the requirements of the successful completion of the course. The task was so hard at the beginning, but with the course of time and after writing three journals, it went so easily and smoothly. This caused the researcher to apply the same technique with her students to find out whether journal writing would develop their critical thinking skills, as it has done with her, or not. The researcher related journal writing to critical thinking skills and primarily to Bloom’s (1984) cognitive skills since the journal writing prompts in the online grammar course were tackling comprehension, application, analysis, synthesis and evaluation.

1.1 Critical thinking
Critical thinking was defined by many scholars. Robert Ennis (n.d.) defined it as, “reasonable, reflective thinking that is focused on deciding what to believe to do” (n. p.) ; Matthew Lipman (n.d.) viewed it as “skillful, responsible thinking that is conducive to good judgment because it is sensitive to context, relies on criteria and is self-correcting” (n. p.); and Richard Paul (n. d.) defined it as “thinking about your thinking, while you’re thinking, in order to make...
your thinking better” (n. p.) (as cited in “What is critical thinking” n.d., pp. 1-2). Echoing this last definition, Paul and Elder (2006) defined critical thinking as “the art of analyzing and evaluating thinking with a view to improving it” (p. 4). In “Some definitions of critical thinking” (2002), critical thinking meant reasoning and logical thinking. It was defined as “a set of skills and attitudes that result in the evaluation of the reasoning of the speaker, or writer, using specific generally accepted criteria for strong reasoning” (p. 4), and it was differentiated from “higher order cognition” (p. 4) in that higher order cognition entails more skills than those intended by critical thinking. However, the “Critical Thinking Assessment Test (CAT)”, (n.d.) designed by Tennessee Technological University associated critical thinking to Bloom’s (1984) classical taxonomy of higher order skills that include comprehension, application, analysis, synthesis and evaluation and excluded knowledge, the first level of the taxonomy, since it assesses “rote retention of factual information” with the purpose of improving memorization and not critical thinking skills. Critical thinking in the present study is associated with Bloom’s (1984) taxonomy of cognitive skills, and it follows the Tennessee Technological University approach in excluding thinking at the level of knowledge from the taxonomy for the same reason.

Critical thinking assessment tests are abundant. Some of these tests use multiple choice questions like The California Critical Thinking Skills Test and Cornell Critical Thinking Test (Bart 2010; Ennis, 2009). Others use short essays to evaluate arguments like Ennis-Weir Critical Thinking Essay Test (Bart 2010; Ennis, 1993; Ennis, 2009). However, these critical thinking tests do not apply Bloom’s taxonomy; hence they are not suitable for the present study. On the other hand, the Tennessee Technological University developed a critical thinking one hour test in the form of short essays to assess evaluating information, learning and problem solving, creative thinking and communication, and it is marked in workshops by trained faculty members (“Critical Thinking Assessment Test (CAT)”, n.d.). Yet, this test could not be used in the present study because it costs a lot of money for purchasing the test and sending faculty members abroad to attend training workshops for marking the test (“Critical Thinking Assessment Test (CAT)”, n.d.). Consequently the researcher made use of the available materials to design her own tool for measuring students’ critical thinking skills, which is discussed in the methodology section (see section 2.2.1.1).

1.2 Literature review

Journal writing has been the subject of many studies. It was used as one of the varieties of “informal writing techniques” in the field of sociology to develop students’ cognitive thinking skills using a concentric thinking model or “the PTA model” (prioritization, translation and analogy) (Hudd, Smart, & Delohery, 2011, p. 180). Besides, journal writing was used in the field of teacher education: when comparing traditional journal writing to e-mail journals entries shared by other members of the e-mail list which showed to be more reflective for undergraduate pre-service teachers (Kaplan, Rupley, Sparks, & Holcomb, 2007); when promoting reflective thinking of experienced EFL teachers (Farrell, 1998); when examining the perception of five experienced music teachers after reviewing the journals they wrote in their first year of teaching (Conway et al., 2012); or when examining journal writing perception of “Health and Physical Education pre-service teachers who participated in an experience-based learning activity” (O’Connell & Dyment, 2011, p. 135). In addition, learning journals were used to engage students with their university work and to serve as a “transitional space” between “life narrative” and the “university essay” (Creme 2008, p. 49). Journal writing was also used as a scaffold for children with learning disabilities (Fahsl & McAndrews, 2012). All the aforementioned studies discussed the role of journal writing in the learning process and in promoting students’ cognitive skills in different parts of the world; however, no study, to the researcher’s knowledge, in Egypt, relates journal writing to cognitive critical thinking skills.

1.3 Context of the study

The University where the research took place offers, as a University requirement course, first year students (second semester) an academic writing course with a special focus on writing a problem solution essay. The book used in this course is Slaght, Harben, and Pallant (2013) with supplementary materials to develop summarizing and paraphrasing techniques and teach in text citation and documenting sources. At the end of the course, students are to read five sources, integrate them in a problem-solution essay using in-text and full citation techniques and deliver a presentation. The course does not entail any kind of “informal writing techniques” (Hudd et al., 2011, p. 180) that focus on students’ reflection on what they have been taught. Therefore, the researcher needed to teach two groups of one specialty (to be able control the variables as much as possible) in order to tryout her experiment.

1.4 Hypothesis

The hypothesis which laid the foundation of the current experiment stated that if students wrote a weekly journal on what they have learned throughout the whole week, their cognitive critical thinking skills would improve. In order to test the validity of this hypothesis, the experiment presented in the following section was carried out.
2. Method

This experiment followed a quasi-experimental design where there was one experimental group and one control group. The procedures involved a pretest, an experiment and a posttest. The experiment was carried out during Spring 2014 semester over a period of seven instruction weeks (Note 1).

2.1 Participants

Sixteen Mass Communication intermediate students represented the experimental group that wrote a weekly journal on what they have studied throughout the week. Other seven Mass Communication students of the same level represented the control group that was taught the same syllabus by the same instructor of the experimental group with the only exception of not writing a weekly journal (Note 2). Participants were males and females and their ages ranged from 18 to 20 years old.

At the very beginning of the semester, while administering the pretest, the experimental group comprised thirty three students and the control group included other twenty three students. However, absence of students throughout the semester forced the researcher to exclude many of them from the experiment. Therefore, students who represented the experimental group were those who attended the pre and posttests and wrote seven journals out of a total of seven journals (they accomplished 100% of the journals) and also those who attended the pre and posttests and wrote six journals out of seven (they wrote 85.7% of the journals). These students came up to be only sixteen. The researcher did not include students who wrote less than six journals for fear of affecting the results of the experiment. Similarly, students who represented the control group were those who attended the pretest and the posttest, and these were only seven students.

2.2 Procedures

The procedures went through three steps: a pre-test, the experiment with journal writing as a weekly requirement task and a posttest.

2.2.1 Pre-test

The hypothesis upon which the experiment was based sought to determine whether writing weekly journals would enhance students’ cognitive critical thinking skills or not. Hence, the purpose of the pretest was to measure these skills, and the purpose of the posttest was to measure the same skills to determine whether there had been some development after conducting the experiment or not. The modified critical thinking test discussed in the following section was used as the pretest of the experiment. Students were given 40-45 minutes to answer all questions.

2.2.1.1 Modified critical thinking test and rubrics for marking it

Fearing that students might get their answers correct just by luck if the questions used in the test were multiple choice ones, the researcher decided to use open ended questions that require some writing from the students. These questions have to be valid and reliable, but validity and reliability of a test are not easy to achieve; therefore, the researcher decided to look for readymade questions to assess students’ cognitive critical thinking skills after aligning these questions to Bloom’s (1984) taxonomy.

Gardner’s (2005) New Directions was once used by the researcher to develop students’ Reading, Writing and Critical Thinking. Therefore, she decided to use one of its readings once more with some modifications to adapt to Bloom’s (1984) taxonomy. The researcher chose Tannen’s (1990) article on the difference between men and women in communication and the questions accompanying the reading. She chose this particular article because she thought it might be appealing to current students as it were appealing to former students in previous semesters. Questions that follow the reading tackle main ideas, reflecting on content, summarizing and paraphrasing, vocabulary and discussion. The researcher’s main aim was to find questions that align to the levels of Bloom’s (1984) taxonomy to measure students’ critical skills before and after the experiment. She used the questions accompanying the article as pre and posttests. Some of the questions were used as they are; others were modified to correspond to the cognitive level under discussion (see Appendix A).

Still, marking the test was another challenge that faced the researcher. Due to the fact that the semester was a short one and each instructor was trying to finish up his/her work before the final exams, there were no available colleagues to double mark the test to achieve an inter rater reliability and avoid any subjectivity. Therefore the researcher was the only person who marked the test.

An additional challenge that faced the researcher were the rubrics she would follow to mark the test. Inspired by Ennis & Weir (1985) criteria for scoring their essay test, the researcher graded 1 for correct answer, 0 for no response and -1 for wrong answer. However, when piloting these criteria, it was found that some students answered partially
and some had better answers than others. Even students who had wrong answers could not be graded -1 because at least they have attempted to achieve the task. Besides, when referring to international marking criteria as those of assessing the writing of the International English Language Testing System (IELTS) exam, for instance, it was found that there are no bands with a negative, as -1, and band 1 is awarded if the “answer is completely unrelated to the task” and band 0 is given if the student “does not attempt the task in any way” (“IELTS Task 2 Writing band descriptors (public version)”, n.d., p. 2). Consequently, the criteria for scoring students’ responses in the current experiment were modified to be as follows:

0 = no response
1 = response is unrelated to the required skill
2 = response addresses the skill in a minimal way
3 = the student responds semi-adequately/partially/incompletely
4 = the student responds adequately (Note 3).

Language was not graded because the focus was on the cognitive critical skills not on the language.

It is worth mentioning that the researcher herself did not have enough time to mark the pretest before conducting the experiment since she also had to finish her teaching before the final exams. So, the pretest was given to students, then the experiment was carried out, then the posttest was administered, and after the semester ended, both tests were marked.

2.2.2 Experiment

As an additional component related to the course, seven weekly journals were given to students throughout the semester. Students were given from two to four prompts to write about (see Appendix B) in 15-20 minutes. Journals were not corrected by the teacher. They were just used as a technique that allowed students to reflect on what they were taught throughout the week.

Fearing that students might not complete the journals if the task was given as a handwritten homework or online assignment, students were asked to complete the task in class in pen. Also, fearing that students might lose their journals since they were not used to such a technique, the teacher collected all the journals and kept them with her. In order to motivate students to write the journals, they were told that they would get extra credit points in the coursework when completing the journals.

2.2.3 Post test

Once again, the modified critical thinking test discussed in section 2.2.1.1 was used as the posttest of the experiment to see whether there was development in student’s cognitive critical thinking skills after the experiment or not. Students were given 40–45 minutes to answer all questions. After finishing the semester, the pre and posttests were marked by the researcher using the scoring criteria discussed in section 2.2.1.1. In an attempt to be as objective as possible, the researcher marked the questions horizontally; i.e. one question was marked in both groups and in the pre and posttests, then another question was marked in the same way until all seven questions were graded.

3. Results and Discussion

When comparing the mean of the pretest in the experimental and the control groups using a t test, it was noticed that there was no statistically significant difference between the levels of the two groups since the p value = 0.7354 (p > 0.05). This is normal since both groups were of the same University level. The difference in the scores of the answers to the seven questions between the two groups did not surmount to one grade (Figure 1).
On the other hand, when comparing the mean of the posttest in the experimental and the control groups using a $t$ test, it was found that the difference between the two groups was extremely statistically significant since the $p$ value = 0.0001 ($p < 0.05$). The cognitive critical thinking skills of the experimental group surpassed those of the control group in the answer of all seven questions (Figure 2), and the difference between the two groups exceeded two grades (more than 50% difference) in some answers. This result agrees with all the previous literature on the importance of journal writing to the learning process, and it strongly validates the hypothesis upon which the study was based.

Furthermore, when comparing the results of the pre and posttests of the experimental group to those of the pre and posttests of the control group (Figures 1-2), it was found that the cognitive critical thinking skills of the experimental group had developed and those of the control group had deteriorated. The experimental group had shown slight improvement, and a $t$ test assured that the development was not statistically significant since the $p$ value = 0.3910 ($p > 0.05$). In contrast, the control group had drastically declined, and this decline was proven by a $t$ test where the $p$ value = 0.0014 ($p < 0.05$) which meant that there was a statistically significant difference in the control group cognitive critical thinking skills.
thinking skills before and after the experiment. This result would demonstrate the fact that journal writing was the only factor that prevented the degeneration of the experimental group cognitive critical thinking skills, which coincides with the literature on the importance of journal writing and validates the hypothesis upon which the experiment was based.

4. Conclusion

4.1 Summary

The purpose of this article was to report on a quasi-experiment where journal writing was an additional task to an academic writing course in an Egyptian private university. It was hypothesized that journal writing would develop students’ cognitive critical thinking skills. A modified critical thinking test was used to measure students’ cognitive critical thinking skills before and after the experiment. Results, which are consistent with all the literature, indicated that journal writing plays an important role in developing students’ critical thinking skills, and they also showed that journal writing prevented the regression of students’ cognitive skills since it was the only added variable to the experimental group and all other variables were controlled.

4.2 Limitations and implications for further research

The study was limited by the number of participants. Only sixteen students represented the experimental group, and seven students only represented the control group functioning as a convenient sample. The study could be duplicated with a larger sample that is randomly chosen. Time constraints and the nature of the course were other limitations. Only seven weeks were dedicated to the experiment in an essay writing course where the information related to content and ideas is so limited. It is recommended to devote more time to the experiment and to apply it to other courses and other disciplines in order to be able to measure the effect of journal writing on the development of students’ cognitive critical thinking skills.

Journals being kept with the teacher was also a limitation since students were not able to refer back to them anytime, which resulted in the teacher being the only source of knowledge. It is recommended to keep journals with students in portfolios (handwritten or electronic) as a means of promoting autonomous learning; thence diminishing the role of the teacher in the classroom (Lo, 2010) and developing students’ critical thinking skills when they analyze and evaluate their own writing for the purpose of improving it (Paul and Elder, 2006). After getting students used to journal writing, it is recommended to correct the journals and assess students’ understanding of the prompts; hence checking the validity of the questions. Journal writing may also be used as a tool of promoting students’ language proficiency level if students are given feedback on what they have written.

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References


Notes

Note 1. Spring 2014 was a short semester. It was only ten weeks due to the political situation in Egypt after the 30th June Revolution and the preparation for the new Presidential Elections. The instruction weeks were only seven, and three weeks were for revision before midterm exams and final exams, students’ presentations and submissions of problem-solution essays.

Note 2. Mass Communication students, in particular, were chosen to be the participants of the experiment for mere administrative issues.

Note 3. The ideal situation was to train some colleagues on the scoring criteria and then ask them to grade the pre and posttests to reach inter rater reliability.
Appendix A

Questions that measure comprehension:

Questions that measure comprehension should demonstrate understanding of facts, main ideas, summarizes and paraphrases (Fowler, n. d.).

1) According to Tannen, what are the major differences in the ways females and males use language? (This question was copied as it is from Gardner (2005)).

2) What is the main point Tannen makes in the article? Summarize her central idea in one or two sentences. Use your own words. Begin the sentence “In her article, “Sex, Sighs, and Conversation”, Deborah Tanen maintains that …”. (This question was copied as it is from Gardner (2005)).

3) Paraphrase/Rephrase the following sentence: (This is one of the many ways that men value oppositional stances, whereas women value harmonious ones. (par. 9). (This question was copied as it is from Gardner (2005)).

Questions that measure application:

Questions that measure application should apply acquired knowledge in a different way (Fowler, n. d.). Here students should apply acquired knowledge from the article to talk traditional female and male roles.

4) How do gender differences in language use that Tannen discusses reflect traditional female and male roles? (This question was shortened from the original that is “How do gender differences in language use that Tannen discusses reflect traditional female and male roles and expectations? Give at least two examples.” The question was shortened to make students focus only on applying the knowledge they gained from the article to traditional females and males roles and not to think of situations where these roles are exemplified. The researcher wanted students to do only one thing when answering questions related to lower order skills.

Starting from the following questions that tackle higher order skills, the questions are more complex. Students were asked to respond to two levels of the taxonomy in one question.

Questions measuring analysis and synthesis:

Questions measuring analysis should break information found in the article by making inferences and finding evidence to support generalizations, and those measuring synthesis should combine information in a new pattern (Fowler, n. d.).

5) Describe how your friendships with females differ from those with males. Justify your answer from the article. (The justification part was added to the question for the purpose of combining information in a new pattern)

Questions measuring analysis and evaluation:

Questions measuring analysis should break information found in the article by making inferences and finding evidence to support generalizations, and those measuring evaluation should present opinion by making judgments about information (Fowler, n. d.).

6) In the last paragraph, Tannen refers to gender differences as “cross-cultural.” What does she mean by this? How accurate do you think her characterization is? (This question was copied as it is from Gardner (2005). It already involves two levels of the taxonomy).

Questions measuring evaluation and synthesis:

Questions measuring evaluation should defend opinion by making judgment about validity of ideas, and those measuring synthesis should present opinion by making judgment about information and propose a solution (Fowler, n. d.).

7) Do you agree with Tannen’s ideas about gender differences in language use and the problems caused by these differences? Why or why not? Propose a solution based on your experience and observations. (The last part of the question was only modified to allow students to synthesize).
Appendix B

Journal 1: Before starting anything in the course:
In this course, you are going to learn how to write an academic essay (a problem-solution pattern). You will also learn some Reading strategies and Writing techniques. So,

1. Why do you think this course is important to you?
2. What do you hope to gain from taking this course?

Journal 2:

1. What Reading strategies have you learnt this week?
2. What did you find easy and what did you find difficult?
3. Did you find the Reading passage easy or difficult? Why?

Journal 3:

1. What have you learnt about the Writing process this week?
2. What have you learnt about writing Introductions?
3. Did you find writing Introductions easy or difficult? If it is difficult, how can (you/your teacher help you) to work on it?

Journal 4:

1. What have you learnt about summary, paraphrase and quotation?
2. What have you learnt about author(s) in-text citation?
3. Did you find this week’s material easy or difficult? How can you work on the difficulty?

Journal 5:

1. What have you learnt about Conclusions this week?
2. What have you learnt about strong and weak arguments?
3. Did you find this week’s material easy or difficult?
4. Did you find all the materials taken before midterm easy or difficult? What are your suggestions?

Journal 6:

1. What have you learnt about the structure of the problem-solution essay? State the components of the Introduction, Body and Conclusion?
2. What have you learnt about full citation this week? How can you relate this to in-text citation?

Journal 7:

1. What have you learnt about persuasive techniques?
2. What have you learnt about inferences?
3. What is your overall evaluation of the course?